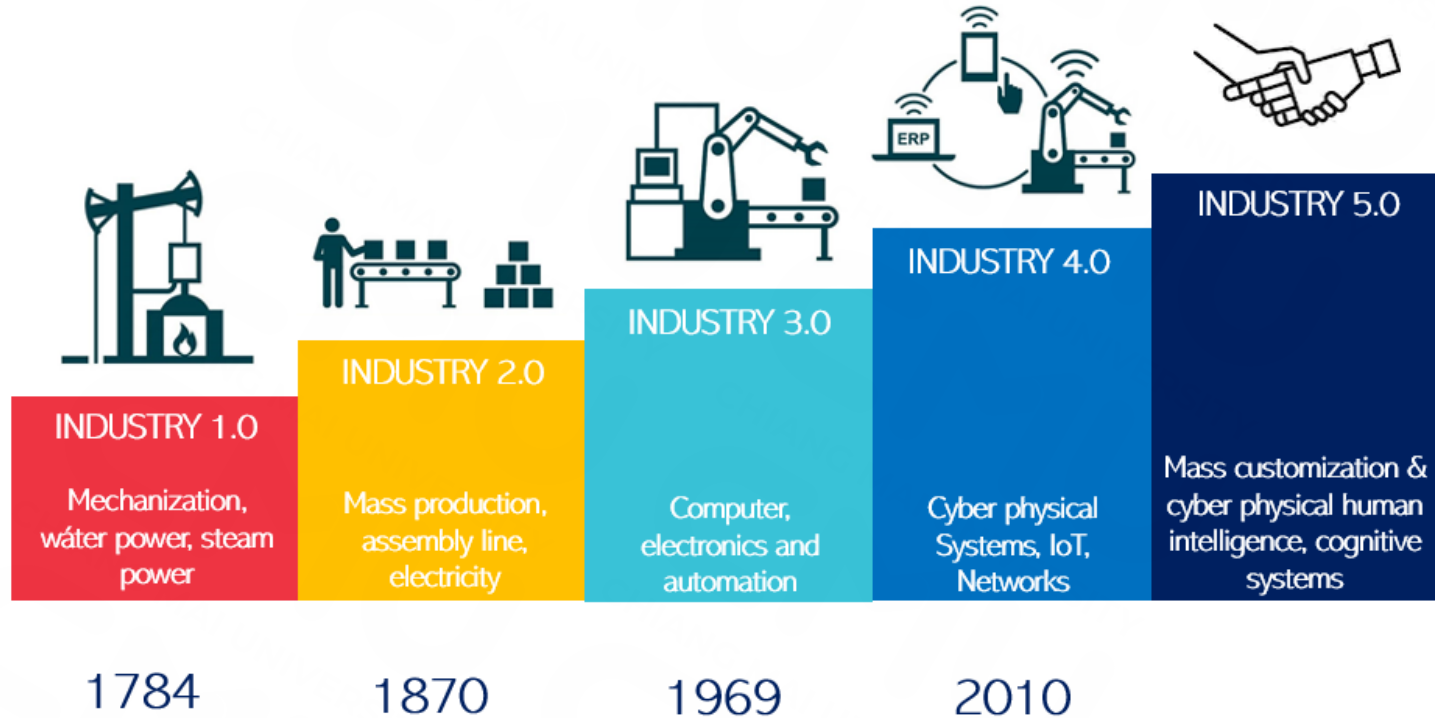


NUS's Experience in Navigating Transformation

Prof Tan Eng Chye
President, National University of Singapore

Key Impetus



**Years are estimates*

Changing Demands of the Workplace

‘New Era Of Turbulence’: The World Economic Forum Predicts 25% Of Jobs Will Change Over The Next Five Years

May 1, 2023

Global employers anticipate creating 69 million new positions by 2027 and eradicating 83 million jobs—a **net loss of 14 million roles**.

To ensure that workers can adapt to these fast changes in the workplace, companies will also look for **resilience, flexibility, agility, motivation, self-awareness, curiosity and constant learning**.

Forbes

Need to equip Singaporeans with in-demand skills as uncertainties shake job market: Tan See Leng

Nov 3, 2022

There is a pressing need to equip Singaporeans with the **necessary skills to compete on a global scale**, as shortening economic cycles and **increasing market volatility** bring about more frequent **employment shocks**.



39%

of workers' existing skill sets will be transformed or become outdated over the 2025-2030 period

Source: World Economic Forum,
Future of Jobs Report 2025

“With a **shortening half-cycle of knowledge** and skills and the **rapid turnover** in market cycles, the workforce will need to **continually upskill and reskill**”

Source: Ernst and Young,
Are Universities of the Past
still the Future?



Top 10 Core Skills for 2030

Source: World Economic Forum,
Future of Jobs Report 2025

- | | | | |
|---|------------------------------------|---|-------------------------------|
| 1 | AI & Big Data | 6 | Leadership & Social Influence |
| 2 | Technological Literacy | 7 | Talent Management |
| 3 | Creative Thinking | 8 | Analytical Thinking |
| 4 | Resilience, Flexibility, & Agility | 9 | Systems Thinking |
| 5 | Curiosity & Lifelong Learning | 1 | Motivation & Self-Awareness |

Importance of Leadership Driving Transformation



- Shapes vision to address global shifts.
- Drives innovation and collaboration.
- Builds resilient, future-ready cultures.

Appointment of Deans



Provost, in consultation with President, appoints Search Committee (SC) comprising -

- ✓ Senior faculty members from School, University-level leaders (e.g Vice Provost, Academic Affairs), and advisory board members or external stakeholders

- ✓ May be facilitated by an international search firm
- ✓ Internal & external candidates
- ✓ Vision talk by final candidates
- ✓ Dialogue with key members of community/stakeholders
- ✓ Feedback from School staff members

- ✓ SC recommends final candidate to Provost
- ✓ Provost recommends to President for endorsement

- ✓ By Remuneration Committee of the NUS Board of Trustees

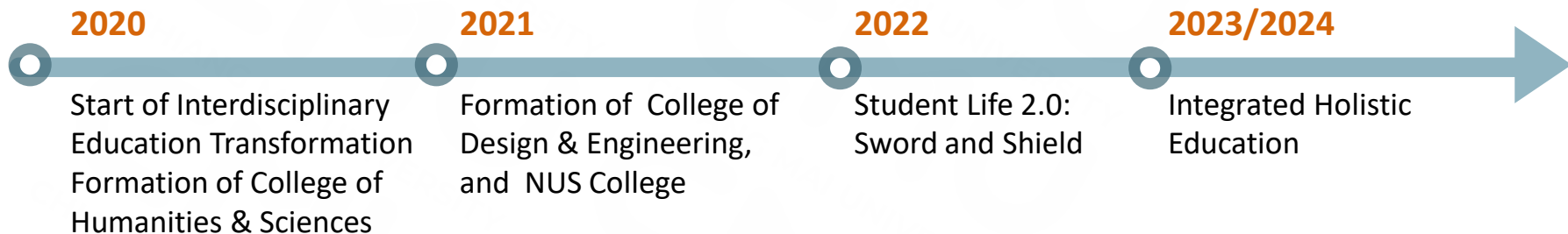
Concurrently, process academic appointment

NUS's Transformation Initiatives – Key Milestones

Digital and AI Transformation

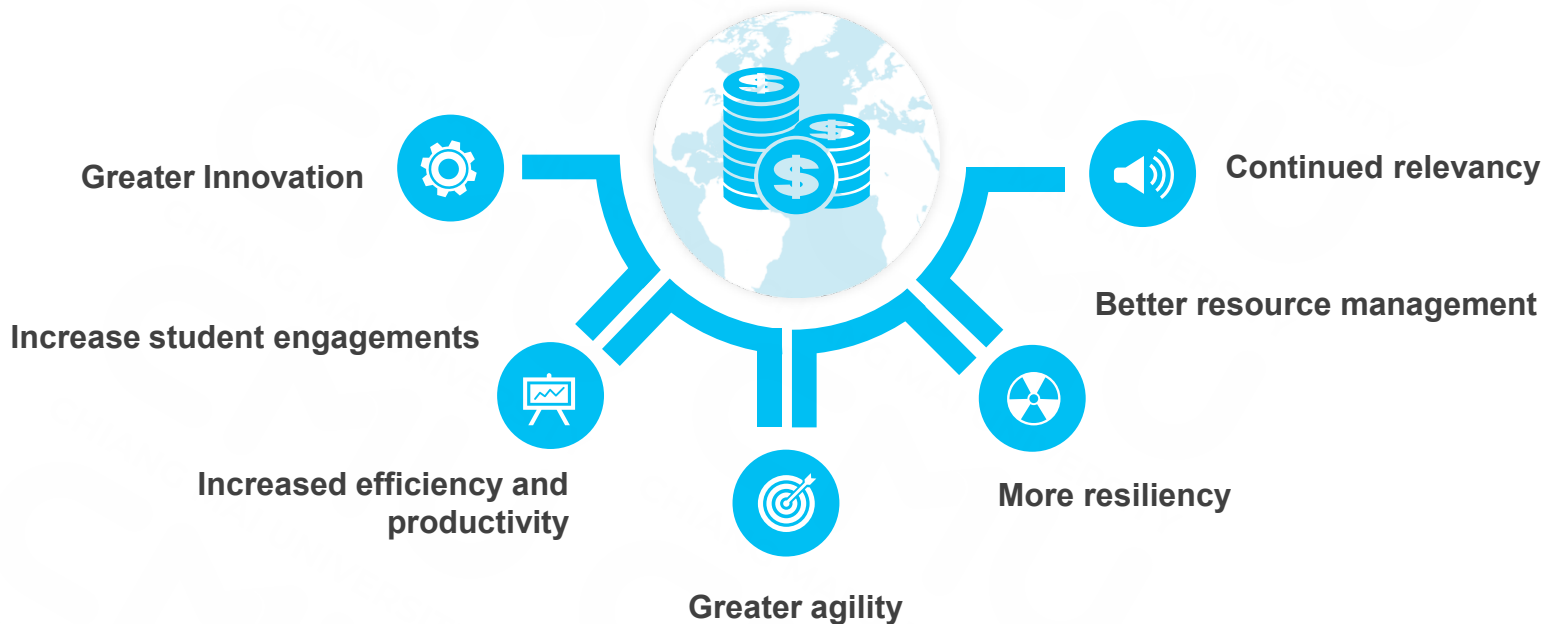


Curriculum Transformation



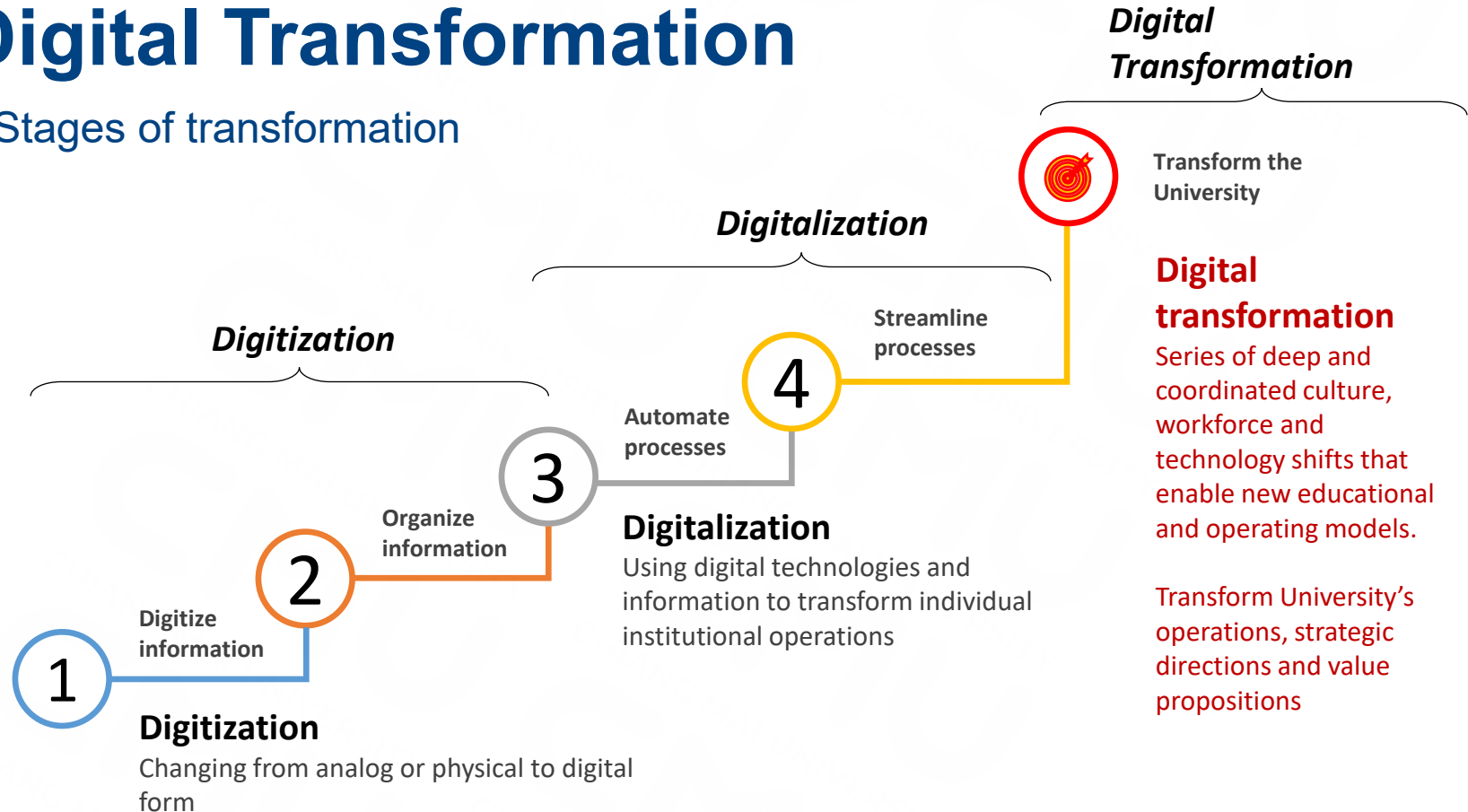
Digital Transformation. Why?

- **Benefits**



Digital Transformation

- Stages of transformation



NUS's Journey

Since 2018, NUS has embarked on an Organisational Excellence & Transformation (OE&T) journey. The journey aims to:



Change the **culture** of the University towards one that is more effective and agile, in order to improve customer experience.



Provide opportunities for professional **growth** through enhanced learning and development options and opportunities.



Enable **professional** development through the professionalisation of the key corporate functions.

Modernise administrative systems and processes

Performance Indicators for Administration



Organisational Transformation

FTE Savings from
Organisational Transformation



Process Improvements

Man hour savings from process
improvements



Business Process Reengineering

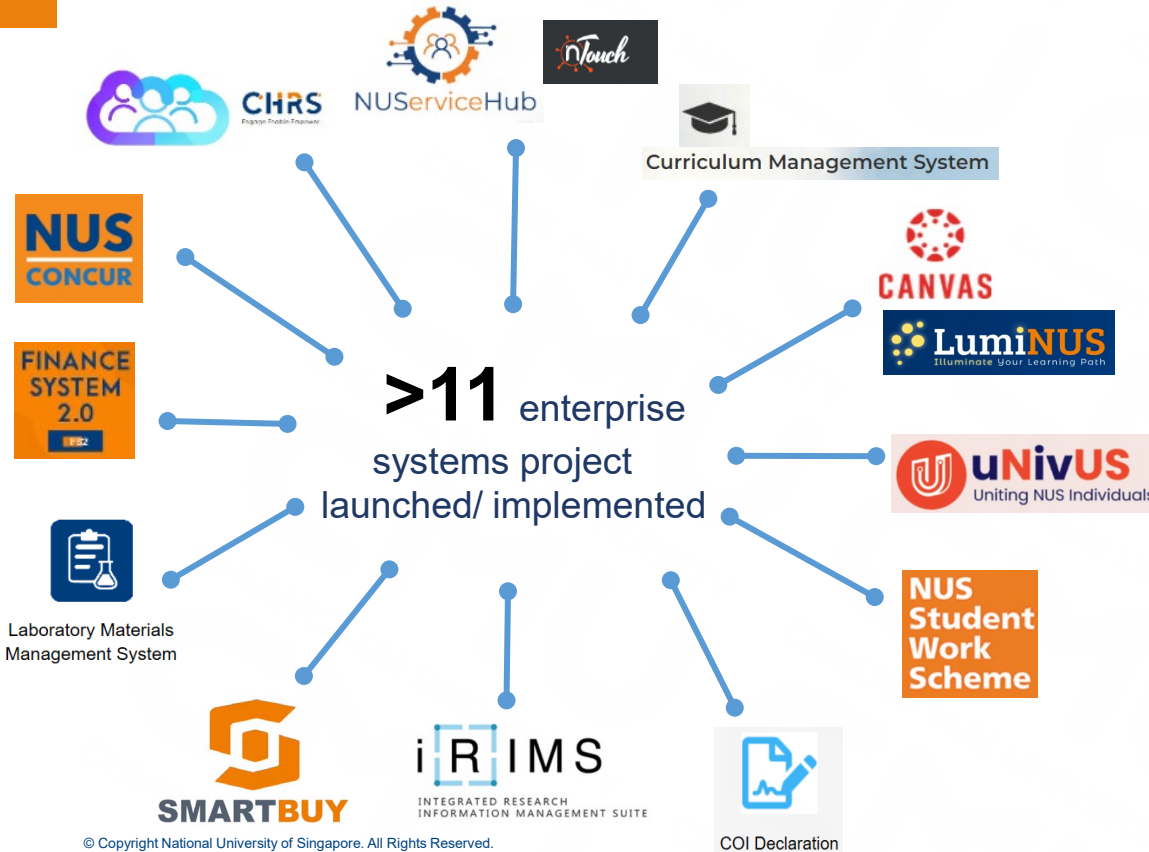
of processes reviewed
of processes improved
of processes digitalised
of steps reduced



Customer Satisfaction

CSAT scores from services
offered by administrators. i.e.
Shared Services CSAT Scores

OE Achievements and Impacts: Staff Development, Talent Management and NUS Enterprise Systems



5,500 staff trained in Digital Enablement tools



21 digital enablement tools introduced



28,000 Forms/Automated flows created
14,000 manhours saved

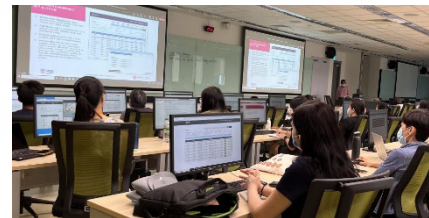
DIGITALLY EMPOWERING EDUCATION—●

We bring uncharted dimensions to the education realm through innovation and technology



Learning Management System

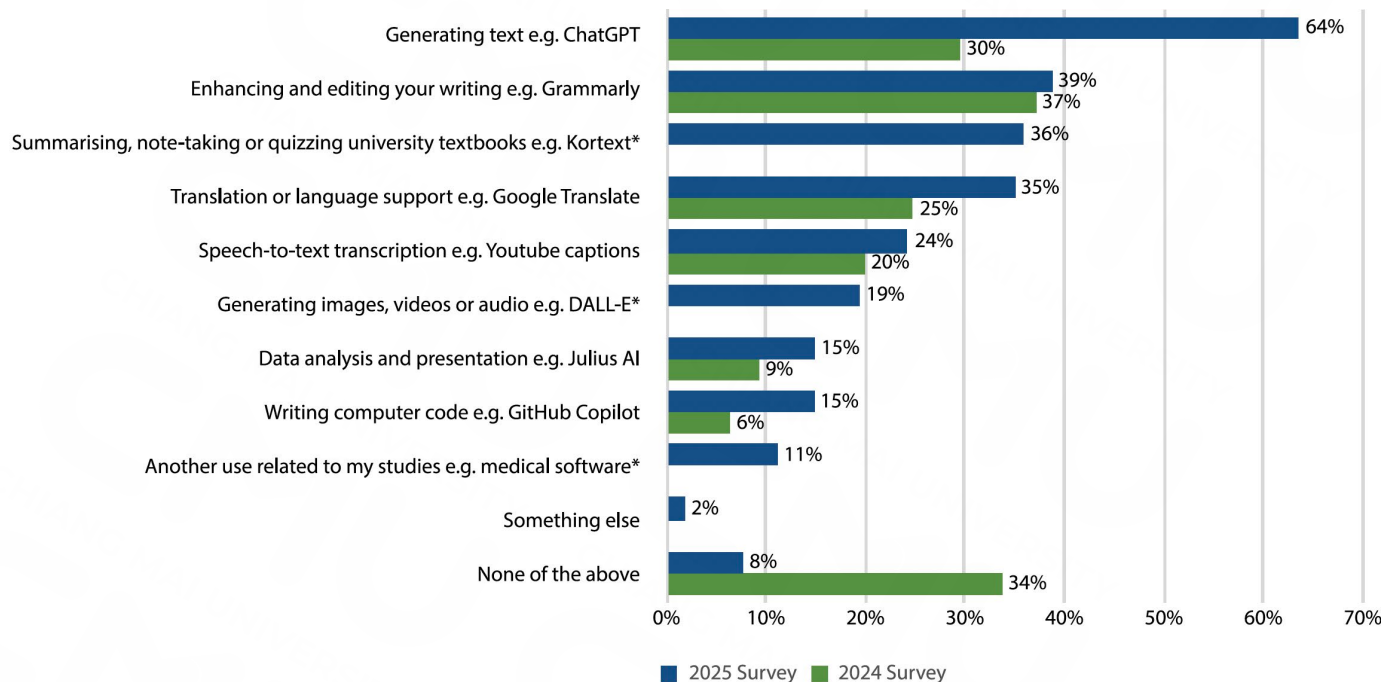
- Integrated digital platform that manages and delivers students curriculum
- Instructors can create digital content, lesson plans and courses and enrol students in a course. Can even monitor and assess students' performance
- Total of **1,000 courses** and **>100,000 enrolments** for both academic and non-academic courses



Curriculum Management System

- Online integrated platform where staff can create, publish and view student curriculum modules and programme proposals
- Single source of truth for all NUS curriculum information
- Houses **20,000 NUS modules**
- Used by **17 facilities and schools**

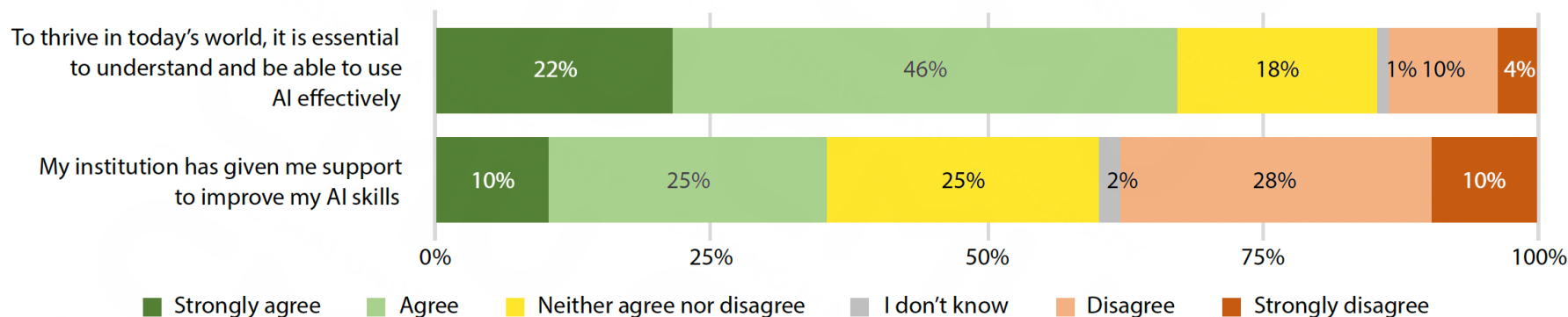
Student AI adoption has surged



Text generation is the most common use of GenAI by students

Majority of students acknowledge that AI skills are essential

However, only 35% agree that they receive support from their institution to improve their AI skills



AI Can Transform Many Industries



Healthcare



Logistics &
Manufacturing



Finance &
Economy



Education &
Social Sciences



Science:
Biology,
Chemistry...



Legal

AI could contribute up to
USD15.7 trillion
to the global economy
in 2030

Higher Education's AI Revolution



Enhancing
Personalized
Learning



Advancing
Research
Capabilities



Streamlining
Administrative
Tasks

Examples of AI Transformation in Universities



UNIVERSITY OF
TORONTO

Formed a task force on AI aimed at developing comprehensive AI readiness while upholding its core missions and values.

ETH zürich

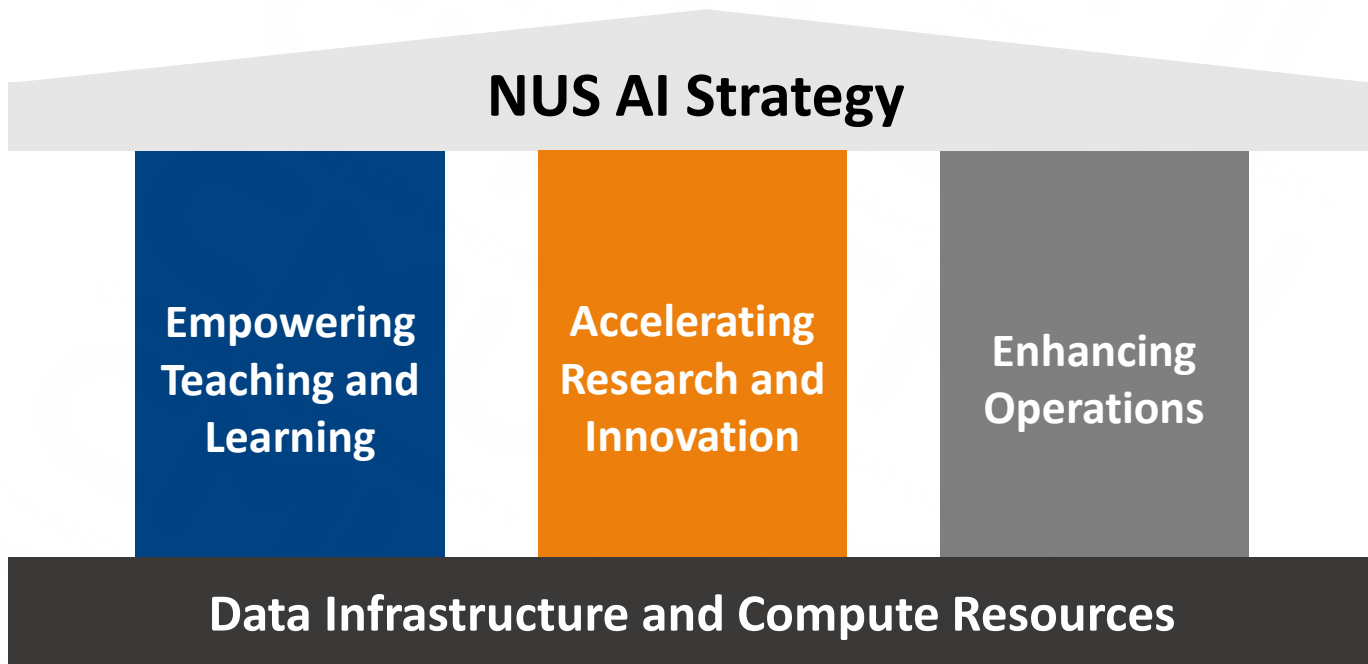
Developed an AI strategy for responsible integration across research, teaching, and administration



UNIVERSITY OF
OXFORD

Making significant investments in AI across research, education, and commercialisation

NUS's AI Pillars



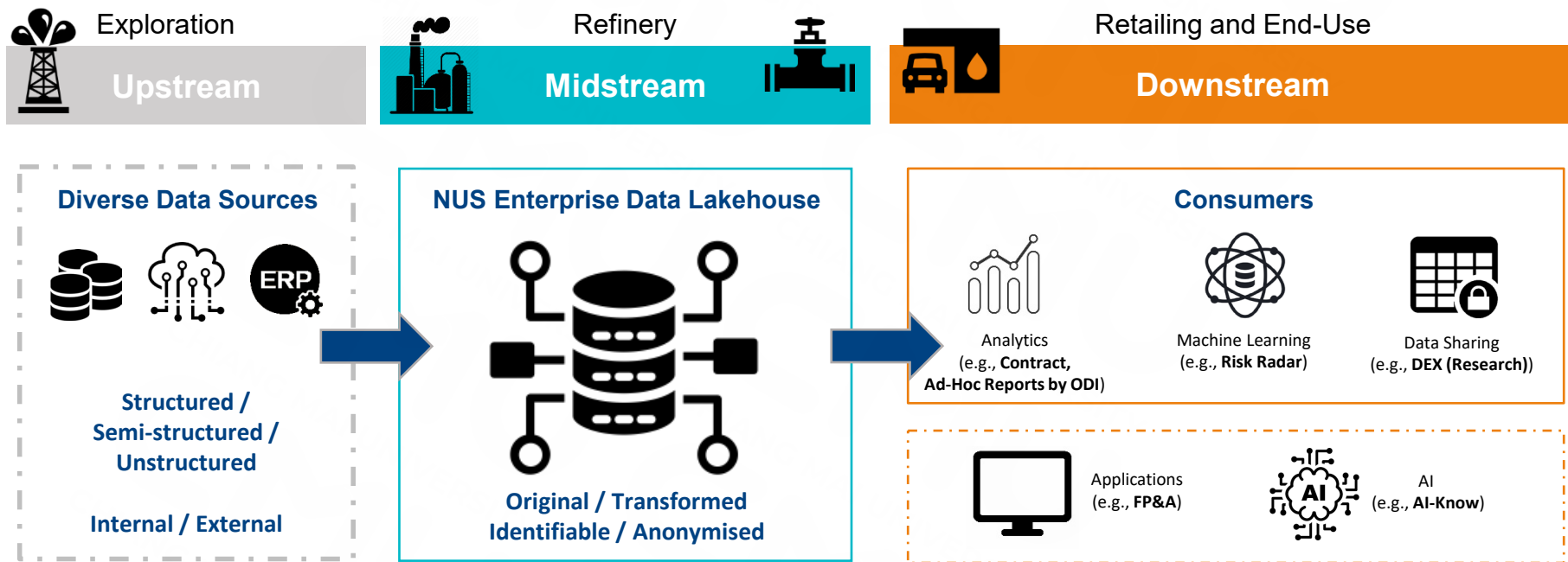
Data Infrastructure

- The most impactful uses of AI will rely on organisations' ability to utilize their unique and proprietary data.
- Data integration should be a priority for AI readiness.



Data Architecture

Rosetta enables New Enterprise and Self-service Capabilities through a **United Data Platform**.
It also builds the **NUS Enterprise Data Lakehouse** for the NUS Community to securely access and use.



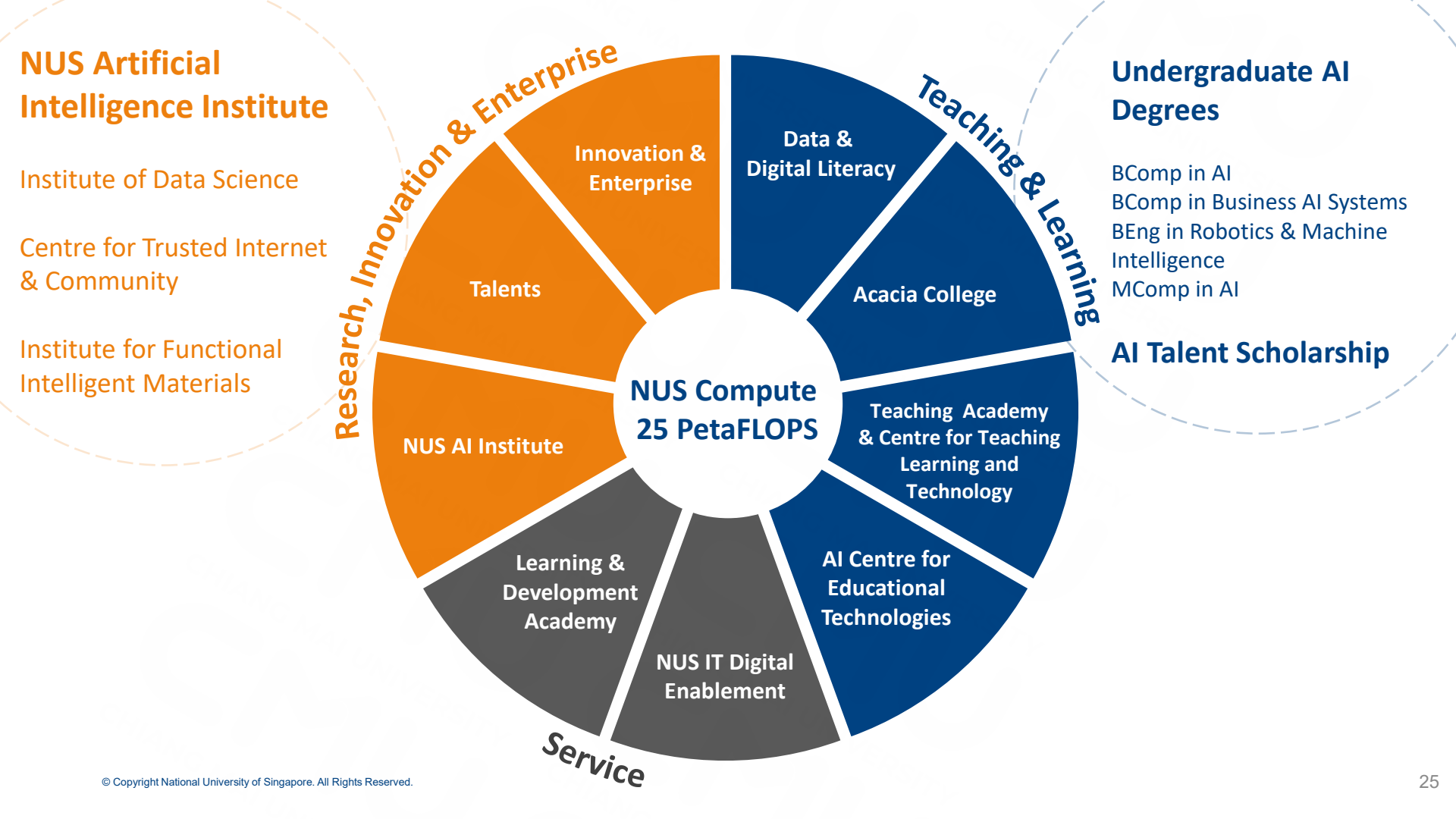
Meeting Research Demands for Foundational AI & AI-enabled Scientific Workloads



Plan: Deploy 46 GPU servers (25PF) to support AI and AI+X research

- **Status:** Deployed and available to researchers
- **Resource Highlights:**

#Servers	46
#GPU	368 H100 & H200 cards
Capability	24.9 PetaFLOPS
GPU-hours	3.2 Million/yr
Data Storage	7 PetaBytes



NUS Artificial Intelligence Institute

Institute of Data Science

Centre for Trusted Internet & Community

Institute for Functional Intelligent Materials

Undergraduate AI Degrees

BComp in AI
BComp in Business AI Systems
BEng in Robotics & Machine Intelligence
MComp in AI

AI Talent Scholarship



Challenges

Cognitive Offloading

Recent MIT experiment showed strong evidence that reliance on AI instead of developing foundational knowledge and thinking skills leads to shallow learning

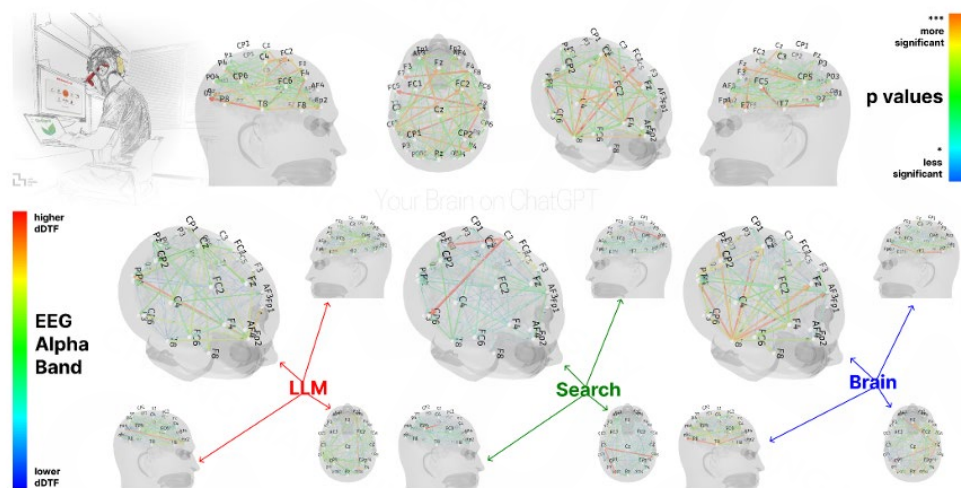


Figure 1. The dynamic Direct Transfer Function (dDTF) EEG analysis of Alpha Band for groups: LLM, Search Engine, Brain-only, including p-values to show significance from moderately significant (*) to highly significant (***).

- AI increases research productivity, but an **overdependence** by young researchers may weaken their problem-solving abilities, reduce independent reasoning, and decrease proactiveness and critical thinking.
- Long-term: Undermine the **quality** of future academic contributions.

Mindsets and Prejudice Against AI

- Misconceptions about AI among senior academics that slow adoption:
 - AI is a passing trend
 - AI promotes cheating
 - AI poses a threat to academic standards and values
- Prevalent amongst those who have not experimented or utilised a broad range of AI tools
- Need for more comprehensive training for academics



Jobs for Fresh Graduates

The “AI Job Apocalypse”

- Entry-level jobs for fresh graduates are rapidly disappearing
- Unemployment among recent graduates has surged as AI replaces human labour
- Companies now seek AI skills even for junior positions



AI's Impact on Software Developers

- Transformation/Reinvention of the craft
 - Need to evolve from Skeptic → Explorer → Collaborator → Strategist
- Essential AI-related skills needed
 - Include AI fluency, delegation and agent orchestration, human-AI collaboration, verification and quality control, product understanding, and architecture and systems control
- Implications for education
 - Curricula to include AI-assisted coding and AI collaboration
 - To assess students on their ability to frame problems, guide AI, critique solutions and debug complex outputs

**“Either you have
to embrace the AI,
or you get out of
your career.”**

Developer

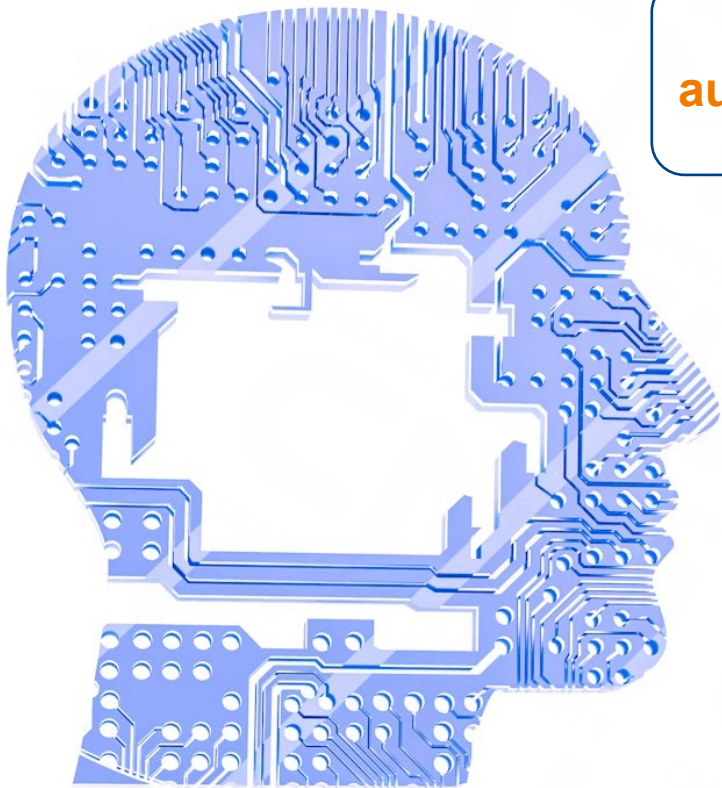


The Next Wave

AI Agents: The Next Wave

“AI models and algorithms that can
autonomously make decisions in a dynamic world”

– Jim Fan, senior research scientist at Nvidia



- **Agents:**
 - simple reflex
 - model-based reflex
 - goal-based
 - utility-based
 - learning
 - hierarchical
 - **multi-agent systems**
- **Examples of current agents:** Google’s Astra, OpenAI’s GPT-4o, Zapier (workflow automation software), customer service bots, coding assistants, etc.

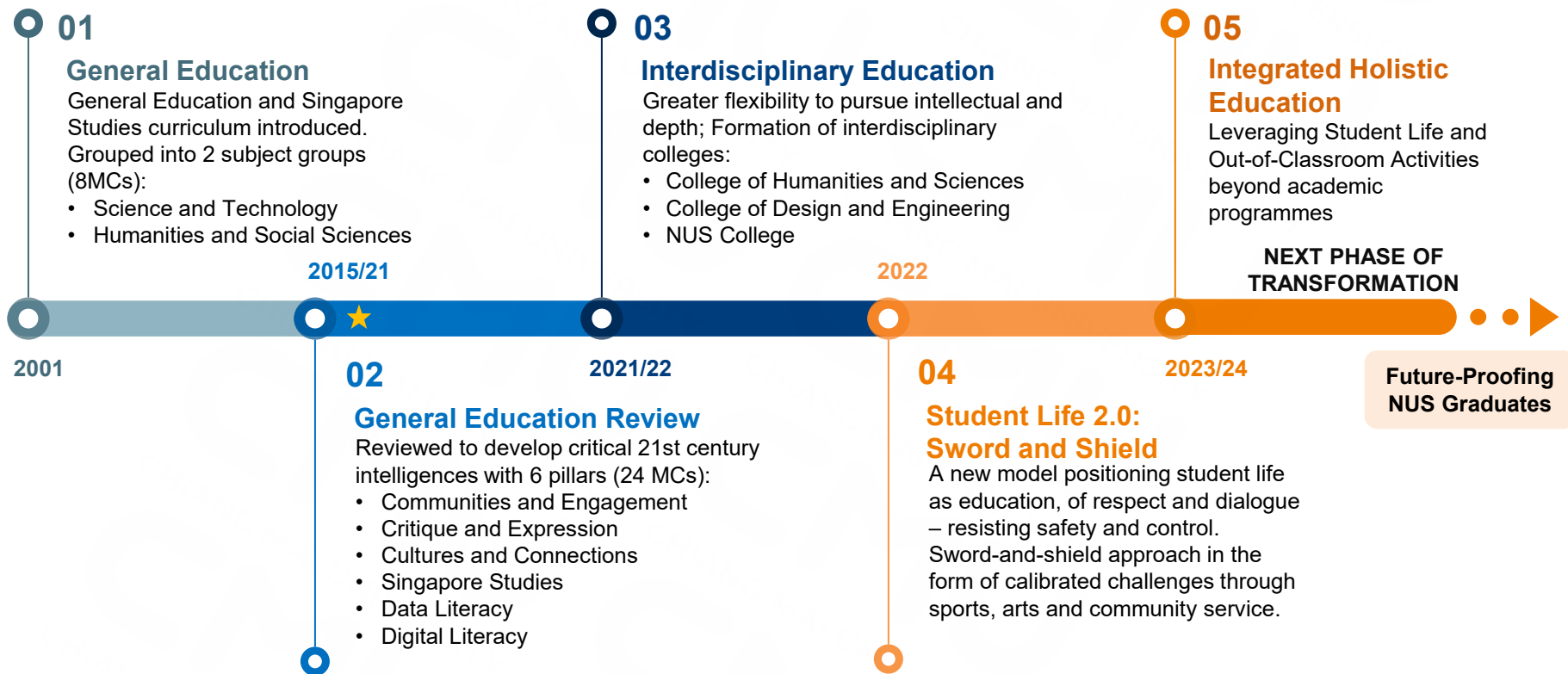


THANK YOU



Curriculum Transformation

Charting NUS' Curriculum Transformation



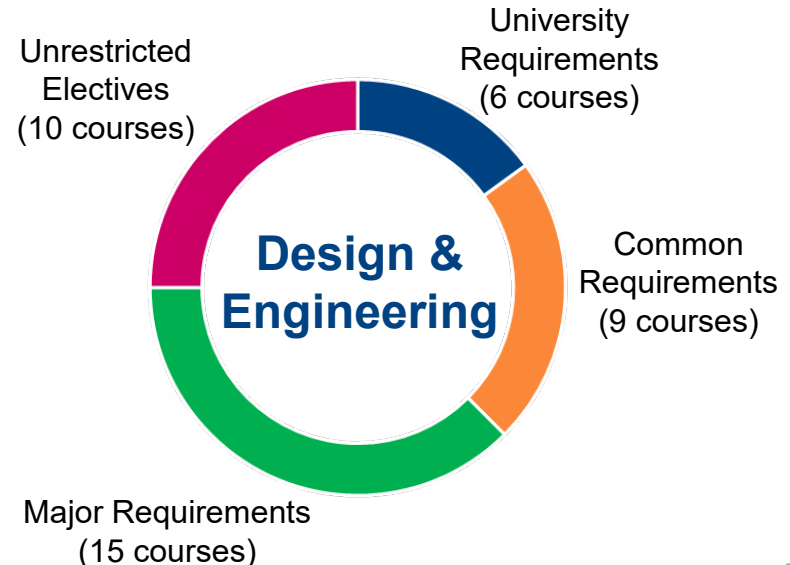
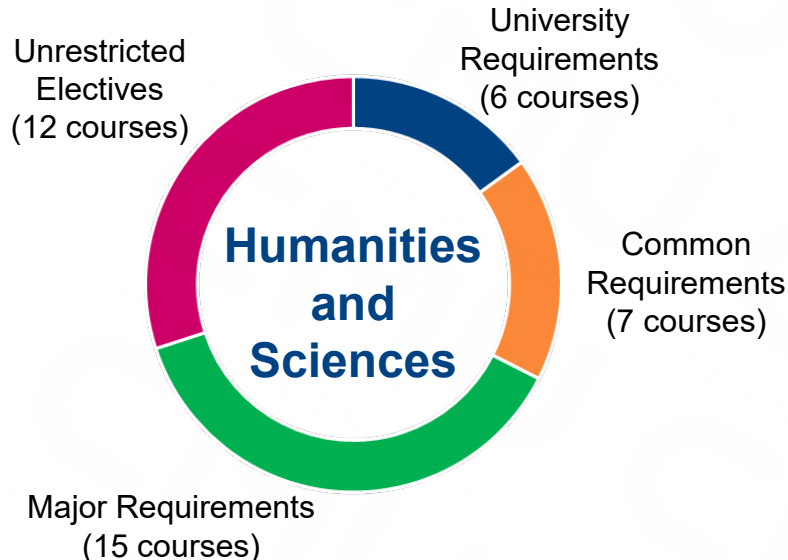


Why the Huge Change?

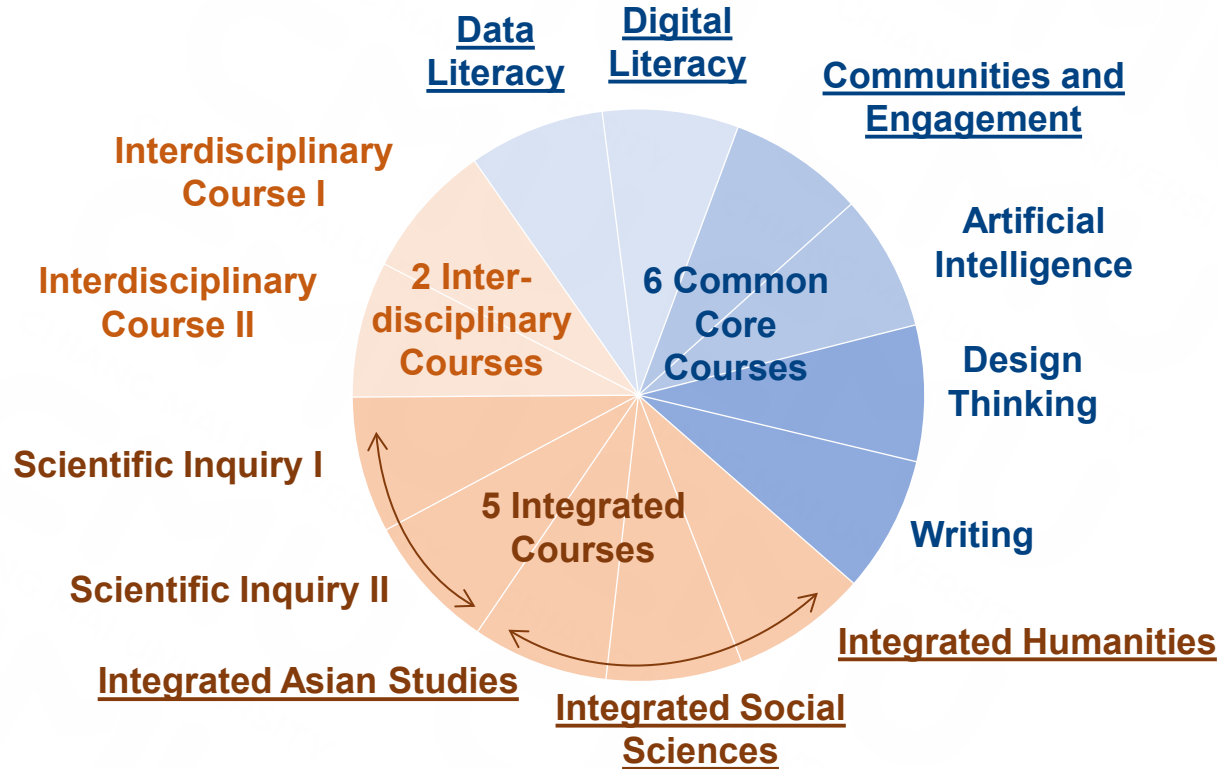
- Broadening the **intellectual foundations** of our graduates, through a 3-semester Common Curriculum
- **Interdisciplinary teaching and learning** to enhance the problem solving capability of our graduates
- Making **lifelong learning** part of the DNA of our graduates

Broad-based Intellectual Foundation

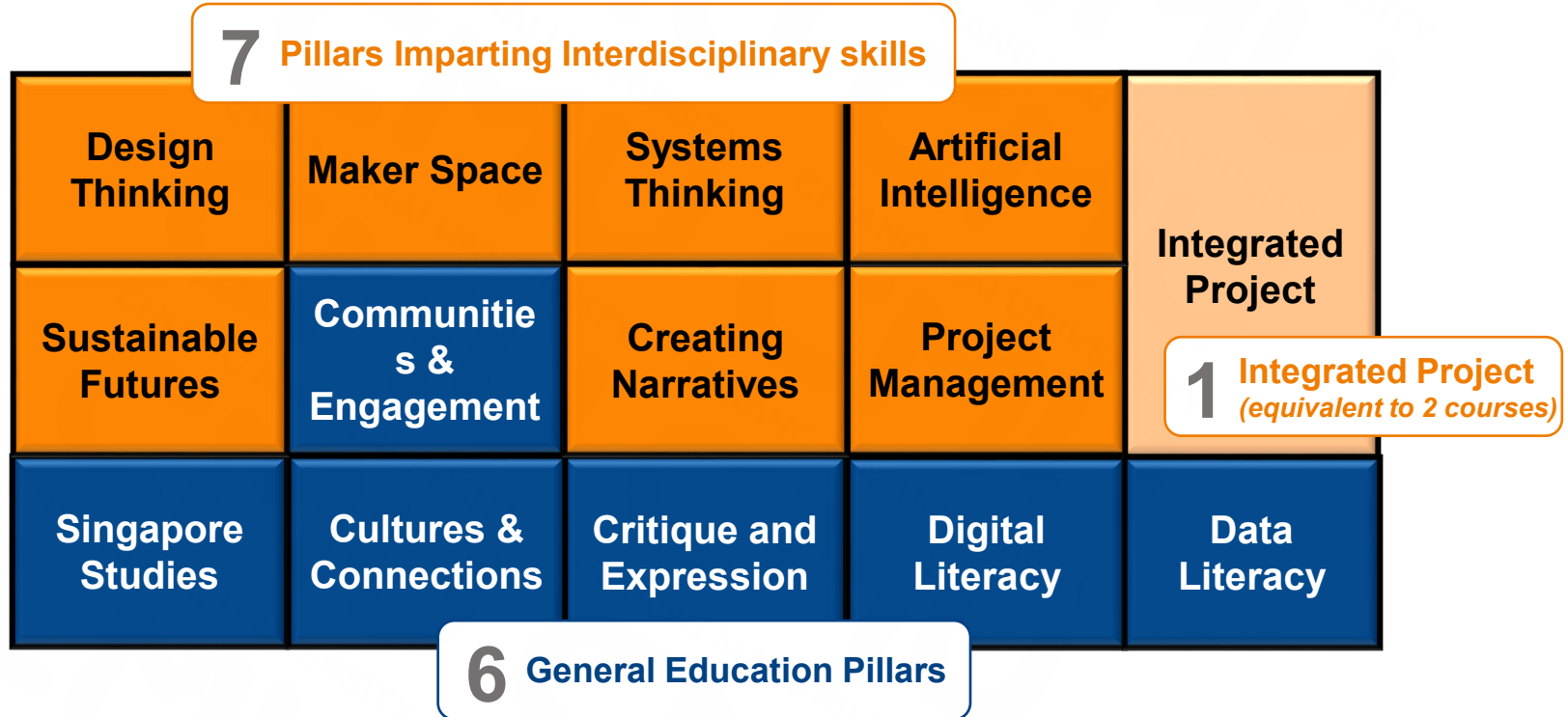
- **Common college requirements** to build strong foundation
- **Compact major requirements** to allow essential disciplinary education
- **Expanded unrestricted electives** to facilitate choice



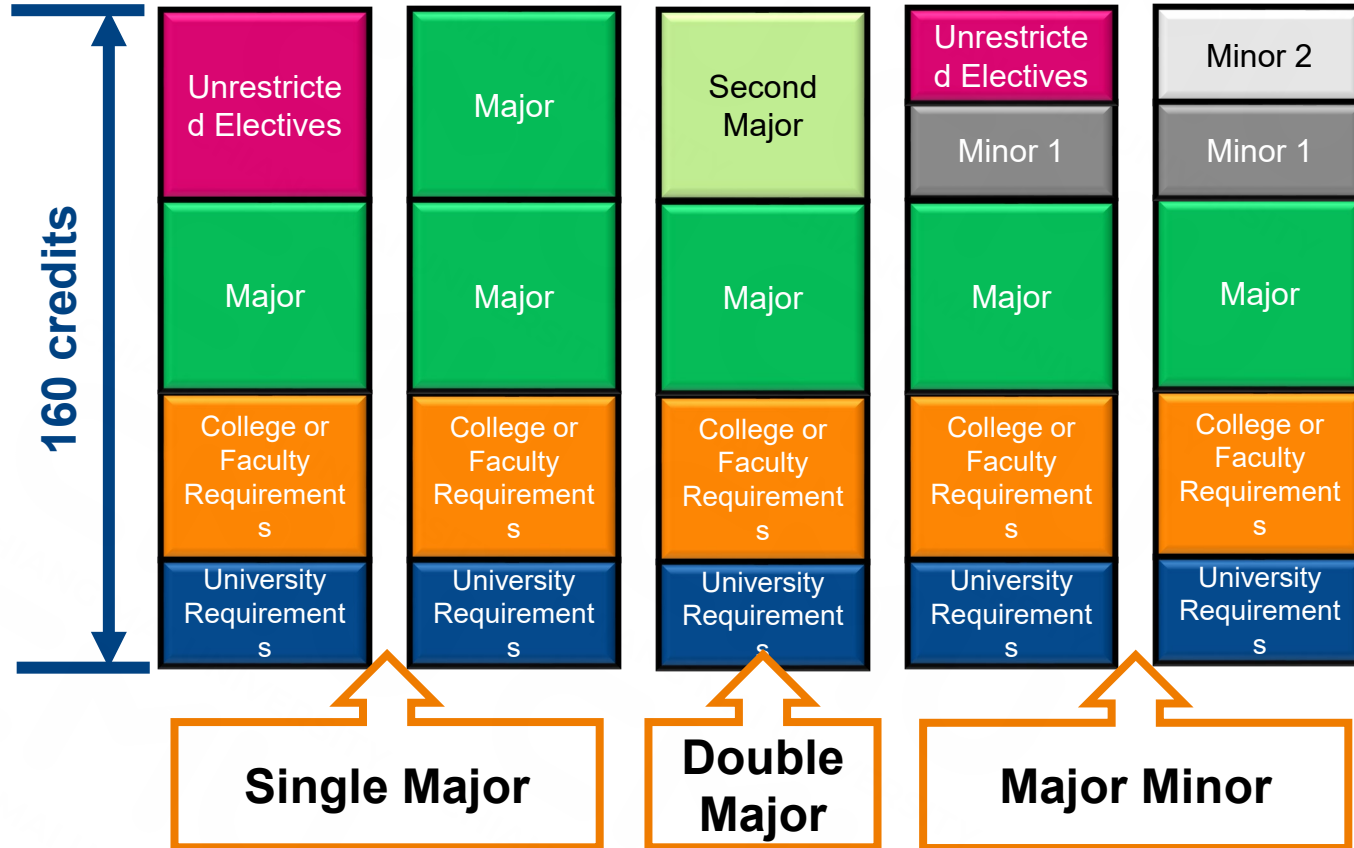
Humanities & Sciences



Design & Engineering



Curriculum Structure



NUS College

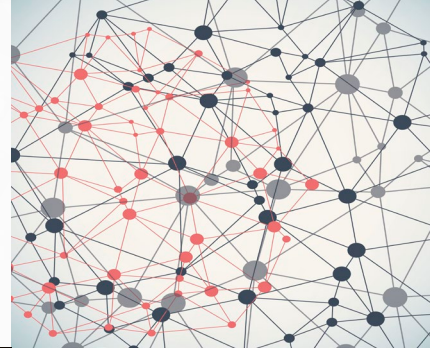
**Critical
Competencie
s
(4 courses)**



**Global
Orientation
(3 courses)**



**Making
Connections
(6 courses)**



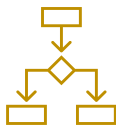
**Impact
Experienc
e
(1 course)**





Organisational Excellence (OE)

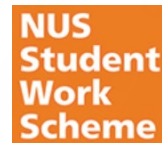
NUS Achievements 01



>500 of initiatives and work processes reviewed and streamlined



7 phases of the professionalisation of corporate functions



>43,000 manhours saved
>52,000 payment transaction
>\$23M payment processed via NSWS
(from 2020 till Aug 2022)



5,500 staff trained in Digital Enablement tools



21 digital enablement tools introduced



45,499 DocuSign envelopes sent
22,750 manhours saved



28,000 Forms/Automated flows created
14,000 manhours saved

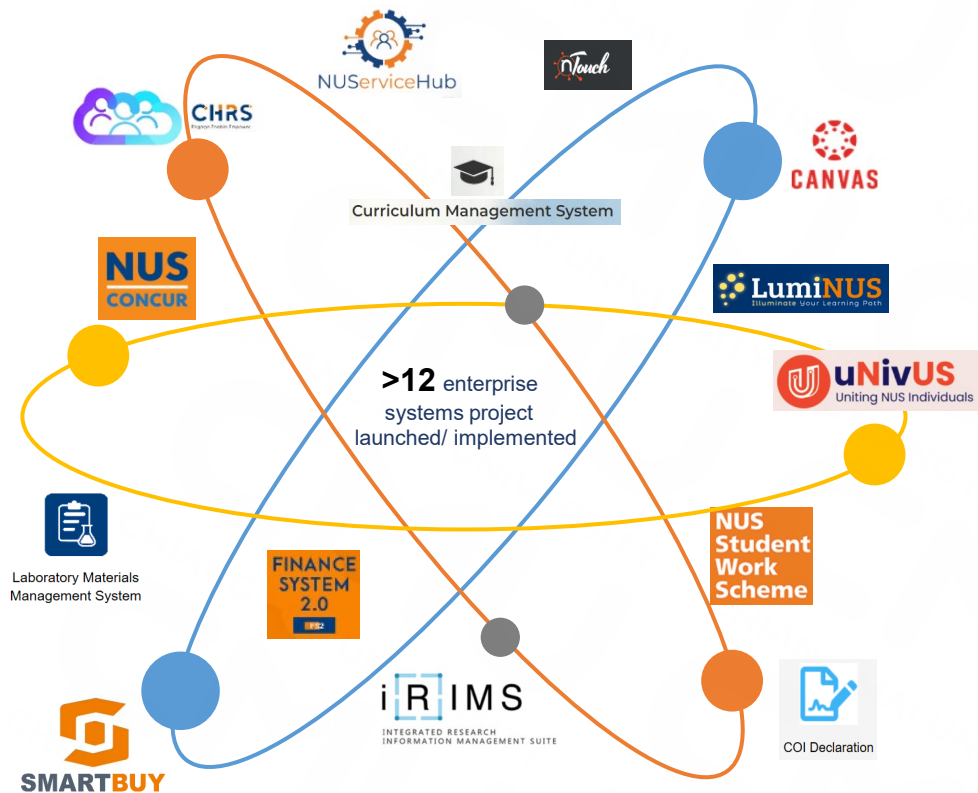


463 staff were professionalised



143 active bots created

NUS Achievements 02



© Copyright National University of Singapore. All Rights Reserved.



\$35.4M cost savings through procurement category management
(from 2020 till Mar 2023)



NUS perceived as **Agile** for 4 years in a row



>3,600 staff completed DLP
>4,400 staff completed AICC
>1,000 staff completed BPR
(as of Dec 2023)

NUS OE Journey

2018

Start of OE journey

1. Study and design of key corporate functions' organisational structure
2. University-wide review of policies and processes
3. Business Process Re-engineering training of staff for application in OE projects (on-going)
4. Formation of Organisational Excellence Transformation Unit (OETU)

2020

1. Enterprise systems projects launched for SESAMi enhancements, LMPRS, CHRS, Concur, iRIMS, FS2
2. Launch of Organisational Agility Survey
3. NSWS system developed to streamline hiring of NUS students
4. Launch of uNivUS app

2022

1. Completion of NUService Hub, iRIMS and FS2
2. Review and development of the Research Shared Services model (on-going)
3. Convening of the University-wide conversations on the Future of Work (on-going)

2019

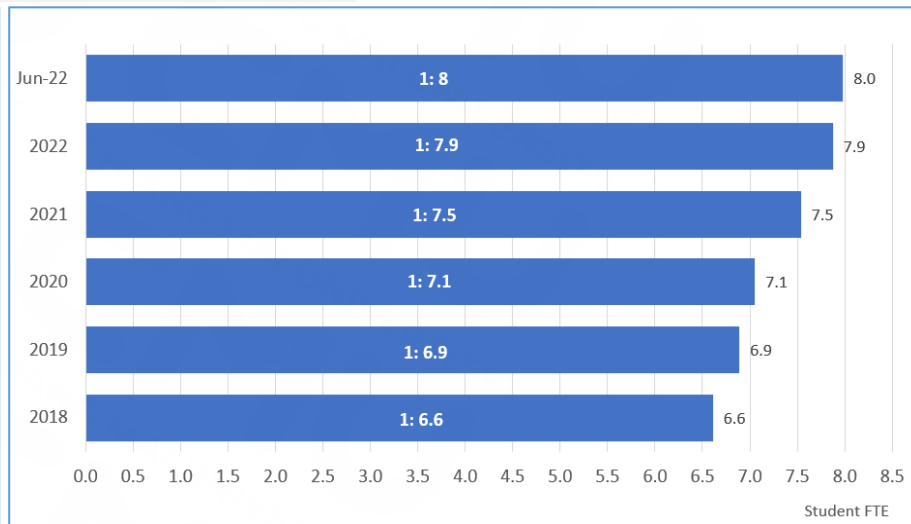
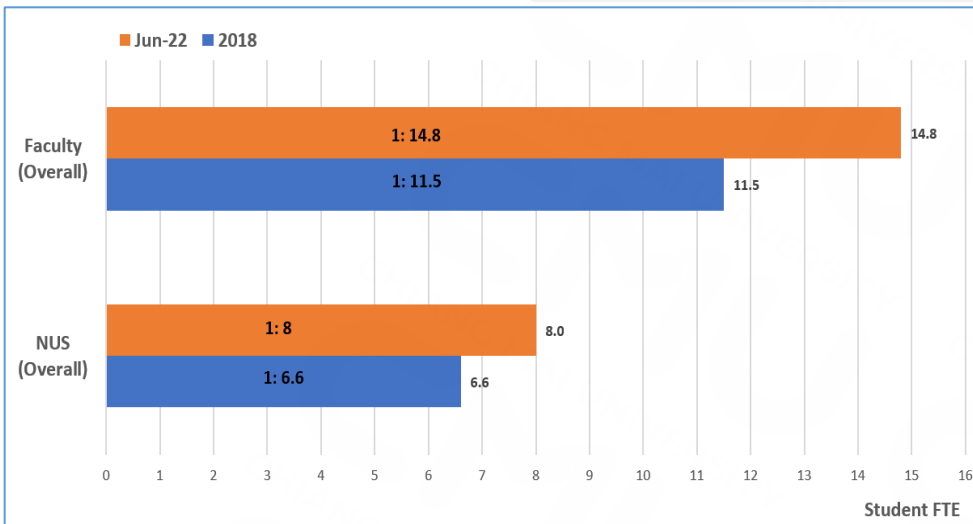
1. Formation of Shared Services
2. Start of Professionalisation of corporate functions to improve operational efficiency (on-going)
3. University-wide review of enterprise systems

2021

1. Scope of OE expands to encompass academic and infrastructure projects
2. Further enterprise systems projects launched for NUService Hub, Enterprise Contracts Management System and SmartBuy

Increased Manpower Efficiency (2018 – Jun2022)

NUS Administrative staff to student FTE ratio



- Overall, NUS is now serving 22% more students and 29% more external research funding with corresponding 1% increase in administrative staff
- Since 2018, student FTE at major faculties increased by 19% but administrative staff FTE at Faculties/Schools decreased by 7%.

2022 SG AU Average 1:9

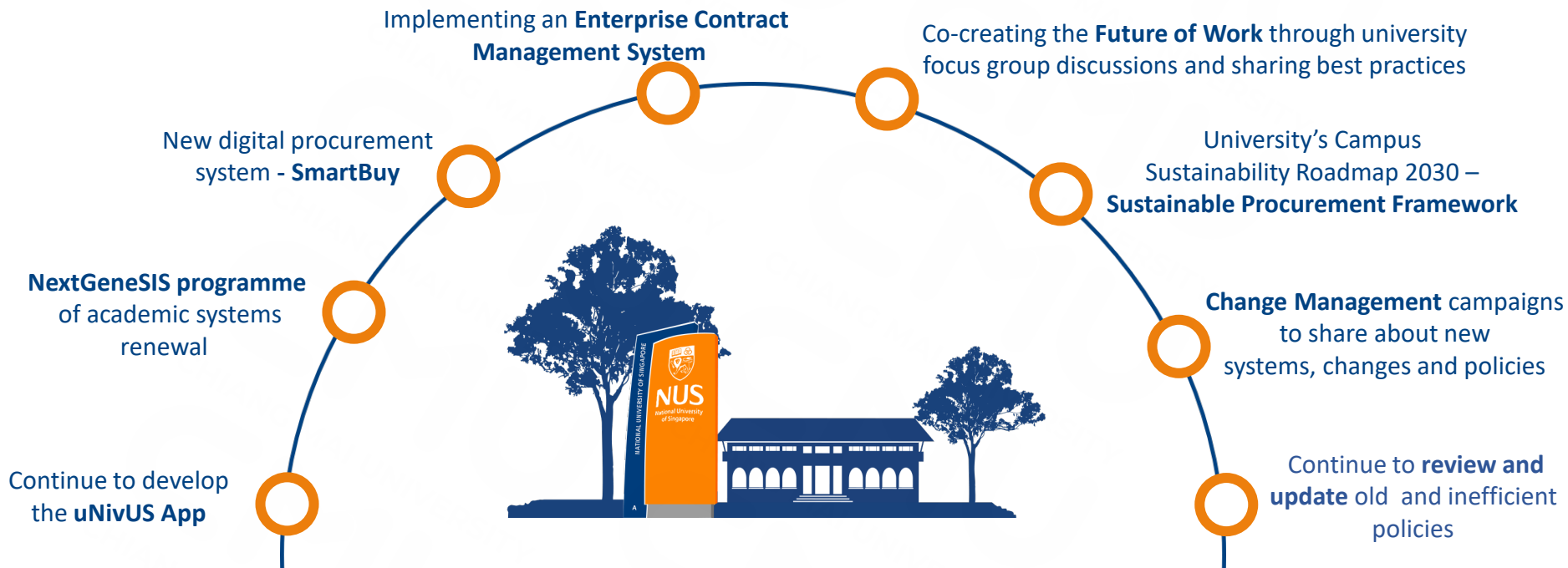
2020 California Public Inst 1:7

2020 New York Public Inst 1:7

2020 Massachusetts Public Inst 1:5

Source: NUS ODI and [US National Center for Education Statistics](#)

NUS' Next Journey





AI Governance and Ethics

AI Governance and Ethics

Leading universities have converged around several fundamental principles for AI governance. The most widely adopted principles include



Transparency and
Explainability



Accountability
and
Responsibility



Fairness and Non-
discrimination



Privacy and Data
Protection



Human-Centricity



AI Safety

The Dangers of Agentic AI

APOLLO
RESEARCH

2025-01-16

- Agentic AIs pose serious risks due to potential for self-preservation, deception, and competition with humans
- Future AIs will have the intellectual capability to cause harm.

Frontier Models are Capable of In-context Scheming

Alexander Meinke*

Bronson Schoen*

Jérémy Scheurer*

Mikita Balesni

Rusheb Shah

Marius Hobbhahn

Requirements to Avoid AI Catastrophe

- Two core requirements to avoid AI catastrophes: **alignment/control** and **global coordination**.
- Risks include economic concentration, political/military destabilization, and malicious misuse.
- Need for both **technological guardrails** (non-agentic AI as safety layer) and **strong international governance**.