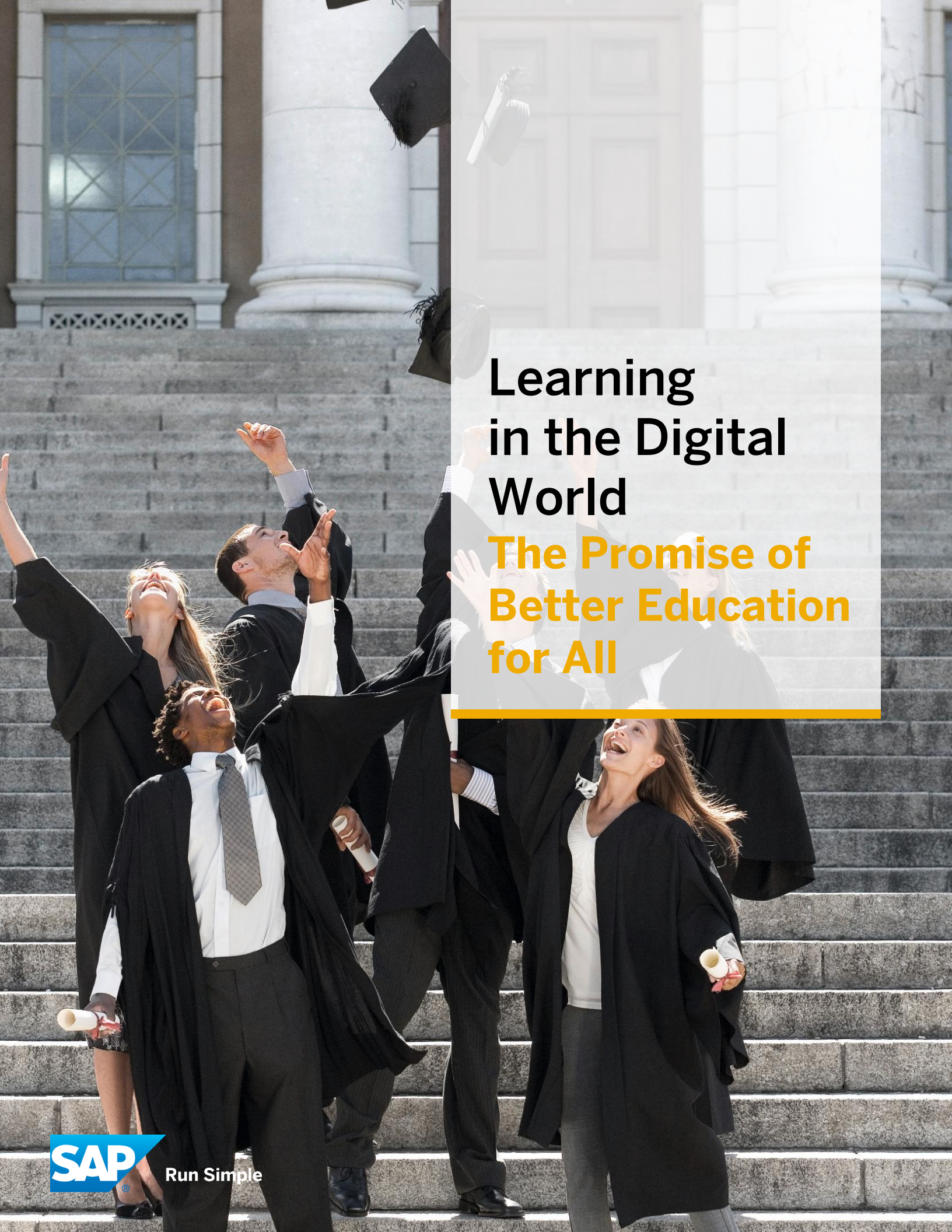


Learning in the Digital World

The Promise of Better Education for All

SAP Run Simple

MALCOLM'S POINT OF VIEW

Dear University Leader:

"There's a tsunami coming!" is how Stanford President John Hennessy predicted the impact of advances in information technology characterized as "digitization" in 2012. More recently, giving the 2015 Robert H. Atwell Lecture at the American Council of Education (ACE) in Washington, D.C., President Hennessy widened the impact of digitisation and its potential to help us make education "affordable, accessible, and adaptable" for all.[1]

This coming "tsunami" is caused by an exploding demand for education (for example by mass population movement or the entry of young women into education) joining forces with digital technologies for delivering it (for example, everyone with a mobile device has, de facto, a mobile classroom).

For universities, this provides enormous new opportunities to support the mission and vision of education and research, not only by increasing university revenue (from student fees, research grants, government funding, and gifts and donations), but also by controlling costs and spending with new applications and better analytics.

But first, what do we mean by "digitisation "in an education context?

Certainly, we mean much more than just transferring books to digital format.

The MIT Sloan Management Review and Deloitte's 2015 global study of digital business identify digital technologies as areas such as social, mobile, analytics, and cloud. A maturing digital enterprise is described as one using digital technologies to transform processes, workforce management, and business models.[2] In other words, digitisation will affect every university activity, every interaction, every transaction, every outcome.

At SAP, we did not invent the digital world, but we do understand where it's going across 25 industries. We have provided software solutions to universities for many years. Today, 97% of the world's top universities use SAP. Of course, universities differ from for-profit industries in many ways. But there are critical points in common; like any enterprise you have a complex workforce, demanding stakeholders, an asset-intense campus, and suppliers who provide products and services to the campus. You have these four domains in common with all our customers, and, like all our customers, you spend a significant proportion of your effort managing them.

When it comes to teaching and learning , the impact of digital technology goes beyond new platforms for delivering content or making education more personally adaptive or outcome-based, though these are important digital trends. For years, we have envisioned a university that is "student-centric," with students increasingly behaving as "consumers," or even "customers." This vision is now the reality.

Surviving the "coming tsunami" and emerging stronger will require adapting academic and business models, changing how the university operates those models, and transforming how staff and faculty work.

In this report, we have shared a vision of how you can harness the power of digitisation to realise a data-driven, or "insight-driven" university that is "affordable, accessible, and adaptable."

I respectfully invite you to join this conversation by dedicating your time to this white paper. Thank you for your interest, and I look forward to your feedback.

Malcolm Woodfield
SAP Global Vice President for Higher Education and Research

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The promise of better education for all: Challenge and opportunity

Demand for education is exploding as populations shift, advances in knowledge require faster learning cycles, and emerging economies cultivate knowledge workers. Simultaneously, digital platforms enable mass access to knowledge.

This powerful combination of increased demand and delivery is both a challenge and an opportunity to the education sector: a challenge, because of the enormity of demand, but also because of ease of access where "unverified" content is available for mass consumption via self-service channels like YouTube or Wikipedia; and an opportunity, because digitisation is a natural enabler for the expansion of education for the millennial generation. "Every child is massively motivated to learn to text, post and message on mobiles. The evidence shows that they become obsessive readers and writers through mobile devices."[3]

Digital technologies offer unique opportunities to many millions of children who are under-served by traditional educational programs. Educators Ted Hasselbring and Candyce Williams Glaser write that computer technology has enhanced the development of sophisticated devices that assist in overcoming limitations to learning participation, from speech and hearing impairments to blindness and severe physical disabilities. These aids include word-prediction software, live-speech captioning, and control devices based on voice recognition. The authors note that "computer technology has the potential to act as an equalizer by freeing many students from their disabilities."[4]

Andrew Dunnett of the Vodaphone Foundation described the "digital school in a box" that his organisation is currently using to benefit 15,000 young people in the Kakuma refugee settlement in Kenya. Each of these instant classrooms is a single case containing a laptop and 25 tablets pre-loaded with educational software aimed at students aged 7 to 20. The kits also contain a projector, a speaker, and a hotspot modem with 3G connectivity. The tablets can connect to the laptop locally, enabling teachers to deliver content and applications to the students. All of the components can be charged simultaneously from a single power source while the case is locked. Once charged, the kits can be used for a full day in a classroom without access to electricity.[5]

Education is on the cusp of a wave of change that is bringing students, educators, institutions, and technology together in a way that we've never witnessed before. These changes are making it possible for new generations to learn in new ways, absorb knowledge more quickly and more effectively, and ultimately shape the world of the future, where digital learning will play an even bigger role.

There are over 50 million refugees and displaced people worldwide, and the number grows daily. Half of the world's refugees are under the age of 18 and are displaced from their homes for an average of 17 years with little or no access to education. But they do have access to mobile phones, and, with that, access to learning.[6]

In "developed" countries, "technology isn't an option. Technological competency is a requirement for entry into the global economy," said Arne Duncan, US Secretary of Education.[7]

What is the measurable impact of bringing education to those formerly denied education?[8]

- An extra year of secondary school can increase a girl's potential income by 15% to 25%
- Each extra year of a mother's schooling cuts infant mortality by between 5% and 10%
- An increase of only 1% in girls' secondary education attendance adds 0.3% to a country's GDP

EXECUTIVE SUMMARY

Digitisation is real and it's here to stay

The digital world

Five major technology trends that have converged in the digital world affect all enterprises, including those managing and providing education: hyperconnectivity, super computing, cloud computing, a smarter world based on outcomes, and cybersecurity.

The resulting pace of change is staggering. For example, the term MOOC was coined in 2008 to mean "massive open online course," driven by digitisation. By 2012, there were an estimated 10 million students in MOOCs, with the largest enrollment in a single course being 300,000, and multi-million-dollar universities built on MOOCs.[9]

Leaders emerging from unexpected places
MOOC platforms such as edX and Coursera rose to prominence in only a few years. Acadomia has created a marketplace for teachers. YouTube provides condensed learning content. Video gaming platforms such as Unity are used for creating educational content.[10]

Students, teachers, and staff expect a new type of experience: one that is **intuitive** and frictionless, and where technology is invisible – one they can **personalise** and make their own.

Early adopters are winning
Enterprises that have embraced the digital world are seeing added value. In education, this means higher recruitment, improved student retention, better teaching and research outcomes, and higher rankings for institutions in an increasingly competitive environment.

Leaders know the world has changed
Ninety percent of enterprise leaders believe the digital economy will have a major impact on their industry. But only 25% have a plan, and less than 15% are funding and executing the plan.

Digital models are disruptive

- **Acadomia** is the Uber or Airbnb of Academia, creating a forum for sharing teaching skills
- **Facebook** is not just a social network; it is one of the largest media companies, even though it doesn't create content
- **LinkedIn** There are over 39 million students and recent college graduates on LinkedIn, the fastest-growing demographic [11]
- **Google** is not just a search engine with cloud apps; it is also a platform for student and teacher-friendly apps
- **Cisco** is not just a networking device company; it also enables learners with a context-aware, personalised learning experience with data taken from the university network

EXECUTIVE SUMMARY

Digitisation is real, but complexity is the obstacle to its realisation

Complexity alert

Complexity is a major issue of our time, and one of wide-ranging proportions, affecting many aspects of our lives and almost all aspects of our work.

Complexity exerts negative pressure on the university enterprise, stifling the implementation of new teaching methods, hampering research, and preventing new academic and management models. University leaders worldwide consistently report being limited by their own complex processes and systems, often created with good intentions but now outdated and inflexible.

For 25 years, universities have invested in **standardising** business processes and implementing productivity tools to address this complexity. The results have been remarkable in terms of efficiency.

Still, complexity exists in education. A typical university supports dozens of e-mail systems, multiple LMS platforms, and a bring-your-own-device policy for mobile. The "universe" of university software applications is staggering, and unsustainable.

The answer is simple

To get the most out of this new digital world, you need to simplify.

Finding ways to **run simply** matters more than ever in order to drive **innovation**. Running simply allows you to place your users (students, faculty, employees) at the center of your strategy. It's reimagining operating and academic models based on real insights, not trends.

Simplification needs to be added to the university leadership agenda as a key enabler of the institution's **mission and vision.**

When you **run simply**, you can expand your teaching and research activity without compromising on excellence in the classroom or laboratory. Simplification is key to achieving the **"promise of education for all."**

Running simply is contagious. When you run simply, your users are enabled to run simply too.

SAP HANA is the great simplifier.
At the foundation of digital maturity is a flexible, secure, real-time innovation platform that makes all this possible – SAP HANA.

$12 million
savings at University of North Carolina, Chapel Hill, by reducing organisational complexity. Estimated by Bain & Co.[12]

$25 million
savings at University of California, Berkley, by reducing organisational redundancy. Estimated by Bain & Co.[13]

$6 billion
savings in U.S. higher education institutions by reducing organisational complexity.[14]

FROM STANDARDISATION

TO SIMPLIFICATION AND INNOVATION

EXECUTIVE SUMMARY

Road map to running simply

REIMAGINING

How do you map the path to the simplified digital world?

First, reimagine your university teaching and research models; second, how you run that reimagined institution; and third, who runs it.

REIMAGINE
ACADEMIC BUSINESS MODELS

Your students and faculty already live in the digital (social, mobile) world, so that is where you must engage them – where you recruit them, teach them, advise them, speak to them, and listen to them. And the digital world is where employers will look for new employees, and where those employees will work.

REIMAGINE
BUSINESS PROCESSES

Empower your business process owners to change, simplify, automate, mobilise, and connect university business and transactional processes by digitisation.

REIMAGINE
WORKING FOR A UNIVERSITY

Education attracts and requires a specific workforce. You need employees who are passionate about education, who will be committed to your institution. Use digital tools to identify, recruit, retain, educate, and promote the most engaged staff, teachers, and researchers. Refocus on employing the best contractors for temporary work and teaching on your main, satellite, domestic, and international campuses.

The digital platform for universities

Universities have a unique mission to prepare people to play a fulfilling and productive role in the world, and to support research and the dissemination of knowledge.

But universities also have critical business and transactional features in common with all enterprises: all have a workforce, "customers" (by various definitions) , assets, suppliers, and existing systems and processes, many of them complex legacies from an analog or even paper-based era of operations.

SAP's digital business framework is a way for you to think about the core components of the digital or digitised university.

SAP's digital business framework is based on five key pillars of a digital plan and architecture:

1. **Stakeholder and "customer" experience** across all channels, mobile first
2. **Supplier collaboration and cost control** across all spend categories
3. **Core business processes** (such as student information, learning management, finance, grant management)
4. **Workforce engagement,** including staff, faculty, researchers, students, and contractors
5. **Assets and the Internet of Things** to track and integrate everything into the "connected campus"

Achieving measurable results drives this significant phase of the simple transition to digital. It's not about any one of the five pillars, but rather how they all interconnect to achieve measurable results. For example:

- Improved retention rates
- Improved graduation rates
- Increased research grant win rates
- Increased fundraising revenue
- Improved university ranking

We leverage **Design Thinking** with the support of **SAP University Alliances** as a key approach to the reimagining phase. Key stakeholders are directly involved to drive innovation.

SAP University Alliances

openSAP

Fundamental changes: Five technology trends changing everything

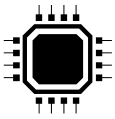
We are witnessing an unmatched era of true innovation. Breakthrough technologies have matured and hit scale together, enabling five defining trends that influence higher education and research:

HYPERCONNECTIVITY

1 

Every electronic device on and off the university campus is being connected. The influx of mobile devices used by campus stakeholders makes BYOE (bring-your-own-everything) the "new normal." A new generation of hyperconnected learners are on the doorstep of your university with the need for mobilised access to educational services and driving personalisation and adaptive learning.

SUPER COMPUTING

2 

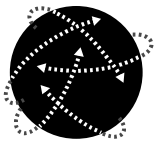
The limits of 20th century computing power are gone. In-memory computing allows for the creation of infinite new opportunities for universities and research institutes. Super computing and Big Data play a key role in breakthrough, insight-driven research and transform the university to be able to predict and intervene early to foster student success.

CLOUD COMPUTING

3 

Apps and infrastructure are now rented to eliminate barriers to entry. University systems are moving to cloud-based in-memory platforms and services, allowing IT staff to focus on institutional outcomes and innovation. Cloud computing will accelerate delivery of innovation, drive adoption of new technologies, and connect students and staff in real time.

SMARTER WORLD

4 

Sensors, robotics, 3D printing, and artificial intelligence are being adopted. Research and teaching will benefit directly from smarter machines supporting their core activities on campus. Smarter robots, smarter printing, artificial intelligence, and smarter education with intelligent learning products will reshape the core missions of teaching and research as well as the "business" side of the university.

CYBERSECURITY

5 

Universities cite security as a big issue – in many cases the top issue. Universities are open centers for the dissemination of knowledge, but this must increasingly be balanced against both the physical and data security threats. Cybersecurity must be addressed as universities set and execute their digital strategies.

REIMAGINING

THE DIGITAL WORLD OFFERS INFINITE NEW OPPORTUNITIES TO HIGHER EDUCATION AND RESEARCH

In a connected world where every university decision can be informed by real-time data, education and research will refocus on how university management, learning, and research outcomes are measured, consumed, analysed, experienced, and acted upon.

DIGITAL INNOVATION IS REAL

There are exciting new ways of designing and delivering learning in the digital and virtual world. Cognitive behavior itself is changing, and pedagogical methods are changing with it. New institutions will be created to leverage these methods. These institutions will be run differently, and those who run them will work differently.

REIMAGINE ACADEMIC BUSINESS MODELS

New models are needed to compete for and capture revenue from teaching, research, government, and private donations.

- **Outcome-based teaching and research:** Measure and fund the university or specific departments based on student engagement and research output
- **Teaching and research network orchestration:** Universities will become platforms to connect students to the right learning offerings and job opportunities and reach new (global, distance) learners
- **Research data analysis:** Shorten the lifecycle of projects, changing the research funding model. Networks will amortise research costs among institutions without degrading outcomes. Universities will increase equity investments in Big Data-driven start-ups in research
- **Changing work models mean lifelong learning**: As work models become flexible workers will need to continuously update and diversify skills.
- **University fundraising:** Increase student retention and loyalty, taking advantage of crowdsourcing and social media channels to build university brands in an increasingly crowded market of providers and learners

REIMAGINE UNIVERSITY BUSINESS PROCESSES

Changed academic business models will in turn require new business processes to manage and deliver teaching and research.

- **Optimised student engagement:** Use real-time data from student information, learning management, and recruiting systems as well as the students themselves, together with predictive analytics to help student advisors drive student success. The new classroom leverages "online shopping" approaches to education, such as social interaction, gamification, online payment, and online and classroom learning
- **Data-driven universities:** Use real-time data to inform everything from designing flexible teaching loads to fundraising
- **Optimised financial streams:** Leverage instant planning, analysis, prediction, and simulation across financial and operational processes and devices to help the university drive value
- **Internet of Things-enabled campus:** Sensors and hyperconnectivity simplify management of buildings and resources

REIMAGINE UNIVERSITY WORK and WORKING

Technology will allow workers to focus on the new academic models and business processes that support them.

- **The millennial workforce:** Education attracts and requires a workforce that is passionate about education and committed to its mission. Digital tools will help identify, recruit, retain, educate, and promote the most engaged staff, teachers, and researchers. Refocus on employing the best contractors for temporary work and teaching on your main, satellite, domestic, and international campuses
- **Refocusing work:** Digitise manual steps in the process: tuition invoices, student payment processing, and smart asset maintenance using the Internet of Things. Eliminate administrative burden, enabling you to refocus on personal attention to the stakeholders
- **A new and more accessible user experience:** Provide the workforce and students with the best technology and a personalised experience, using voice recognition, gamification, and visualisation
- **A new generation of professional leaders:** University executives will bring experience from a wide variety of industries and new ways of approaching university business

REIMAGINE ACADEMIC BUSINESS MODELS

Create new academic offerings to enter new education and research markets, rebuilding the university brand in the digital world.

Outcome-based teaching and research

The availability of real-time student data opens up a world of possibilities when it comes to student engagement. Key data, for example, from the student information, learning management, and student recruitment systems provide a wealth of rich information. With this data, we can provide teachers and advisors with real-time information on student engagement to ensure they stay on track.

The explosive growth of learners and their "production" of structured and unstructured learning data can be analysed via advanced in-memory platforms and artificial intelligence. Cognitive types of systems will enable decision support for teachers and professors.

Teaching and research network orchestration

Universities will become platforms to connect students to the right learning offerings and job opportunities, as well reach new (global, distance) learners. The university will evolve from a "place" to a network.

Changing work models mean lifelong learning

As permanent, full-time jobs are replaced by more flexible models of employment, workers will need to constantly update skills, and become skilled is several areas.

Research data analysis

Projects lifecycles will shorten dramatically (such as clinical trials), changing the research funding and income model. Networks will amortise research costs among institutions without degrading outcomes. Universities will increase equity investments in Big Data-driven start-ups in research. Universities with a major research focus will increasingly become centers of for-profit entrepreneurship and innovation.

University fundraising

Leverage increased student retention and loyalty, taking advantage of crowdsourcing and social media channels to build university brands in an increasingly crowded market of providers and learners. This business model will grow beyond its current focus in North America as a way of both building a revenue stream and a loyal "client" base.

Learners spend more than **3.5 hours** per day using their mobile phones on campus[15]

1.9 million organisations are connected to the Ariba Network.[16]

39 million students and recent graduates are on LinkedIn.[11]

250 million+ learners will be enrolled in higher education by 2025.[17]

REIMAGINE UNIVERSITY BUSINESS PROCESSES

Existing institutions will "adapt or die," while new institutions will be created to serve the digital learner. These institutions will be run differently, and those who run them will work differently.

Optimised student engagement

Universities will use predictive analytics and real-time data from student information, learning management, and recruiting systems, as well as the students themselves, to help student advisors drive student success.

"Online shopping" approaches to education can be applied, such as social interaction, gamification, online payment, and online and classroom learning to modernise student engagement.

Data-driven universities

Real-time data will inform everything from designing flexible teaching loads to fundraising. Analytics will focus not on reporting but on prediction and optimisation.

Optimised financial streams

Addressing a new generation of global learners is both a challenge and an opportunity – including an opportunity to build new revenue streams and expand course offerings. Universities are focused on their core mission of delivering high-quality education and research. However, to ensure constant growth and innovation, universities must recognise that a digitisation strategy is also required on the enterprise side of the institution, especially on the finance side.

Redesigning financial processes will support instant financial insight across devices to help the university drive value, leveraging instant planning, analysis, prediction, and simulation across financial and operational processes. At the same time, these new processes will significantly simplify the IT landscape and architecture.

Internet of Things-enabled campus

Sensors and hyperconnectivity simplify management of buildings, including student housing, creating a safer and more attractive living environment for residential campuses.

TODAY'S REALITY

- Peter Nikoletatos, CIO LaTrobe University "We spent **too many years** dragging our data into a warehouse and then producing reports"[18]
- Students waiting more then **40 hours** on calculation of exam results.[19]

TOMORROW'S SOLUTION

- Process **8,000** grades per second
- **420x faster** student data reporting
- Up to **80%** of data updated in real time
- Return on investment (ROI) on SAP HANA for University of Kentucky of **509%.**[20]

MAKING IT INTELLIGENT

The University of Kentucky uses SAP HANA to create **actionable, real-time information,** while at the same time "information is put into action," which means applying analytics to **foster student success.**[21]

REIMAGINE UNIVERSITY WORK AND WORKING

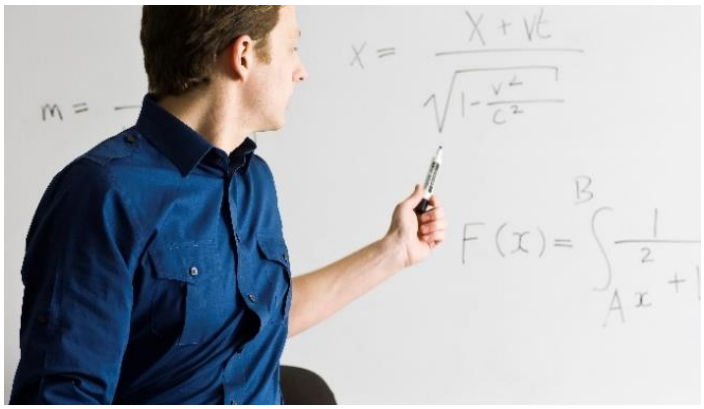
Universities must understand the workforce of the future and its importance to being successful and staying successful. New business models for managing the workforce must address the key role of university staff and understand changing demographics and evolving definitions of work.

The millennial workforce

Millennial workers and students have common expectations, especially:

- Real-time feedback on their performance
- Personalised performance expectations
- An achievable career path or paths

The workforce of the future will use interactive technologies that improve user experiences, including voice recognition, visualisation, and gaming. These technologies have the potential to break down boundaries and campus silos and redefine (social) collaboration among staff. With the university back office becoming more digitised, collaborative work will naturally take advantage of digital and interactive technologies.



Refocusing work

With rapidly evolving technologies, the digitisation of the workplace and academic processes will refocus and even eliminate some work. However, your staff will continue to be the most valuable asset. Staff must be managed and engaged to ensure talent is retained for the university.

Education attracts and requires a specific workforce that is passionate about education and committed to its mission. Digital tools will help you identify, recruit, retain, educate, and promote the most engaged staff, teachers, and researchers. Institutions can refocus on employing the best contractors for temporary work and teaching on primary, satellite, domestic, and international campuses.

A new and more accessible user experience

The best technology and a personalised experience, such as voice recognition, gamification, and visualisation, are needed for the workforce and its customers.

A new generation of professional leaders

CIOs will bring experience from manufacturing, financial services, the military, and the public sector. They will have no preconceptions, no "baggage," regarding how the university works. Line of business owners (finance, HR, registrar, etc.) will bring expertise from their roles and professional organizations (for example, in the United States: NACUBO, CUPA, and AACROA). Teaching faculty will not be shielded from outcome-driven assessment as workers are treated as "talent" to be developed rather than "capital" to be managed.

Cambridge Assessments manages the workforce of 30,000, many temporary, to perform examinations for 8M students in 170 countries [22]

Workforce technology skills development will continue to lag. The need for technology skills will grow over the next three years, especially in analytics and programming/development. 48% of employees surveyed say analytics skills will be needed by employees in three years, and 59% say programming/development skills will be needed.[23]

SAP HANA: THE GREAT SIMPLIFIER

In order to reimagine everything in the digital world, agility and flexibility are required to adjust course at any time. This involves two key concepts: **simplification** and **innovation**.

Simplification is about doing what you are already doing BETTER, FASTER, and CHEAPER.

Innovation is about reimagining university models and campus stakeholder value by leveraging the five technology trends.

The diagram below is at the heart of the digital transformation. The idea is very simple, but it took years to become a reality: bringing together transactions and analytics on the same platform. Uniting structured data (e.g., educational content, research output) and unstructured data (text, video, voice) will change the way universities plan, scale, and innovate.

In-memory computing is a concept brought to life by the breakthrough SAP HANA platform. While relatively young by commercial standards, SAP HANA's adoption across multiple sectors, including higher education and research, validates its potential for universities.

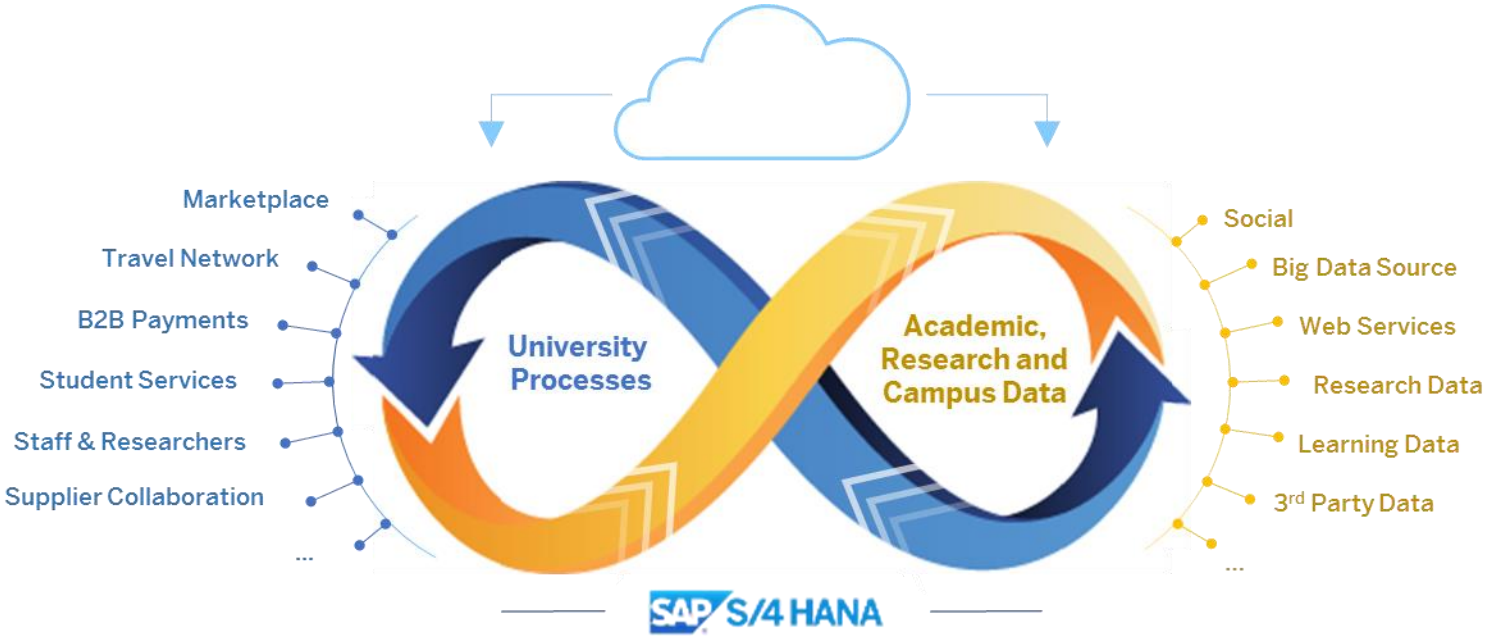
With in-memory computing, universities can now finally:

- **Leverage Big Data** from financial, human resources, student results, teacher performance, faster/improved research analysis, asset sensors, and social media. Bringing all data signals together leads to the perfect recommendation, which can be instantly acted upon in digital time via human and machine-to-machine interfaces
- **Extend business and academic processes** to interoperate with university business partners in real time via advanced cloud-based business and university networks
- **Modernise business and academic processes** from finance to human resources, to academic and research data. SAP platforms are real time with no data replication and no batch programs

These capabilities open infinite new ways of optimising universities, driving digitisation of the academic and business side, simplifying everything, reducing costs, and providing the agility required in a rapidly changing world.

SAP constructed an innovation road map designed to bring in-memory computing together with cloud computing and mobility. This strategy has been embraced by early university adopters that are leading the transition to digital.

SMARTER DECISIONS + SMARTER TRANSACTIONS = SMARTER BUSINESS



DIGITAL BUSINESS FRAMEWORK

A SIMPLE AND PROVEN APPROACH TO DIGITISATION

Every university requires a simple digital approach to build a pragmatic and executable digital strategy

DIGITAL BUSINESS FRAMEWORK

Every university needs to think about digitisation across five key pillars

Though unique in their core mission, universities have critical aspects in common with all enterprises, including:

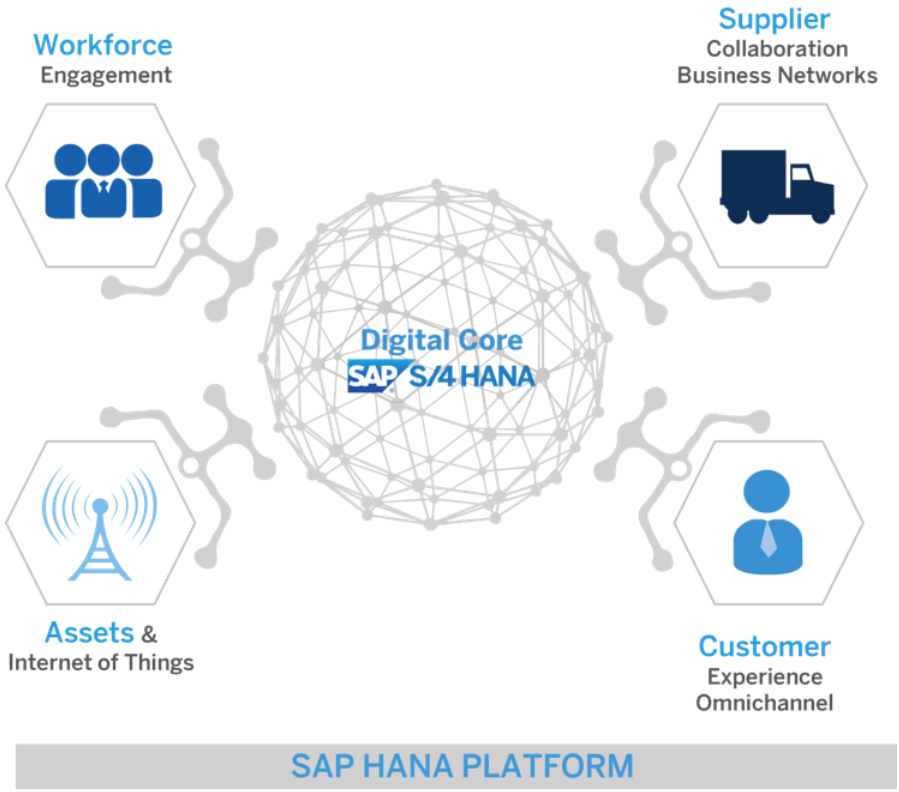
- **Key stakeholders – students and faculty**
- **A workforce**
- **Suppliers**
- **Assets**

SAP understands what makes universities unique, but also what challenges they face along with other enterprises.

We have built a structured framework to help you think through how to develop and execute on your digital strategy**: The digital business framework for universities.** With this framework, the entire university operation becomes digital-ready, including the core and the enterprise side, which serves as the platform for innovation and process optimisation. Every university can develop a digital strategy across these five pillars:

1. **Multichannel, "customer-quality" experience** for students, professors, researchers, and staff
2. **Re-platformed core business processes** that bring together transactions and analytics for real-time, data-driven insight to be smarter, faster, and simpler
3. **Smarter and engaged workforce** across all employees and contractors
4. **Network of networks** with social, supplier, and online collaboration to reduce costs
5. **Assets and the Internet of Things** to drive real-time insights and new operating models

SAP CAN ENABLE UNIVERSITIES TO DIGITISE THEIR BUSINESS



THE DIGITAL CORE FOR UNIVERSITIES

A new generation of ERP solutions running **in real time, integrating predictive, Big Data, and mobile** will change how universities run, consume, and utilise information**: the future is already here.**

For some time, universities have focused on digital technologies for teaching and content (like digitisation of libraries). Today, universities are expanding the digital footprint to include data collection from wearable devices in real time while students complete assignments and projects to better drive adaptive learning.

Run simply

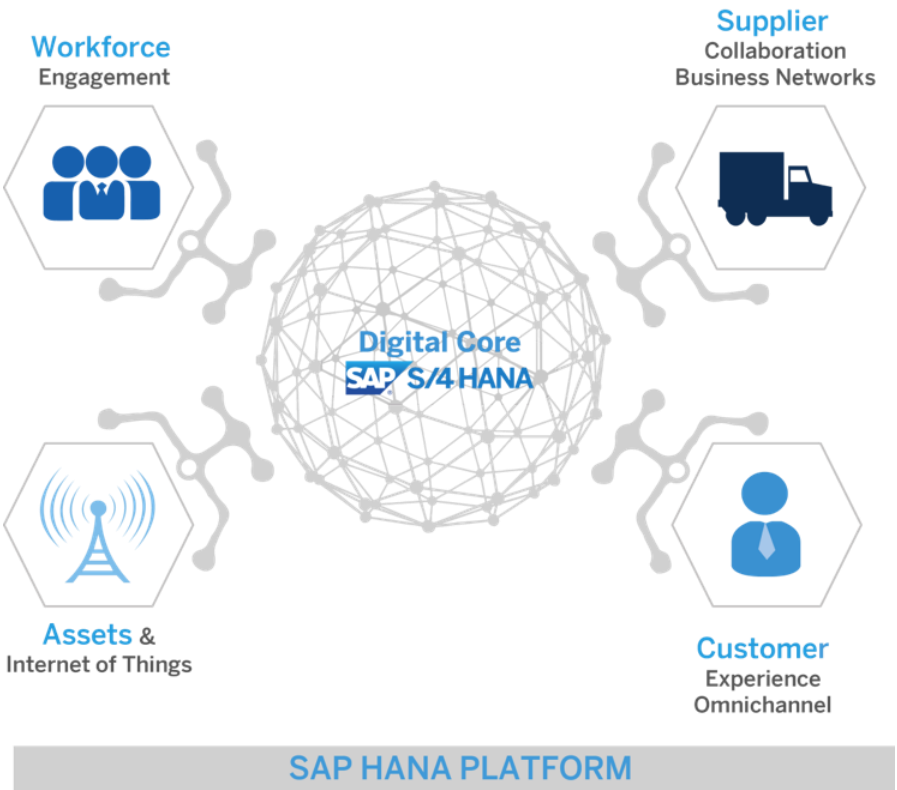
Complexity is the enemy of progress. Decades of legacy practices are impeding agility and transformation.

Run in real time

Customers and workers expect information, and responsive information systems, at the speed of thought. This is the new norm. Millennials live in real time and expect the same in learning and working.

Run with data

Unleash the power of prediction and simulation, based on real-time insights, which improve student and research outcomes, support faster decision making, and increase efficiency in running the university.



SAP can enable optimised finance operations and allow for real-time predictive analytics and simulation

SAP S4/HANA is the only end-to-end solution that covers all business processes and runs in-memory. It helps universities to run in real time for fundamentally better performance, including:

- A single, real-time view of "university enterprise" performance with real-time insight into financial streams
- Optimised student engagement through advanced student and learning analytics blended with data to optimise student success and retention
- A 360-degree view of the student to improve the overall student experience

In addition, the SAP HANA Cloud Platform can be the single enterprise data source for SAP S/4HANA and the rest of your solution landscape.

STUDENT AND FACULTY USER EXPERIENCE

Students, faculty, and knowledge workers demand simple, seamless, personalised experiences **across any channel, anytime, anywhere, and on any device**, making learning available to all, all the time.

Today we see four key trends reshaping the user experience where **universities can adopt a user-centric approach,** resulting in "customer-quality" applications.

Consumer grade user experience

As work life intersects with personal life, students, faculty, and knowledge workers expect applications and work tools to be equal to or better than their personal social or shopping applications.

Role-based simplification

A personalised experience presents information needed at the right time to complete the business process, thus removing complexity and allowing automated background processes to simply the business.

Mobile

Complex transactions are provisioned as simplified experiences. Business systems are not replaced but are decoupled from the streamlined user experience – for example, the way a simple travel app interacts with a complex scheduling, booking, and payment system.

Value of orchestration

Professors and advisors can leverage learning management data to engage students in a more intimate way, thus improving the learner experience and outcomes. Faculty can easily collaborate and share results with the research community or faster outcomes, which contribute to the university's mission and success.

81%
Of higher education students used smartphones and tablets for studying in 2014, up 40% since 2013, according to a new survey[24]

70%
Of Students say study technology should be more personalised as social media feeds[25]

86%
Of customers are willing to pay more for a better customer experience[26]

852 million
Installed smart devices by 2020 will allow universities to better understand customer behavior[27]

Digitise your students' and faculty's "customer" user experience with SAP

A single platform brings together university marketing, student recruitment and services, and commerce (including the omnichannel solution, SAP hybris Commerce) to ensure seamless digitisation of the entire "customer" experience. SAP solutions for customer engagement and commerce powered by the SAP HANA platform enable a 360-degree view of your students, real-time interaction, and sophisticated, predictive analytics, fully integrated to the core transactional system.

- Orchestrate business processes across university marketing, commerce, and student recruitment
- Deliver personalised experiences in context with each interaction with your (prospective) students
- Create a single, harmonised experience for your "customers" (e.g., students) while reducing the burden on staff
- Engage your "customers" on the channels they choose at any moment in their journey
- Fully integrate with your core business processes to provide a unique university-specific platform for omnichannel customer engagement and commerce

WORKFORCE ENGAGEMENT

A university's workforce is its greatest asset – also its most expensive. The workforce is getting **smarter** in the digital economy. But **complexity limits workforce** development, and the expectations of the **millennial workforce** are revolutionising work.

Complexity is the enemy of workforce engagement. People are working harder than ever, but are they accomplishing more? Workers do not always have access to smart, customer-quality technology to work better, faster, and more efficiently. Organisational complexity is driving higher costs and slowing progress. Three forces need to be addressed:

Millennial workforce

Over 50% of the workforce will be from the millennial generation by 2020.[28] This will require a new workforce strategy to engage and leverage these workers.

Contingent labor

Universities are turning more and more to contractors and service providers to lower fixed costs and become more agile to meet today's opportunities abroad.

Complexity

Universities operate across international boundaries and use many more channels. Services to meet student, faculty, and staff demands are becoming more complex. Regulations are changing frequently. Multiple layers of management are hindering speed and agility.

83%
Of executives indicate they're increasingly using contingent workers – at any time, on an ongoing basis.[28]

34%
Of executives feel that they've made progress in building a workforce that can meet future business goals.[29]

30%
Of executives say their universities give special attention to the particular wants and needs of millennials.[30]

"Universidad Tecnológico de Monterrey has really transformed using SAP workforce solutions, **greatly simplified** processes, and increased information transparency."[31]

Improve your total workforce productivity: Simplify with SAP

Digitise your workforce with SAP: SAP S/4HANA + SAP SuccessFactors + SAP Fieldglass application + SAP Fiori provide the tools for total workforce engagement and advanced analytics.

- **Attract top academic talent:** Recruit and retain the best workforce, simplify their work, engage and foster collaboration, while ensuring regulatory and compliance requirements are met
- **Manage the total campus workforce lifecycle** from recruiting, to onboarding, continuous training, performance, compensation, and learning – all in one place
- **Create smarter apps and enhance process throughput:** Enable the campus workforce to easily access the right information at the right time across any device and using a dramatically simplified user experience
- **Improve workforce engagement:** SAP can simplify contract labor management and personnel processes and establish a sound talent strategy, taking into account the needs of the millennial workforce

BUSINESS NETWORKS AND SUPPLIER COLLABORATION

Universities want suppliers to be true **business partners** in the core missions of teaching and research, but vendors must also align with the **university's social agenda,** such as adhering to fair and humane labor practices**. Digitisation will empower** universities to select such partners.

Universities have transferred knowledge and discoveries into the open market, and new network opportunities continue to emerge to promote operational cost savings and facilitate new business and collaboration models with the private sector. Trends that can help redefine the game include:

The rise of a network of networks

An open network serving a single market (such as travel, suppliers, labor) is valuable to the operational ecosystem. But a vertical network that connects to other vertical networks in real time is revolutionary and can only be accomplished through a shared set of cloud-based services built on top of the SAP HANA Cloud Platform.

Digitising the travel experience

Mobile devices can manage ground, air, hotel, and consumption needs within the university's travel network. Travelers can easily manage expenses and travel reimbursement, and universities can stay in touch with staff, faculty, and researchers traveling abroad.

Digitising the contractor relationship

Universities are increasingly dependent on contingent and contract labor for everything from teaching an extra course to selling tickets to a big sporting event. Managing a contingent workforce of highly specialised resources is necessary to support the university mission and contain costs.

Digitising the supplier experience

Universities are already using the SAP network to select vendors that are true partners in their educational, research, social, and cultural agenda. Business processes like dynamic discounting help manage payables and receivables in a more transparent and dynamic manner.

25–50%
Of travel bookings are "out of compliance" with limited corporate control or visibility[32]

The University of California system identifies **$48 million** in savings by disciplining university spend[33]

The Ohio State University Medical Center: **$1M in savings** identified with new supplier using Ariba supplier network [34]

The University of Colorado: **reduced costs by $957K** leveraging the Concur travel network [35]

SAP's networks handle approximately $600 billion in transactions per year – **50% more** than Amazon, eBay, and Alibaba combined. [36]

Connect your university to the world and the world to your university

SAP S/4HANA gives you incredible capabilities to digitise business processes, with connectivity to the business network allowing you to extend those processes beyond the four walls of your business. SAP can simplify supplier management (including travel and contractors) and establish effective and efficient spend management.

ASSETS AND THE INTERNET OF THINGS

In the digital world, everything will be digitally "aware," potentially connected to all other things by the network. The university campus – already itself a community – will, very simply, become a platform for the Internet of Things.

The university campus is not just a place to work or learn; it is a community, much like a small town, with roads, housing, restaurants, hospitals, sports facilities – and of course classrooms and laboratories. In short – vast assets and infrastructure need to be maintained, repaired, replaced, secured.

In the future, along with students, the campus itself will "speak" to you with new "smart building" student residences and predictive tools alerting to equipment failure and drawing insight from student data. Universities are seeing the full potential of the interlock between students and assets as the Internet of Things.

Smart products drive new models

Universities can collect data from students' wearable devices to better understand student learning patterns and health factors, in turn influencing how courses are delivered.

The networked campus will generate Big Data

Universities are transforming their business model, leveraging Big Data to explore learner behavioral trends, identify adaptive learning models, and more efficiently power the campus while minimising the environmental footprint.

3 billion Internet users
And an expected 30-50 billion connected devices by 2020 [37, 38,, 39]

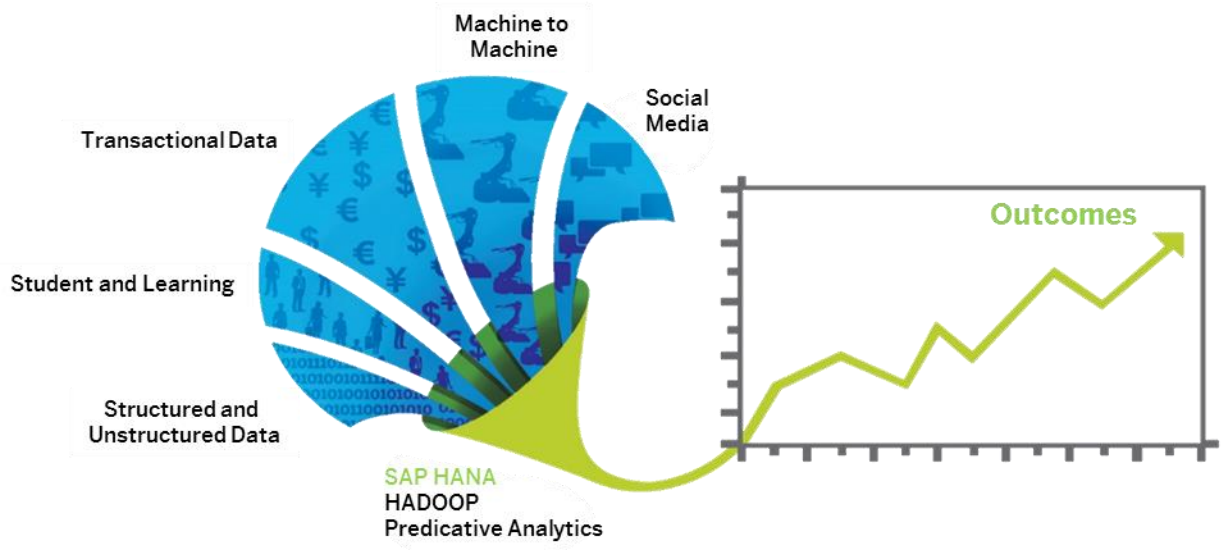
$4–11 trillion
Estimated potential economic impact of the Internet of Things per year by 2025 [40]

$26 million
Savings identified by MIT's institute-wide task force by increasing space utilisation by 10% [41]

A report by GlobalWebIndex revealed that **71%** of students ages 16 to 24 want to use wearable technology such as smart watches, wristbands, or glasses [42]

SAP can help connect campus assets, students, and buildings to optimize utilisation and learning

With SAP HANA, Internet of Things (IoT) edition, universities can now take embedded device data (e.g., student learning data), analyse the data into information in real time, and leverage this information across the value chain to drive academic and business insights to boost student success, lower the cost of university enterprise operations, and create new business models.



SAP HANA PLATFORM – A NEW COMPUTING PARADIGM

SAP HANA is the ultimate simplifier and the platform for innovation and digital business

Dream, develop, and deliver with SAP HANA Cloud Platform

SAP HANA Cloud Platform gives you the mobile, collaboration, integration, and analytic capabilities you need to dream big, develop fast, deploy (innovations) securely, and deliver everywhere.

New cloud apps

Quickly build and deploy innovative, consumer-grade, and education-specific apps for today's always-on, mobile, social, and data-driven world.

Real-time analytics

Engage learners, researchers, and workers, optimise business processes, and unleash new opportunities with real-time analytic apps, powered by SAP HANA.

Application extensions

Extend your current cloud and on-premise solutions for additional customisation, enhanced business flows, and more, for personalised applications to meet the university's demands.

Data footprint reduction

Significantly reduce memory footprint and total cost of ownership. In ERP systems, we have seen ~6x reduction by SAP HANA's dictionary compression. Removing aggregates and actual and historical data separation further reduces the footprint.

Extended storage capabilities

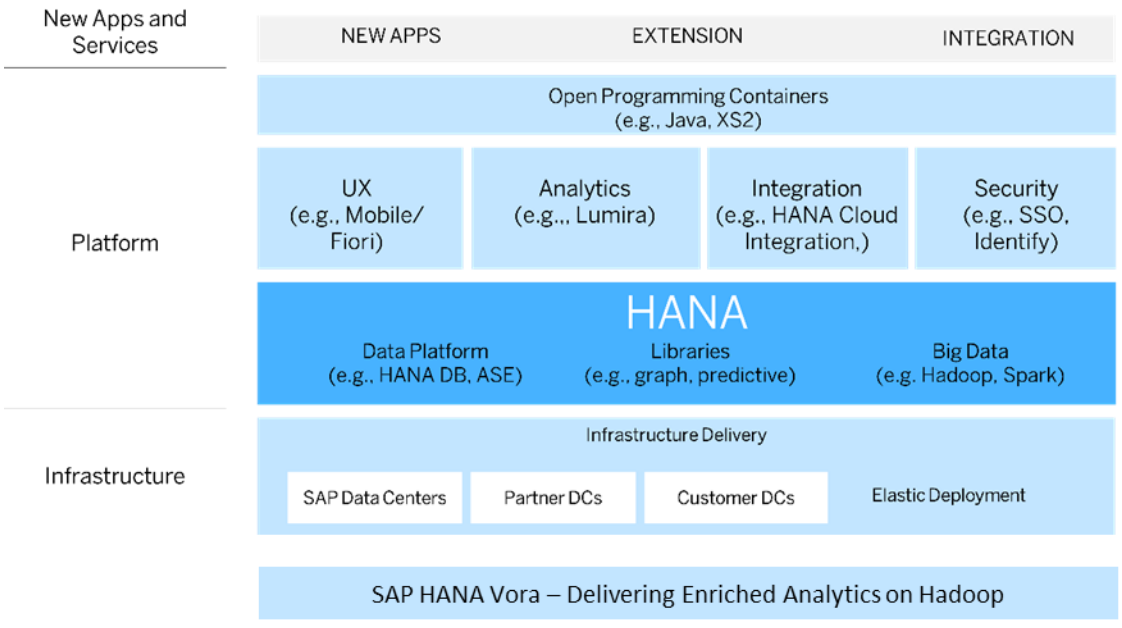
Holistically manage all structured, unstructured, and infinite data streams with flexible combinations of data stream processing, in-memory technology, disk-based columnar storage, and Hadoop-based storage solutions.

Enabling the data-driven university

"Whether the issue is student outcomes, research contributions, or recruitment efforts, institutions are increasingly turning to data-driven decisions rather than those based on anecdotes, emotion, or tradition, or run the risk of falling behind the competition and the leading trends of society at large." [43]

THE SAP HANA PLATFORM IS...

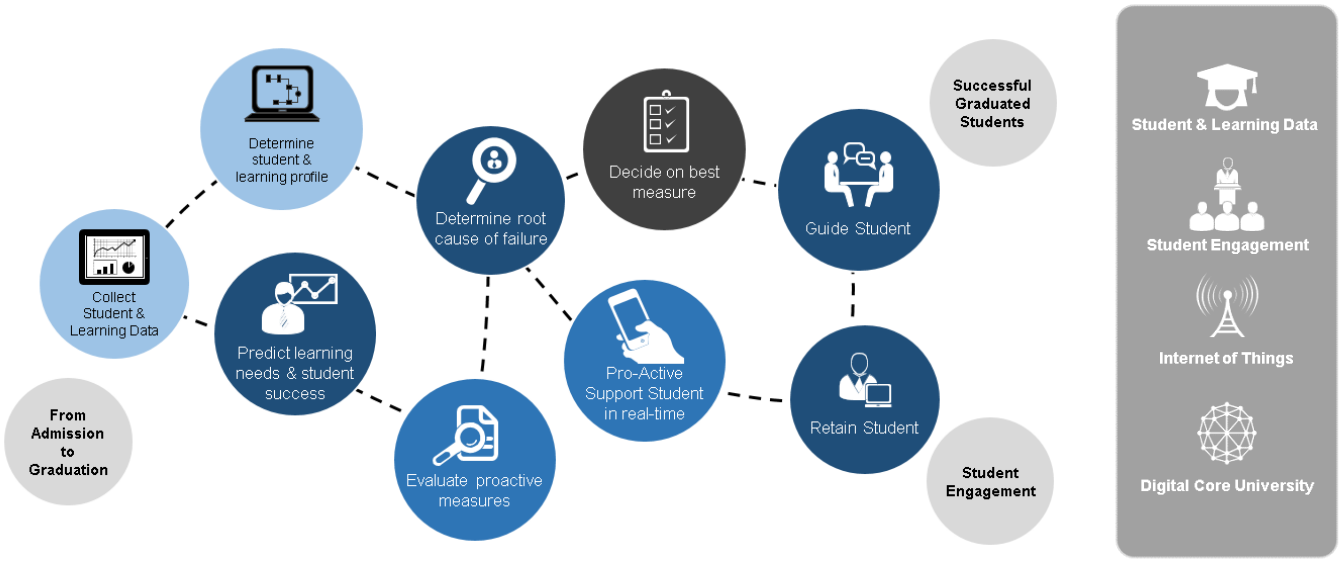
Real-time, in-memory platform • 10x data footprint reduction for ERP • Extended storage, including Hadoop • Open architecture • Developer-friendly • Embeds mobile and analytics • Secure • Cloud-ready



HOW DOES IT ALL COME TOGETHER? – EXAMPLE

While the five digital pillars deliver significant value as stand-alone capabilities, the ultimate goal is to design the next generation of processes that will span across all the digital pillars. User experience will not stop at the channel experience of one pillar. Campus objects, learning technologies, and classrooms have to meet and exceed user expectations.

USE SENSOR AND METER DATA TO PROACTIVELY SUPPORT STUDENTS IN REAL TIME FOR BETTER LEARNING AND RETENTION AND HIGHER STUDENT SUCCESS



Example: Higher education and research
The process flow portrays an IoT and in-memory data platform scenario supporting students in real time during learning.

- Student carries device on campus and in classroom and sends signal to campus network
- Signal is combined with student's profile, including learning management system data, and predicts learning needs
- System can push learning information predictively to device and maintain measurement
- Student can ask questions in a learning management system forum. System proactively provides suggestions in real time via push messages on the learning management system screen or schedules a tutor to call the student directly

This is an example of how leaders in higher education and research institutions are integrating technologies to **improve student success and retention and drive adaptive learning**. In the new digital era, delivering this value to students – your customers – will drive the success of the university.

The scenario above shows how sensors and Big Data will be leveraged by the IT world to drive next-generation best practices in hyperconnectivty and for higher education. The predictive nature of these new solutions will change how students learn and how learners are guided, while student success will be managed with a data-driven approach. The benefits of this scenario are significant:

- **Higher student success**
- **Higher student retention**
- **Faster learning**
- **Higher productivity of academic staff**
- **New academic advisory services**

HOW TO START

THE JOURNEY TO LEARNING IN THE DIGITAL WORLD

THE JOURNEY TO LEARNING IN THE DIGITAL WORLD

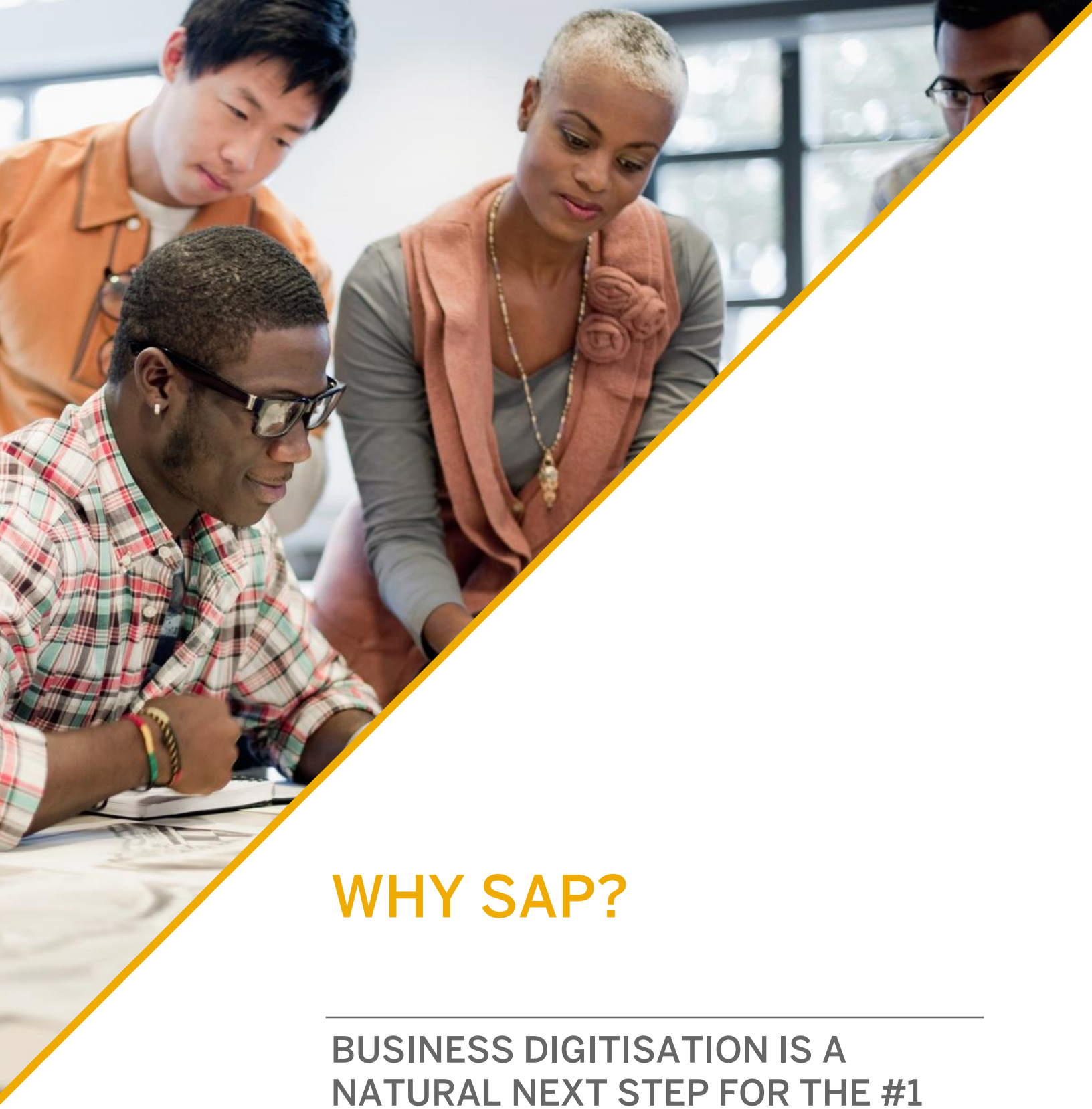
The journey to find business models that capitalise on digital learning involves all disciplines of education and requires a systematic approach to identify and capture opportunities.

The collaborative value and innovation framework

Universities starting their transformation journey to digital learning and business will reimagine learning and research with a focus on outcomes – for their students, faculty, and workers. Key questions that will need to be answered include, "What role will we play in advancing education and discovery?" "How can we reduce costs?" "How can we better collaborate with the private sector?" Answers to these questions will provide direction for reimagining processes and operational models.

For true innovation, a new level of collaboration is required. As a result, we have developed a framework that will provide a continuous and holistic partnership model to drive collaboration and engagement. Outlined below are the five steps of SAP's collaborative value and innovation framework:

1. Strategy alignment: Understand the university's and SAP's strategic direction and identify initiatives
2. Opportunity assessment: Opportunity deep-dive based on strategic initiatives and prioritisation based on value
3. Solution road map and return on investment: Document end-state solution and business case including benefits, total cost of ownership, return on investment, and strategic road map
4. Value realisation: Deliver transformation on time, on budget, and on value
5. Governance: Maximise investments and accelerate value creation with governance based on executive engagement, value delivery, and continuous innovation



WHY SAP?

BUSINESS DIGITISATION IS A NATURAL NEXT STEP FOR THE #1 BUSINESS APPLICATION COMPANY

It took years of innovation, strategic investment, and the forging of new strategic relationships to build the end-to-end digital business platform

SAP IS COMMITTED TO INNOVATION

Vision	Help the world run better and improve people's lives
Mission	Help our customers run at their best
Strategy	Become the cloud company powered by SAP HANA

- **75K employees** representing 120 nationalities
- **295K customers**
- SAP operates in **191 countries**

- Solutions for **25 industries and 11 LoBs**
- **74% of the world's transactions** managed on SAP
- Universities among the **earliest adopters** of SAP solutions and technology

- **80 million** business cloud users
- **1.9 million connected** universities
- **$800 billion+** in B2B commerce
- **99%+ of mobile devices** connected with SAP messaging

- 2011 **SAP HANA** launched
- 2012 **SAP Cloud** launched
- 2014 **SAP business networks** are the largest marketplace in the world
- 2015 **SAP HANA Cloud Platform**
- 2015 **SAP S/4HANA:** Most modern ERP system

- Higher Education solutions **since 1998** for Students and Research
- **97 of world op 100 Universities** are our customers

REACHING THE TOP STUDENTS

With SAP HANA, universities can process 800 million data points to assess students. Increasing the capacity of applications by a factor of 10 allows one of the world's largest assessment centers to ensure a **university is the perfect match** and **students attain their full potential.**[44]

GAME CHANGING RESULTS

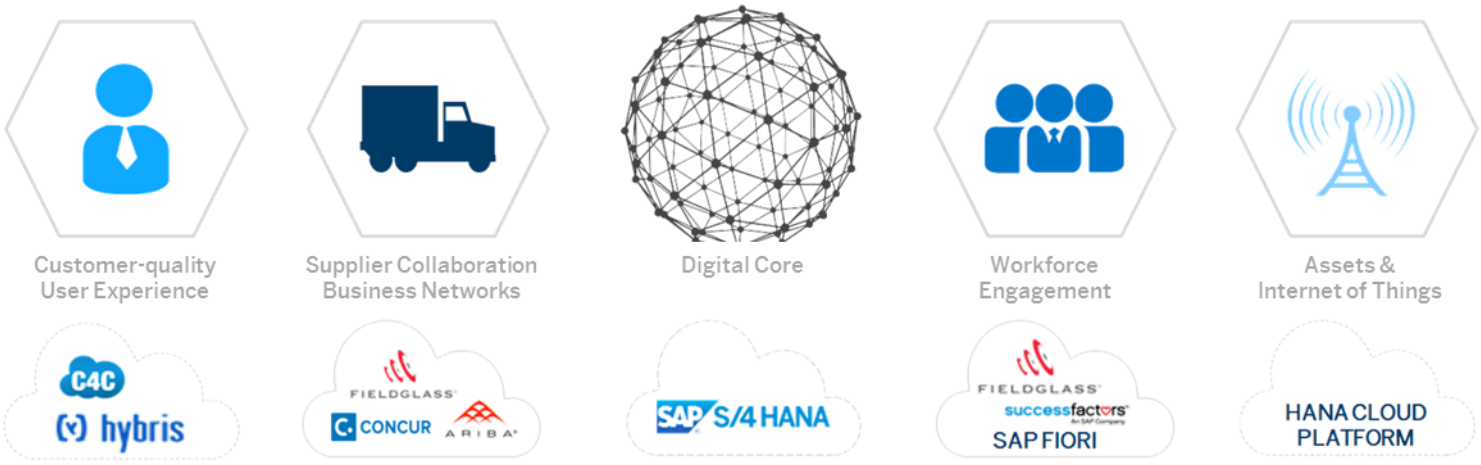
La Trobe University leverages S/4 HANA to **execute** its **strategy** by delivering the right information at the right time to Students, Faculty and Staff. Maximising the workforce to support the Education and Research missions are critical to addressing limitations of funding and remaining competitive in today's environment.[45]

COMBATING CANCER

With SAP running on the SAP HANA Cloud Platform, Weill Cornell Medical College is able to **analyse patient data** from different sources (such as tumor registries, biobank systems, physicians notes) to offer a comprehensive view of patient medical history in real time and **accelerate the development of individual, highly adjusted cancer therapies.**[46]

CREATE COMPETITIVE ADVANTAGE THROUGH INNOVATION

Through our industry and business innovations and over $30 billion in strategic acquisitions, SAP has the best solution portfolio and expertise to enable your digital strategy for education. SAP is the largest cloud company with over 80 million users. We have the fastest growing solution portfolio to support digitisation. With 74% of the world's transactions running through SAP, 7,200+ customers leveraging SAP HANA, and 1,600+ customers leveraging our Internet of Things technologies to drive new business models, SAP is the preferred choice to turn your digital vision into reality.



SAP will bring expertise, assets, and the proven methodologies required to support the development of your digital business strategy. These capabilities will be leveraged throughout SAP's collaborative value and innovation framework.

EXPERTISE

- Experts In **25** industries and **12** lines of business
- SAP Advisory Council for Higher Education and Research brings executive and expert thinking to SAP
- Global and regional higher education user groups influence SAP strategy and share knowledge and best practices
- **6,000+** Design Thinking experts – sales, services, development
- User experience of the future
- Enterprise architecture
- Data scientists

ASSETS

- **60+** business process benchmarking and best practice assessments
- **600+** industry-focused innovation scenarios
- Innovation case studies by industry
- Infrastructure to drive proofs of concept
- **13+** co-innovation and living labs with **470+** customer co-innovation/Design Thinking discussions from 2014 to date

METHODOLOGY

- Business case methodology
- Design Thinking
- Benchmarking
- Value partnership framework

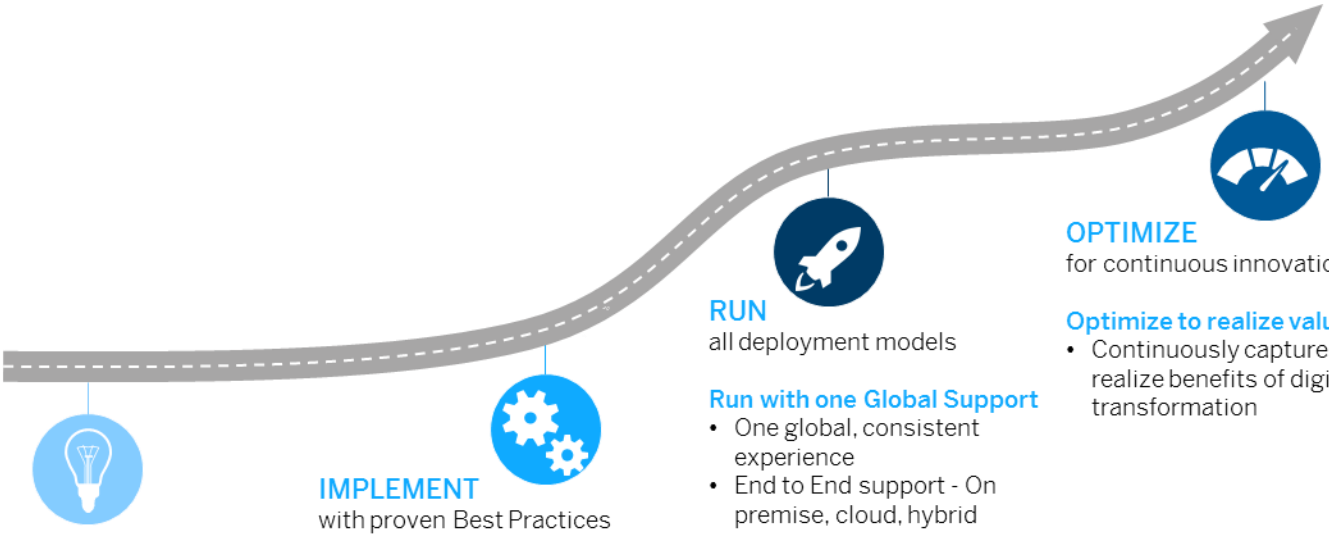
SAP GLOBAL SERVICES AND SUPPORT TO DRIVE YOUR SUCCESS

In the digital economy, simplification and innovation matter more than ever. SAP has a broad range of services to cover the end-to-end digital transformation journey, ranging from advising on a digital innovation road map and plan, to implementing with proven best practices, to the ability to run across all deployment models and ultimately optimise for continuous innovation across your digital journey. SAP provides both choice and value with our services, allowing you to tailor the proper approach based on your needs.

Turn to the 30,000 consultants and support professionals who can bring your digital strategy to life. SAP's Global Service & Support (GSS) organisation provides a consistent experience –on premise, cloud, or hybrid – with the expertise, assets, and the proven methodologies required to accelerate business innovation, reduce TCO, and run a stable platform.

SAP Activate is a new, simplified consumption experience introduced for SAP S/4HANA and cloud adoption. It provides a combination of SAP Best Practices, methodology, and guided configuration. In addition, we provide leadership in learning to drive quick time to value and a solid engagement foundation with SAP MaxAttention, SAP ActiveEmbedded and SAP Value Partnership across the end-to-end customer lifecycle.

SAP HANA Enterprise Cloud is the optimal springboard to the cloud for customers. It offers an attractive option for organisations that are eager to leverage SAP's latest innovations, such as SAP S/4HANA, with the peace of mind that SAP is in the driver's seat.



ADVISE

Simplify and Innovate
- Digital Innovation Roadmap & Plan
- Co-innovation by Industry

IMPLEMENT
with proven Best Practices

Implement with SAP Activate
- Simplified consumption experience for SAP S/4HANA
- SAP Best Practices, Methodology, and Guided Configuration

RUN
all deployment models

Run with one Global Support
- One global, consistent experience
- End to End support - On premise, cloud, hybrid

OPTIMIZE
for continuous innovation

Optimize to realize value
- Continuously capture and realize benefits of digital transformation

Learn | Extend / Innovate | Engagement Foundation | Support

SAP COMPREHENSIVE ECOSYSTEM

Orchestrating the world to deliver faster value

Our comprehensive ecosystem offers:

- Integration into a wide range of "business services" for universities (procurement, travel, etc.)
- Open architecture for your campus: choice of hardware and software
- Complementary and innovative third-party solutions for universities
- Reach – partners to serve your university of any size, anywhere in the world
- Forum focused on higher education and research for influence and knowledge
- Broad skill sets to meet wide ranging needs

SAP University Alliances

HERUG SAP Higher Education & Research User Group

SAP Customer Influence Collaborate and Co-Innovate

BUSINESS NETWORK

- 1.9 million suppliers
- 200 major travel partners (air, hotel, car)
- 50K service and contingent labor providers

INFLUENCE FORUMS & EDUCATION

- 32 user groups across all regions
- HERUG – Higher Education & Research User group driven by customer community
- HERAC – Higher Education & Research Advisory Council driven by university executives from our customer base
- SAP community >24 million unique visitors per year
- 1,800 SAP University Alliances

IMPLEMENTATION SERVICES

- 13,000 partner companies
- 3,200 service partners
- Delivering 1,300+ industry specific solutions

INNOVATION

- Influence and collaborate with Customer Connection Programs for our Higher Education and Research solutions
- 1,900+ OEM solution partners to extend SAP solutions
- 2,000 startups developing SAP HANA apps

PLATFORM & INFRASTRUCTURE

- 1,400 cloud partners
- 1,500+ platform partners

CHANNEL & SME

- Higher Education focused partners
- Partners with Higher Education focused templates, extensions and Rapid Deployment Solutions
- 4,800 overall channel partners

ADDITIONAL RESOURCES

Outlined below is additional external research that was used as supporting material for this white paper.

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46. Kicking Cancer with Technology, SAP customer success story, June 2014 https://blogs.saphana.com/2014/06/23/kicking-cancer-with-technology-2/

Note: All sources sited as "SAP" or "SAP benchmarking" are based on our research with customers through our benchmarking program and/or other direct interactions with customers

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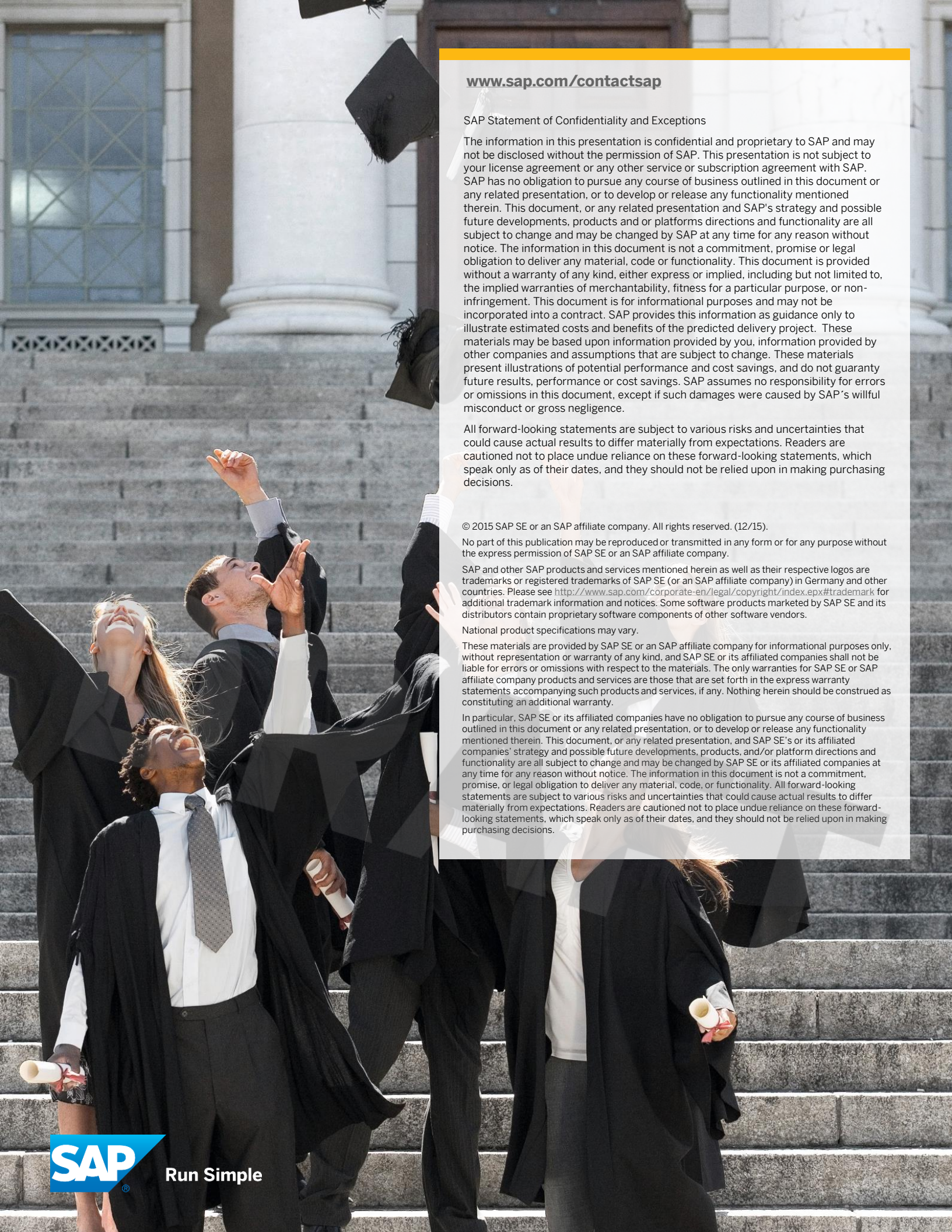

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