THE INTELLIGENT ENTERPRISE FOR THE HIGHER EDUCATION AND RESEARCH INDUSTRY

Helping to establish superior student and faculty engagement through integrated solutions delivered across an intelligent enterprise

THE BEST RUN SAP

"Successfully transforming higher education and research will require a renewed focus on operating models to extend value while focusing on student engagement to extend the learning experience beyond the classroom."

Malcolm Woodfield
Global Vice President
Higher Education and Research
SAP SE

WELCOME

Dear Customers,

The world is facing unprecedented health, economic, and social challenges. Research and education have become more critical than ever for the constant transfer of knowledge and skills to a world hungry for information, real change, and leadership. Online learning environments have become the educational backbone virtually overnight, with social distancing and the closure of institutions. Colleges and universities have never played a more important role in shaping the next-generation workforce and society.

Even before the advent of and disruption following COVID-19, the traditional university curriculum and the business models that support it struggled to satisfy student and employee expectations of the "outcome" of a university education. University business models are failing to control costs. Students are skeptical of the personal value – the value to them, not to the "labor market" – of the knowledge and skills being taught. The situation is further exacerbated with forced remote learning and increasing questions from parents and students about the actual value of tuition.

The focus is moving from institutionally measured "student success" (the buzz phrase of the last decade) to less easily measured but more broadly powerful "student engagement." But this requires investment in people who can engage, in places where they engage, and in platforms on which they engage. And this, in turn, requires some painful disinvestment in or repurposing of people, places, and support.

To deliver on its promise to educate the next generation, the university enterprise must become intelligent. The next-generation learning environment will follow trends for experience economics. Value will be generated through "customer" engagement of both faculty and students. Analytics helps us understand, predict, and recommend
new trends in learning and research and in university business operations. Artificial intelligence is the next-gen UI. Intuitive and innovative people will focus on human services and human outcomes – the mission of teaching, research, and engagement.

The evolution to the intelligent university will affect every activity, interaction, transaction, and outcome at higher education institutions. This includes every aspect of university business operations, including complex workforces, demanding stakeholders, asset-intense campuses, and suppliers they rely on for products and services.

As the operating models change, institutions that deliver great experiences will rely on four pillars:

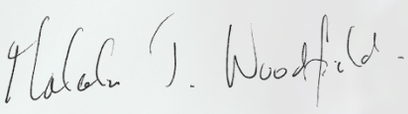
- Rethinking student engagement
- Transforming operations and support
- Creating an end-to-end research experience
- Real-time data and analytics

An institution is not an ivory tower; it is a platform for leadership, student and faculty engagement, and high-velocity research. Today, this platform must be digital. However, simply introducing new technology is not the end goal but rather the means to achieve customer value – now more than ever.

University programs and courses that emphasize strategy and oversight, as well as hands-on project experience, will be necessary to realize the benefits of AI and machine learning. Colleges and universities must ensure that they prepare students for the jobs of the future and embrace new opportunities, leveraging experience analytics and insights to adapt curriculums.

To support the Intelligent Enterprise, SAP provides the integrated suite of applications, intelligent technologies, and the digital platform that institutions need to adapt. We have the vision, the solutions, and the commitment to meet the current and future challenges colleges and universities face in defining their transformation strategy to meet the unprecedented changes in the global learning environment.

Best regards,



Malcolm Woodfield
Global Vice President
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OUR PLACE IN THE NEW WORLD

Global "megathemes" are affecting higher education and research, providing new opportunities for growth.

- **Experience-based economies** continue to evolve and are forcing new operating models to gauge client perception for input and value.
- **Robotic process automation and machine learning** are dramatically shaping the **future of work** at an accelerated pace, driving the need for alternate skill sets, training, and experience.
- Demographic changes are forcing **mismatches** in the availability of **skilled workers** region by region and globally to meet changing technical and professional demands. This affects both the university workforce and budgets, but it also shapes the future workplace for graduates.
- The **gig economy** is growing fast, with 16.5 million people in the labor force having **contingent** or **"alternative work arrangements"** that require continuous learning and skills development within fluid workplaces and cross-organizational support structures.[1]

The higher education and research industry is being reshaped by four major trends.

- Closed campuses, economic pressure, and changing dynamics are challenging the value of education in the view of the millennial generation, especially those seeking work with a sense of purpose.
- Global online and open coursework has become the new normal with the current pandemic, increasingly being integrated as the "global campus" aggressively evolves.
- Proactive student engagement is increasing to adapt classes and teaching based on student experiences, to meet expectations for "success."
- Real-time, "always-on" mobile support is expected now more than ever across the enterprise and virtual campus.

Being able to address these global megathemes and industry challenges will determine who will be among the winners in the next 10 years. Successful operating-model innovation, process optimization, and workforce productivity are directly linked to delivering great customer and employee experiences.

In fact, research indicates that the best-performing institutions are pulling away from the rest and widening the performance gap. They are doing this by creating a landscape where they deliver seamless virtual support, superior experiences, and greater value, successfully adopting new technologies and new working environments to deliver winning solutions and services more efficiently.

According to a July 2018 study by Forrester Consulting commissioned by SAP, innovative organizations focus on digital priorities to help them achieve digital transformation.[2]

Digital strategies are disruptive and changing the rules for educators.

Oita University is using SAP HANA® and intelligent technologies from SAP to power "EDISON," the Earth Disaster Intelligent System and Operating Network, which uses Big Data, machine learning, and AI to spot locations at high risk for disaster and design and build better infrastructure for a safer future.

Tec De Monterrey built its reputation for excellence by creating optimal working environments that attract and retain the best academic and support staff. The institution drastically reduced administrative tasks and burdens with streamlined HR processes to focus on its core mission.

Newcastle University is using SAP HANA for ERP and student management to consolidate key business data, including admissions, scheduling, and finance, to give staff members role-based mobile access through one central location for a complete picture of student needs.

King Abdullah University of Science and Technology worked with experts from SAP to develop the Café Dining ecosystem, which leverages SAP Cloud Platform SDK for iOS to develop a native app for Apple iPhones and iPads and a back end based on SAP Cloud Platform. This personalizes the service experience, streamlines the process with no queuing times, and enables customers to network and collaborate.

83%

Of higher education survey respondents indicate that technology has positively affected teaching effectiveness.[3]

PAVING THE WAY FOR BUSINESS MODEL INNOVATIONS

By 2025, higher education institutions will transform to deliver both the educational skills and real-time job experiences necessary. Curriculums will evolve in close collaboration with public and private enterprises to adapt to changing professional requirements.

Higher education will embrace advanced technology to run the university, support alternate learning environments, and focus on the jobs of the future. These institutions will have fully interactive, real-time platforms focused on student engagement, personal learning, accountability, and purpose. Data-driven results will be expected through graduation, with student and faculty sentiment analysis acting as the real-time barometer.

30%

Of organizations are predicted to use innovation marketplaces by 2022 for on-demand services and software that raise margins by up to five percentage points[4]

35%

Of organizations will have created new ecosystems by implementing AI- and blockchain-centric platforms, thus automating 50% of processes by 2022[5]

90%

Of organizations will leverage real-time equipment and asset performance data to self-diagnose issues in advance and trigger a service intervention to avoid unplanned downtime by 2021[6]

50%

Of organizations are predicted to network related product and asset digital twins into digital twin ecosystems for a systems-level view of their business and 5% reduction in cost of quality by 2024[7]

90%

Of large enterprises will generate revenue from data as a service by 2020 – from the sale of raw data, derived metrics, insights, and recommendations – up from nearly 50% in 2017[8]

FOUR PRIORITIES FOR SUCCESS

We have identified four strategic priorities necessary for higher education institutions to transform their core mission and operational support.

- RETHINKING STUDENT ENGAGEMENT
- TRANSFORMING OPERATIONS AND SUPPORT
- CREATING AN END-TO-END RESEARCH EXPERIENCE
- REAL-TIME DATA AND ANALYTICS

RETHINKING STUDENT ENGAGEMENT

To effectively meet current student expectations, intelligent outreach must begin while the student is still a prospect, and must evolve across individual student experiences.

"Always-on" is not jargon; it is the expectation of every millennial holding a smartphone. Recent history has shown that many colleges and universities were unprepared for forced online learning and necessary virtual support environments. Effective student engagement will be predictive and responsive, bringing together customer experience data with university business or operational data for end-to-end intelligence.

The Vision

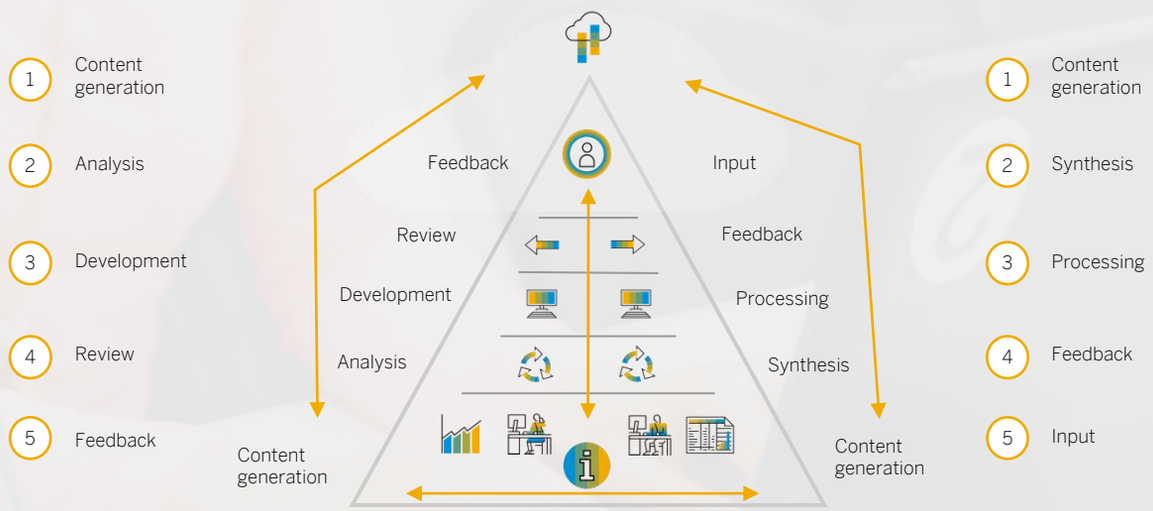
By 2025, advanced student outreach and constant support will be key to the intelligent university strategy and critical to competitiveness, as will be the universities' renewed focus on student engagement throughout (and beyond) their educational journey.

The Journey

The journey begins with the recognition that the student is the focus of integrated services. To establish and develop this customer relationship, institutions must build and support a real mobile, interactive online presence with features such as live customer chat on the front end, integrated with analytics and logic on the back end.

Systems will monitor students in a 360-degree manner, on campus or off campus, sensing interest with sentiment analysis and crowdsourcing, and pairing requested institution features and services. Student experiences and support needs will directly drive system and service change. Embedded analytics within those communications channels will gauge student needs and requirements in real time and will help the university meet their expectations (see Figure 1).

Figure 1: Superior Student Outreach



69% of students surveyed feel that digital learning technology has improved their focus.[9]

RETHINKING STUDENT ENGAGEMENT

CONTINUAL AND INTERACTIVE ENGAGEMENT

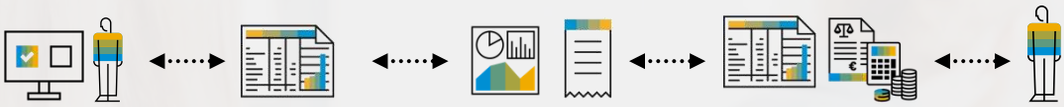
The traditional student management model begins with applications, moves to admissions, and includes invoicing, student class scheduling, attendance, course completion – and repeats. Students can often be viewed as nothing more than a number. Administrative or faculty engagement with students can often be limited to problem resolution. The situation is further exacerbated within the current pandemic environment. Engagement models must rapidly evolve.

In the next-generation college and university, student engagement is a living, interactive relationship that begins as a college prospect investigates a university, with the data processed as sentiment analysis. Respective student interests are cataloged, driving tailored interactive outreach. Student information is continually updated to automatically tailor a learning curriculum for the student, whether on or off campus. Comprehensive account and schedule summaries are available on a mobile device; student activities and interests are continually monitored, with real-time support enabled with faculty.

TRADITIONAL SCENARIO

Student prospect meet and greet → Acceptance and admission → Invoicing → Class scheduling → Lecture attendance

NEW-WORLD SCENARIO



Student reviews university online – executing searches on interest areas. ↔ University monitors prospective student sentiment and develops profiles. ↔ University maintains interactive communication with student from admission through scheduling, adapting curriculum and needs in process. ↔ Student refines class and personal schedule to develop the clearest path to their major curriculum. ↔ Student maintains interactive communication with the university as experiences provide profile and campuswide information updates.

TOP VALUE DRIVERS

3%–10%

Improvement in service margin

25%–30%

Improvement in invoice processing time

Source: SAP Performance Benchmarking

TRANSFORMING OPERATIONS AND SUPPORT

A global need for effective utilization of resources is driving end-to-end integration of support systems.

In recent years, universities have tended to invest in "point solutions" to meet urgent priorities. The result has been an inefficient patchwork of products and platforms. With the recent pandemic disruption of traditional campus environments, the precarious balancing act of university systems and budgets has been further elevated.

The Vision

By 2025, individual departments will cease operating as independent entities as economic and customer pressure drives efficiencies. The goal is to create an integrated intelligent enterprise that balances resources and workloads to focus on teaching, research, and engagement (see Figure 2).

The Journey

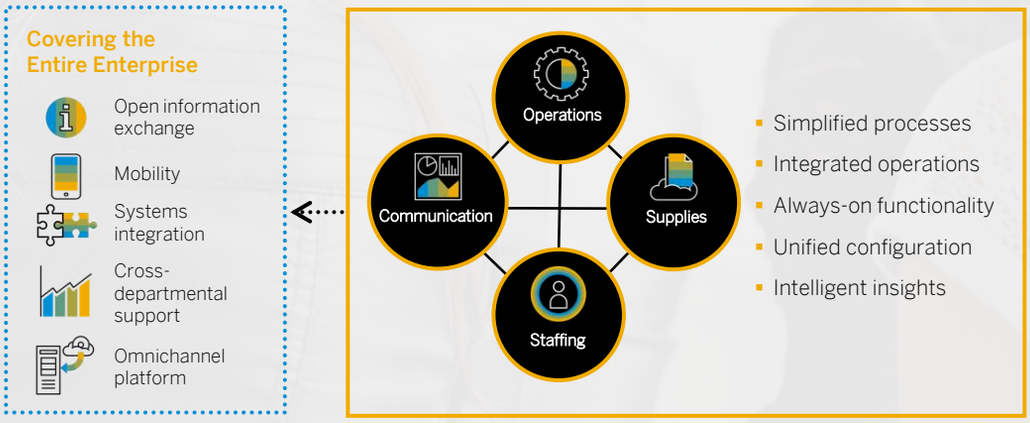
The journey begins by taking a full enterprise view with clear targets in mind, focusing on a measurable impact on teaching, research, and engagement both on and off campus.

The next step is recognition that transformation means deploying integrated technology operations. The journey to becoming an intelligent enterprise requires seeing the university itself as a collaborative common platform for teaching, research, and engagement, bringing together university administration (the back office) with campus stakeholders (the front office).

The deployment of integrated solutions on a single platform is a key step in becoming an intelligent university. But more important is the provision of integrated data and a "single source of truth" for university metrics across key stakeholders.

Using this platform, technologies such as machine learning, AI, and the Internet of Things (IoT) both generate and consume such data. They are now the single engine of the enterprise: powered by machines; driven by data; managed by people; and measured by success in teaching, research, and student engagement; they are building the next generation of leaders and innovators.

Figure 2: The Vision of Integrated Systems Support



By 2020, more than **40%** of data science tasks will be automated, and the number of citizen data scientists using AI will grow **5x** faster than professional data scientists. [10]

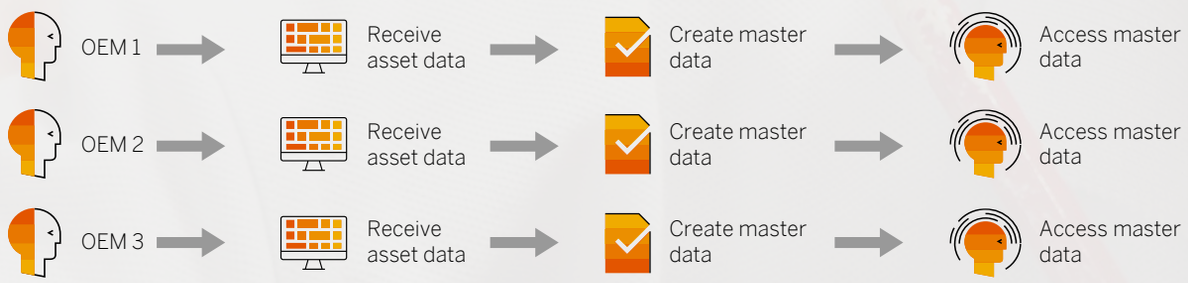
TRANSFORMING OPERATIONS AND SUPPORT

VIRTUAL SMART SYSTEMS AND OPERATIONS

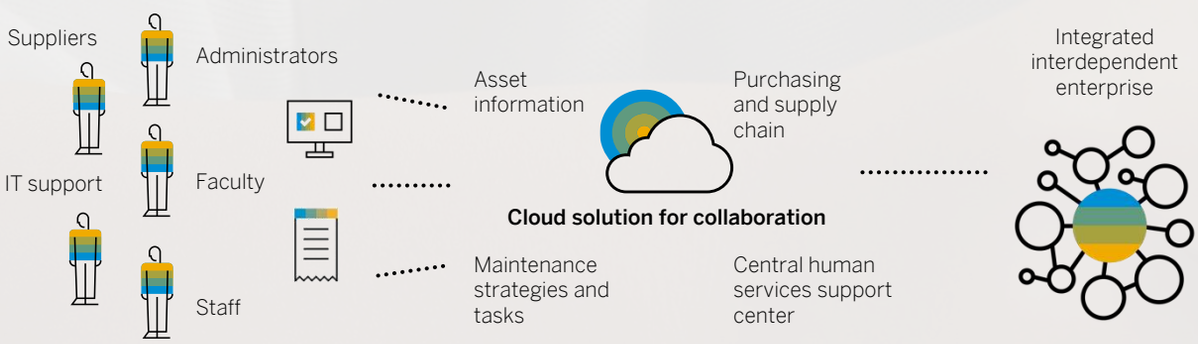
As institutions of higher education continue to seek the means to drive efficiencies and the greatest use of finite institutional resources, outdated legacy systems continue to be identified as demonstrating inadequacies.

The transformation for the institution begins with a thorough review of the current IT infrastructure and operating environment to identify workflow impediments and unnecessary tasks. Final transformation to become an intelligent enterprise would include a dramatic investment and movement of all systems and support to an analytics-driven and flexible cloud platform that can integrate across the organization to help facilitate the shared service environment.

TRADITIONAL SCENARIO



NEW-WORLD SCENARIO



TOP VALUE DRIVERS

12%

Reduction in employee turnover

74%

Improved efficiency when operating KPIs are tracked

Source: SAP Performance Benchmarking

CREATING AN END-TO-END RESEARCH EXPERIENCE

Universities are complex entities that operate across multiple priorities, streamlining shared service environments and minimizing administrative burden to maximize research focus.

University operating structures are the result of institutional history, not necessarily strategic planning. Budget balancing is constant, and the "new normal" focus on student engagement may compromise research priorities. Efficiency and reduced administrative support are critical to maximizing resources. Shared service environments and integrated support structures will be critical.

The Vision

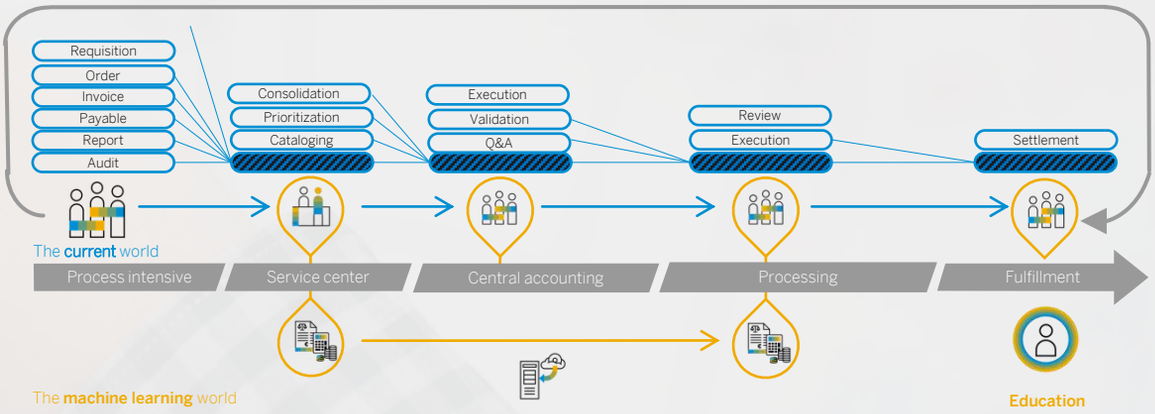
By 2025, administrative tasks will be reduced through automation, allowing for a renewed focus on research missions. Enterprise systems will increasingly be self-driving, standardizing research processes for grants management and reporting, This will allow for the human focus on managing outcomes against the strategic research goals, research productivity, and meaningful outcomes. The result will be the evolution of an integrated platform for high-velocity research.

The Journey

Enterprise change begins at the "enterprise" level, with a recognition of the need for comprehensive processes. The university must evolve, regardless of the organizational structure, into a platform for leading-edge research vision and execution. Integrating the business platform across departments, projects, and grants categories will allow researchers to focus on their primary mission.

Centralization, standardization, and automation will be key steps in the journey toward the intelligent university of the future. That university will be characterized by shared services, real-time data, and a single source of truth for that data. There will be complete transparency of costs and expenses across the enterprise. Administrative tasks will increasingly be automated. For example, grants management payables and receivables will be managed by machine learning (see Figure 3).

Figure 3: Complete Digital Representation of Shared Research Services and Support



70% of surveyed higher education faculty members join administrators in supporting the use of open educational resources to increase student engagement while combating escalating economic challenges of outdated resources (such as textbooks).[11]

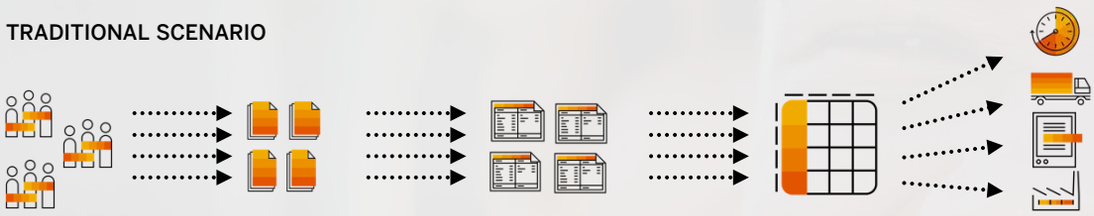
CREATING AN END-TO-END RESEARCH EXPERIENCE

MANAGING INTELLIGENT, INTEGRATED PROCESSES

The inefficiencies in traditional college and university operating structures are inherent in the siloed nature of separate departments and research teams that too often act as autonomous islands. This includes general support, with specific issues in purchasing, supplies, and accounting, all supported with traditional ordering, invoicing, payables, and receivables. The result is multiple groups and departments with multiple redundant workstreams and overstocking supplies.

Digital and smart support structures of the next-generation institution will use advanced technology, such as machine learning, to automatically maintain inventory and supplies across the enterprise. Grants funds can be segregated but still allow centralized ordering and payments, pooling purchasing for economies of scale but maintaining strict accounting segregation across projects. This will negate most standard accounting practices and routine tasks to enable more focus on research.

TRADITIONAL SCENARIO



Administrative staff members from each department or research group identify a supply shortage.

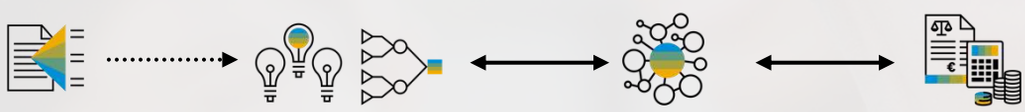
Department-by-department orders are created and forwarded to procurement.

Research group and department invoices are each created to execute orders, with documentation forwarded to accounting.

Invoices are each paid out of the general ledger, and orders are executed.

Varied products are ordered and shipped to numerous points across campus. Accounting in each department and research division performs a month-end audit and review to balance accounts.

NEW-WORLD SCENARIO



Supply inventory is monitored and measured in real time with smart sensors.

Supply reorders are identified with automated processing and matched with the respective funding account. Grants categories are segregated with individual journal entries.

As accounts make automated payments and as supplies across research teams and departments are measured, any necessary restocking is executed.

Inventories are updated and new supply alerts are sent to each department as accounts are replenished and available cash can be reinvested.

TOP VALUE DRIVERS

20%–30%

Reduction in R&D costs

Up to 10%

Reduction in total costs

Source: SAP Performance Benchmarking

PROVIDING REAL-TIME DATA AND ANALYTICS

To meet student and faculty expectations for superior engagement, both on and off campus, institutions' information must be available in real time and allow analytical insights.

Digital institutional platforms must provide insight into the student and faculty experience. Recent challenges through the pandemic have highlighted shortcomings in many college and university support structures. The smartphone and tablet of every student are currently the nucleus of their social world and their online outlet to society. Yet often students cannot use these smartphones to access university systems and support. To change this, universities must become equally "smart," or intelligent. This integration can be further extended to support smart research and smart operations.

The Vision

By 2025, university systems will be integrated to provide the student customer with a single real-time view of the institution, classes, schedules, and finances, enhancing the student experience (see Figure 4).

The Journey

The journey begins with the recognition that the student and the faculty are the codependent customers. On the system side, an integrated, platform approach must be implemented to facilitate mobile access by single sign-on. This enables automation aspects of communication, with integrated forums or chatbots as examples.

The mobile device can now support the focus on student and faculty engagement. The infrastructure will also provide real-time data and a continuous feedback loop regarding student activity and experiences. This insight will be used not only to improve student success but also to influence university planning to further improve student services and academic offerings.

Figure 4: Connectedness with Real-Time Student and Faculty Information

Integrated applications
Smart technology searches for synergy or conflicts

Continual updates
Automated and seamless

Always on, always available
360-degree uptime

Mobile
Unilateral system platforms

Real-time customer service
24x7 real-time support

Security and tracking
Seamless with campus

84% of students surveyed feel that digital learning technology has improved their efficiency and effectiveness.[12]

PROVIDING REAL-TIME DATA AND ANALYTICS

EXPANDING INFORMATION REACH WITH ONLINE INTEGRATION

Putting the student and faculty customer point of view at the center of service decisions is a key prerequisite for success in the digital age. It means capturing information, analyzing the findings, and providing feedback from both the equipment and the people using it. Data compilation and synthesis are constant. And the analysis does not stop at the front desk of the registrar's office. Colleges and universities need to become customer-centric enterprises. The ability to focus on their most valuable customers is one of their key priorities. Since immediate access to information is important for faculty and students, institutions want to prioritize the delivery of services based on what those customers demand. SAP S/4HANA® enables colleges and universities to prioritize customer input more reliably and efficiently while providing valuable insights on how to allocate the necessary resources and balance budgets to meet key needs.

TRADITIONAL SCENARIO

Student initiates inter-library search for old periodical necessary to source a research report.

System malfunctions and aborts numerous search attempts.

Student contacts library staff and outlines the nature of the problem, seeking an alternate research route.

Interlibrary system is scheduled for maintenance and sits dormant for two weeks.

Student research is a failure, and topic and white-paper focus must be altered to use whatever resources are available.

NEW-WORLD SCENARIO

University library designs IoT-enabled equipment to capture resources across participating libraries.

University monitors student project in real time and sends suggested information repositories and related topics.

Current data is merged with new data and automatically located by an IoT-enabled research tool.

Student refines research thesis based on accumulation of new resources, managing back successful sources of information.

Research paper is refined and finalized, with student automatically documenting a successful research string and successful resource locations.

TOP VALUE DRIVERS

29%

Increase in active reporting

10%–20%

Increase in customer satisfaction

Source: SAP Performance Benchmarking

KEY TECHNOLOGIES

The fast pace of technological advancements has the most profound impact on how institutions of higher education and research transform to respond to customers' needs and market trends. Those needs have never been more pronounced than in the disrupted campus environment.

Intelligent technologies promise to bring great benefits, such as productivity and gains in efficiency, enabling innovative new business models and new revenue streams. The following intelligent technologies are instrumental in helping institutions of higher education and research respond to market trends.

Artificial Intelligence and Machine Learning

Machine learning enables algorithms to "learn" from existing data and achieve the best possible outcomes without being explicitly programmed. Once the algorithm is trained, it can then predict future outcomes based on new data. Institutions can use these capabilities to eliminate repetitive manual tasks in accounting, scheduling, and processing for faculty and students across departments and across the campus. Research can now be supplemented by helping with complex solution configurations by applying machine learning to historical data to streamline analytics processes for multiple hypothetical lab scenarios – reducing valuable time spent on administrative tasks for grant funding.

The Internet of Things

Advances in ubiquitous connectivity and edge computing are driving a steep change in organizational productivity. This connectivity, coupled with artificial intelligence and machine learning, can analyze petabytes of data and affect business outcomes. Although institutions have been using the IoT for some time now, an entire campus value chain or cross-institution value chain can be connected from design to production to supply chain.

Data-driven insights from department and faculty preferences can drive better designs, lower costs, and reduce risk. Remote condition monitoring of assets and research provides real-time data from faculty and employees to predict accurate resource allocation and identify potential quality problems in research and laboratory exercises.

Real-time needs assessments and asset deployment monitoring will ensure an institution can leverage economies of scale for the highest level of service, and continuity of the best learning and research outcomes.

Data Platform to Manage Experiences

In the digital economy, the cycle time to sense, analyze, and respond is a big competitive differentiator. Leaders are interlocking the operational performance data from business systems (explaining what is happening) with the experience data coming in the moment from customers and employees (explaining why it is happening).

Advanced Analytics

The integration of advanced analytics capabilities – including situational awareness – into applications enables business users to analyze data on the fly and drives better decision-making. Empowered users, benefiting from embedded analytics in business processes, can get real-time visibility into their changing environment, simulate the impact of business decisions, mitigate risk, and achieve better customer outcomes.

Blockchain

A breakthrough in technology, blockchain is revolutionizing the movement and storage of value by creating a chain of unalterable transactional data. The blockchain model of trust, through massively distributed digital consensus, will reshape commerce across the entire digital economy. In higher education and vocational education, blockchain is already being used to provide secure access to credentials.

Virtual and Augmented Reality

The use of digital technology to create immersive experiences – virtual reality – was once the stuff of science fiction. So was augmented reality, which lets users interact with digital content that's overlaid on the real world. This technology is already in use for medical students and is increasingly being used in the classroom.

Conversational AI

Advances in machine learning are enabling algorithms to become highly accurate in natural-language understanding and in image and voice recognition, which are especially useful in after-service and call-center activities. Voice interfaces will be the go-to technology for the next generation of applications.

Robotic Process Automation

Robotic process automation streamlines repetitive, rule-based processes and tasks in an enterprise and reduces cost through the use of software robots by replicating specific tasks or keystrokes.

X + O Analytics

Differentiation in performance and efficiency requires the fusion of human experience data (X-data) with correlated operational data (O-data), providing a holistic understanding of human experiences through data-driven insights.

83%

Of academics surveyed highlight technology as making a positive impact on student learning [13]

57%

Increase, on average, of the contribution of machines and algorithms to specific tasks by 2022[14]

US$1.2 trillion

IoT spending in 2022[15]

75%

Of manufacturers will provide their service teams with access to searchable video content through mobility and wearables by 2021[16]

40%

Of digital transformation initiatives will use AI services by 2021[17]

GETTING THERE:
A PHASED APPROACH

Institutions will become intelligent enterprises on three distinct tracks as they evolve their strategic priorities to match their vision. They will optimize operations, extend services and support, and transform traditional college and university campuses.

1. **Optimize** what they already do by implementing a stable and scalable digital core to make processes more transparent and integrated
2. **Extend** their current processes by connecting them to the real world using IoT technologies
3. **Transform** their business using a constant stream of data enabling new service-driven business models (see Figure 5).

Figure 5: Strategic Priorities Across the Maturity Framework

	Optimize	Extend	Transform	Create superior customer experiences through tailor-made solutions delivered at scale and as a service
Rethinking student engagement	Evolving student routes into a true omnichannel model	Extension of student calendars and records with a real-time view of campus	Collaboration with students in a 360-degree manner, sensing demand to deliver value	▪ Modular solution architecture ▪ Direct connection to demand signals ▪ Automated communication and alerts
Transforming operations and support	Initiating system analysis and rationalization of existing systems and variants	Collaboration of a common platform for integrated front and back ends	Advanced intelligence and technologies to maximize central data resources for insight and efficiency	▪ Customer-for-life relationships ▪ Shared risk and reward ▪ Seamless omnichannel interactions
Creating an end-to-end research experience	Extending platform for enterprise coordination across research support areas	Centralization, standardization, and automation for shared services	Increasingly automated administrative tasks with machine learning and segregated grants accounting	▪ Self-aware and connected solutions ▪ Flexible configuration during operation ▪ Increased value from software
Providing real-time data and analytics	Building an interactive platform with an analytical front end for immediate connection	Extension of front-end systems with mobility and real-time analytical updates to consolidate sentiment findings and needs	360-degree student and faculty well-being with crowdsourcing and interactive services	▪ Services based on value and data ▪ Multibrand services ▪ Information as a service

EARLY DIGITAL ADOPTERS LEAD THE WAY

How do you achieve these strategic priorities?

Start by reimagining your institution with your customers – your faculty and students. Build a road map for optimization and intelligent automation to simplify your organization and free up resources to invest in and focus on teaching, research, and engagement.

According to a July 2018 study by Forrester Consulting that was commissioned by SAP, innovative companies focus on digital priorities to help them achieve digital transformation more than other companies (see Figure 6).

Figure 6: Innovators Focus More on Digital Priorities than Others[18]

SAP'S FRAMEWORK FOR THE INTELLIGENT ENTERPRISE

All businesses have the same goal: they want to run at their best. They want to offer the best employee experience and the best products and services, and deliver the best customer experience. They want to manage spend, run efficiently, make confident decisions, and innovate. They want to break down departmental silos and integrate their processes so that everything runs seamlessly. SAP's solutions for intelligent enterprises can help you to achieve these outcomes.

Intelligent enterprises run agile, integrated business processes and use advanced technologies such as artificial intelligence, machine learning, and the Internet of Things. They apply leading-edge industry best practices and work together to build flexible value chains. They evaluate and act on customer, partner, and employee sentiment, and they understand and manage their environmental impact (see Figure 7).

As a result, they can keep their workforce engaged and increase organizational agility. They can deliver the products and services customers need. They can deliver engaging, trusted, and connected customer experiences. They can control every source and category of spend. They can increase efficiency and gain insight to guide their business. And they can make confident decisions and drive continuous innovation.

Becoming an intelligent enterprise helps your business become more resilient – able to adapt, innovate, and overcome challenges. It helps you become more successful – able to run efficiently and drive long-term growth. It helps you become more sustainable – able to reduce waste and emissions, and make responsible choices.

Only SAP has the solutions, services, and ecosystem to deliver this vision and help your business run at its best.

SAP'S FRAMEWORK FOR THE INTELLIGENT ENTERPRISE

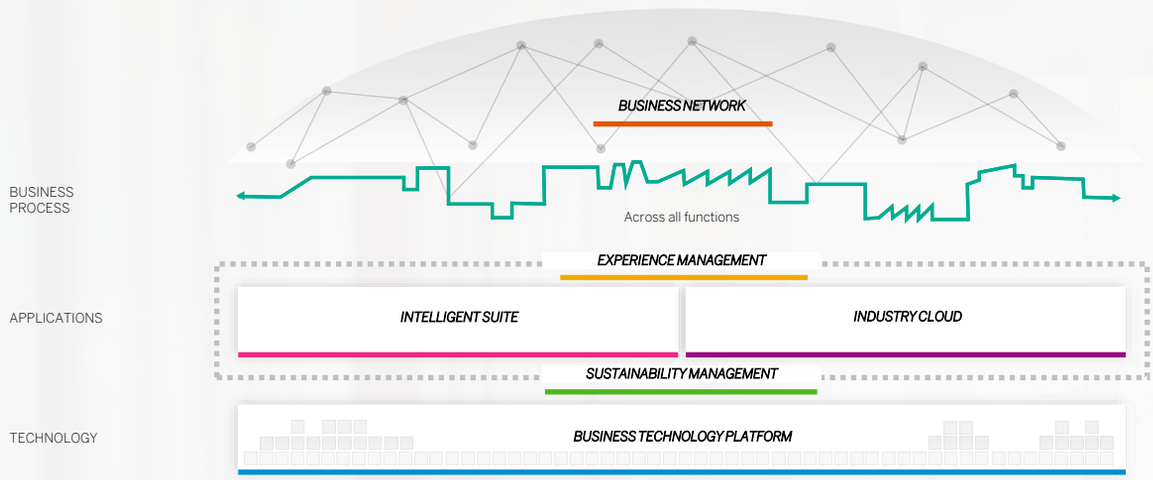


Figure 7: SAP® Intelligent Enterprise Framework

Business network – helps customers digitalize cross-company business processes. The network builds on our procurement, travel, and contingent workforce solutions. It helps our customers work together to build flexible value chains.

Experience management – helps organizations evaluate and act on customer, partner, and employee sentiment. Understanding what your stakeholders want and how they feel is critical to making the right decisions.

Intelligent suite – helps to run agile, integrated business processes. We help manage every part of the organization – employees, customers, products, spend, finance, and IT. With embedded analytics, we offer a 360-degree view of the business.

Industry cloud – allows customers to discover and deploy vertical solutions from SAP and partners. These help customers apply leading-edge industry best practices and extend current business processes.

Sustainability management – helps customers understand and manage their impact on people and the environment. Climate 21 is the name of one new initiative that helps businesses understand and manage greenhouse gas emissions. Other solutions help companies move toward a circular economy, manage energy use, improve employee safety, and reduce waste.

SAP Business technology platform – provides data management and analytics and supports application development and integration. It also allows our customers to use intelligent technologies – such as artificial intelligence, machine learning, and the Internet of Things – to drive innovation.

HOW TO PLAN YOUR PATH TO THE INTELLIGENT ENTERPRISE

In the digital economy, intelligent technologies and integrated operating processes are now driving digital transformation.

To do this effectively requires an end-to-end plan for becoming an intelligent enterprise. This includes creating an intelligent enterprise road map and implementation plan with proven best practices and deployment options that optimize for continuous innovation with a focus on intelligent outcomes.

The end-to-end journey to becoming an intelligent enterprise

Plan
well to manage expectations

Simplify and innovate
- Reimagined operating models, processes, and work
- SAP Intelligent Enterprise Framework methodology as a guide for digital transformation
- Value-based innovation road maps

Build and launch
with proven best practices

Standardize and innovate
- Model-organization approach to accelerate adoption with model industry solutions
- Design thinking and rapid, tangible prototypes
- Coengineered industry innovations delivered with agility

Run
all deployment models

Run with one global support
- One global, consistent experience
- End-to-end support – on premise, cloud, or hybrid

Optimize
for continuous innovation

Optimize to realize value
- Continuously captured and realized benefits of digital transformation
- Adaptation of operating models based on customer experiences and expectation of value

To move forward with speed and agility, it helps to focus on live digital data and combine solution know-how and industry-specific process expertise with data analytics so the right digital reference architecture is defined and delivered. In that context, a model-institution approach is aimed at simplifying and increasing the speed of the digital transformation journey. Model organizations represent the ideal form of standardization for a specific line of business or industry. They are built on preconfigured SAP solutions based on best practices supported by SAP, along with the business content that encompasses our experience and expertise relevant for the industry. They provide a comprehensive baseline and come with the accelerators to jump-start digital transformation projects.

COMPREHENSIVE SAP ECOSYSTEM ORCHESTRATING THE PARTNER ECOSYSTEM TO DELIVER VALUE FASTER

Our comprehensive ecosystem for the higher education and research industry offers:

- The Intelligent Enterprise as the overarching strategy to meet future requirements, providing:
  - SAP S/4HANA co-development programs for customers and partners
  - Industry co-innovation programs for industry-specific use cases
  - Delivery of enterprise-to-enterprise industry clouds
  - Thought leadership, evangelism, and enablement by industry through events, councils, and regular customer exchange
- Integration into a wide range of business services (OEMs, suppliers, key vendors, and more)
- Open architecture, with a choice of hardware and software specifically designed to meet requirements
- Complementary and innovative third-party solutions to provide leading-edge and state-of-the-art technology

Our partner ecosystem includes, among others:

accenture, aws, Deloitte., ellucian., Flexso, Google, itelligence NTT DATA Business Solutions, Microsoft, EPI-USE, pwc

SAP IS COMMITTED TO INNOVATION

10-Year Innovation Vision

SAP delivers fully intelligent business solutions and networks that span across organizational boundaries and promote purpose-driven operations. These solutions will be the most empathic symbiosis between machine intelligence and human ingenuity.

- Self-running enterprise systems
- Self-organizing operational ecosystems
- New markets and operating models

Extensive Industry Coverage

SAP enables extensive coverage of the integrated higher education and research value chain across the enterprise. With its clear industry road map, SAP is the partner of choice for the industry.

- More than 8,000 higher education and research customers innovate with SAP solutions.
- 97 of the top 100 global universities run SAP solutions.
- The top 20 universities with the largest endowments run SAP solutions.
- All lines of business are supported on a single platform.

Proven Services Offering

By bringing together world-class innovators, industry and emerging technology expertise, proven use cases, and design thinking methods, we help higher education institutions develop innovations that deliver impact at scale.

- Proven methodologies to drive innovation, from reimagining customer experiences to enhancing operations
- Innovation that is fueled through a managed innovation ecosystem from SAP
- Ability to build your own innovation capability and culture

SAP supports higher education and research organizations in becoming intelligent enterprises – providing integrated applications that use intelligent technologies and can be extended on SAP Cloud Platform to deliver breakthrough business value.

Learn more

- SAP for Higher Education and Research
- SAP Services and Support

RESOURCES

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

1. "US Gig Economy: Data Shows 16m People in 'Contingent or Alternative' Work," The Guardian, June 7, 2018.

2. "Emerging Opportunities to Deploy Industry Processes in the Cloud," Forrester Consulting on behalf of SAP, July 2018.

3. "1 in 5 Faculty Members Say Technology Makes Their Job Harder," Teaching with Technology Survey, Campus Technology Magazine, August 2018.

4. "IDC FutureScape: Worldwide Manufacturing Product and Service Innovation 2019 Predictions," IDC, Doc. #US43135918, October 2018.

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7. "IDC FutureScape: Worldwide Manufacturing Product and Service Innovation 2019 Predictions," IDC, Doc. #US43135918, October 2018.

8. "IDC FutureScape: Worldwide IT Industry 2018 Predictions," IDC, Doc. #US43171317, October 2017.

9. "New Survey Data: Four Out of Five College Students Say Digital Learning Technology Helps Improve Their Grades," McGraw-Hill, October 17, 2016.

10. "Gartner Top 10 Strategic Technology Trends for 2019," Gartner, October 15, 2018.

11. "Conflicted Views of Technology: A Survey of Faculty Attitudes," *Inside Higher Ed* in partnership with Gallup, October 2018.

12. "New Survey Data: Four Out of Five College Students Say Digital Learning Technology Helps Improve Their Grades," McGraw-Hill, October 17, 2016.

13. "1 in 5 Faculty Members Say Technology Makes Their Job Harder," Teaching with Technology Survey, Campus Technology Magazine, August 2018.

14. "The Future of Jobs Report 2018," World Economic Forum, September 2018.

15. "IDC Forecasts Worldwide Technology Spending on the Internet of Things to Reach $1.2 Trillion in 2022," IDC, June 18, 2018.

16. "IDC FutureScape: Worldwide Manufacturing Product and Service Innovation 2019 Predictions," IDC, Doc. #US43135918, October 2018.

17. "Worldwide Spending on Cognitive and Artificial Intelligence Systems Will Grow to $19.1 Billion in 2018, According to New IDC Spending Guide," IDC, March 22, 2018.

18. "Emerging Opportunities to Deploy Industry Processes in the Cloud," Forrester Consulting on behalf of SAP, July 2018.

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

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