
Strategic planning: Review of external data/information

Briefing theme: Technology Disruption & Digital Transformation

Background:

- Much has been written from thought leaders and pundits alike about how the pandemic has caused a once-in-a-lifetime disruption to almost all sectors, including post-secondary education. However, the COVID-19 pandemic has not been a change agent so much as an accelerant of trends already well underway. In what some are calling “post-Corona”, several real threats and opportunities lie ahead for higher education.
- The following briefing provides a synthesis of these trends that are disrupting post-secondary education that are related to technology disruptions and digital transformation. This is pertinent for the University of Calgary to consider as we embark on the development of our next strategic plan.

Key Trends Identified:

Technological disruption will continue to shape all aspects of university operations (teaching/learning, research, operations, community engagement). Emerging technologies, such as artificial intelligence, 3D printing, robotics, genomics, new material technologies, quantum computing, and more, will significantly impact the higher education sector in the years to come. Note that many of the other briefings also touch on technological trends (e.g. alternative learning platforms, mass digital learning), but this is such an important disruptor that we thought it deserved a briefing of its own – we won't repeat the items previously mentioned though.

- **New business models almost always equate to new technology.** Universities are seeing competitive threats from new entrants with disruptive business models, challenging the status quo and forcing them to evolve their business models.ⁱ Changes to business models often require new technologies to support them, such as continuing education and workforce development platforms to enable new types of credentials.ⁱⁱ
- **Many of the new investments in technology during the pandemic were focused on enabling new learning environments and supporting/improving the student experience.** For example, specialized web-conferencing platforms and tutoring platforms facilitate learning in ways designed to be more engaging and satisfying for students. Understanding and implementing virtual experiences and cross-life-cycle CRM will be critical components to institutions addressing and improving the student experience, which will be a key differentiator within higher education.ⁱⁱⁱ
- **Many universities made significant one-time investments in new classroom technology during the pandemic.** This is largely in the form of classroom video, audio, presentation and content capture. Much of this new spending on classroom technology was funded by one-time money related to the COVID-19 pandemic. Classroom technology typically requires maintenance where costs average around 20% of the initial outlay per year. The new investments will require ongoing funding, which has often not been allocated by universities.^{iv}
- **Additional technology supports for faculty, such as remote proctoring and faculty information systems, are increasingly going to be the norm for institutions and they will need to adapt accordingly.**^v

- **Two of the most significant technology disruptions expected over the next decade are expected to be automation and datafication.**
 - **Automation:** The spread of automation in every industry will accelerate, driven by the growing maturity of a wide range of technologies such as artificial intelligence, robotics and 3D printing. All of these have the potential to enable smarter and more sustainable use of resources – and to fuel future growth. Automation will also cause disruption for many workers and put further strain on the link between work and economic security in many places. There is a high risk that automation will lead to rising inequality within countries, fueling anger and disillusionment, and fanning the flames of populism. Regular reskilling will become a requirement for most. Supply chains, too, will be reshaped – and, in many cases, shortened – as access to leading edge technologies becomes more critical for both manufacturing and services than access to a cheap, skilled workforce.^{vi}
 - **Datafication:** For better and worse, business, finance and government will all become much more data-driven. This should enable massive resource and labor productivity gains across industries – particularly in areas such as manufacturing, food production and logistics – that have the potential to create wealth and reduce environmental impact. The finance sector will increasingly harness the power of Big Data and AI to assess potential loans and investments: if these are used to help assess sustainability impacts, this could help trigger a reorientation of financial flows in support of sustainable development. And we will inevitably see new levels of surveillance and manipulation in service of both profits and power: ‘Surveillance Capitalism’ as well as the Surveillance State. In the absence of a societal and regulatory “techlash” that leads to much more stringent enforcement of antitrust and data privacy/ownership rules, Big Tech will continue to amass citizens’ data and turn it into megaprofits. Without regulatory changes, winner-takes-all market dynamics are likely to fuel inequality and stifle competition. Algorithmic bias could compound the situation by perpetuating and worsening inequalities.^{vii}
- **Rapid growth of zero-trust digital security infrastructure, as a result of a more hostile security and risk setting.** When institutions moved to primarily online learning and remote work as a necessary response to the pandemic, they extended their trusted network via VPN and became easy targets for attackers. In most instances, university networks were not designed for such scale or the support of such a modern business model. They were unable to defend against attacks found in environments where both users and data may be outside of any physical office or network perimeter. In Fall 2021, educational organizations were the target of 6 million malware attacks (63% of all such attacks).^{viii} Zero trust principles can better position institutions to secure sensitive data, systems and services across increasingly dispersed and complex enterprise environments.^{ix}

ⁱ Ernst & Young (2018). Can the universities of today lead learning for tomorrow? Retrieved from <https://cdn.ey.com/echannel/au/en/industries/government---public-sector/ey-university-of-the-future-2030/EY-university-of-the-future-2030.pdf>.

ⁱⁱ Gartner (2022). Top Technology Trends in Higher Education for 2022. Retrieved from <https://www.gartner.com/en/documents/4012341>.

ⁱⁱⁱ Gartner (2021). Top Technology Trends Impacting Higher Education in 2021. Retrieved from <https://www.gartner.com/en/doc/742584-top-technology-trends-impacting-higher-education-in-2021>.

^{iv} Gartner (2022). Top Technology Trends in Higher Education for 2022. Retrieved from <https://www.gartner.com/en/documents/4012341>.

^v Gartner (2021). Top Technology Trends Impacting Higher Education in 2021. Retrieved from <https://www.gartner.com/en/doc/742584-top-technology-trends-impacting-higher-education-in-2021>.

^{vi} World Business Council for Sustainable Development (2020). Macrotrends and disruptions shaping 2020-2030. Retrieved from https://docs.wbcsd.org/2020/05/WBCSD_V2050IB_Macrotrends_Disruptions_20202030.pdf.

^{vii} World Business Council for Sustainable Development (2020). Macrotrends and disruptions shaping 2020-2030. Retrieved from https://docs.wbcsd.org/2020/05/WBCSD_V2050IB_Macrotrends_Disruptions_20202030.pdf.

^{viii} Kshetri, N. (2021). Cybercriminals use pandemic to attack schools and colleges. Retrieved from <https://theconversation.com/cybercriminals-use-pandemic-to-attack-schools-and-colleges-167619>.

^{ix} Gartner (2022). Top Technology Trends in Higher Education for 2022. Retrieved from <https://www.gartner.com/en/documents/4012341>.