Sector Analysis:

Higher Education

The Higher Education Sector is a fast growing and significant industry. In Australia, in 2017 it generated more export income than anything, but Iron ore and Coal. The higher education system is made up of universities and other institutions, such as Technical and Further Education (TAFE) institutes and Registered Training Organisations (RTOs), that play a critical role in fueling innovation and giving students the skills they need for future success. In Australia, Higher Education universities and institutions have increased their private income, but are still heavily supported by the government through policies, funding and programmes.

Higher Education faces its biggest disruption in over 1,000 years with the new generations of students having increased expectations, a changing workforce, demand for new IT roles, new digital technologies, increased globalisation and mobility.

1. **New Digital Education models:** Students are frequently using online tools that assist them in the college

admission process and in gaining necessary certifications according to industry requirements.

- Universities are facing increased competition from new online service providers as students are looking for life-long learning opportunities and availability of other price performance alternatives at lower switching costs. Prestigious global universities provide full online offerings, with MOOC (Massive Open Online Course) while online aggregators are also moving to full-service offerings.

- Universities and Institutions can develop short granular courses providing micro-credentials and badges on specific competencies to address student requirements, which employers validate as qualifications.

2. **New Digital Learning models:** Higher Education competitors are providing deep student engagement via digital.

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- Blended learning is a way of combining traditional classroom methods and independent online learning by students to create a hybrid teaching methodology.

- A number of technologies support this new type of learning and create a highly engaging learning experience via Open micro-credential, Adaptive learning, AI, Institutional Video Management, Digital Assessment.

- These technologies support the development of Digital Education facilities - with Smart classroom, Smart campus, Digital innovation laboratory, Digital Library - leveraging Digital Education environments – such as AI-based coaching, Peer-to-Peer education, Flipped classroom, Gamification, Virtual studios.

3. **New Innovation Culture and Vision:** Digital disruption is also driving the Higher Education universities and institutions to continuously innovate and adapt to the changing workforce expectations and challenges. To embed innovation in their ways of operating, the Higher Education universities and institutions have recently focused on re-defining their Culture and Vision:

- Major universities across the globe are investing in student and faculty development, innovative technology implementation, and financial management.

- Australian Universities are also primarily focused on enhancing student and faculty experience through collaborative and innovative IT environments.

4. **New Digital Operating Model:** Universities have adopted multiple changes in Governance model and Funding Model to support the changing IT Department requirements.

- The adoption of digitalisation has resulted in changes in the traditional IT governance model including:

    i. Introduction of a new position Chief Digital Officer (CDO),

    ii. Development of Digital Transformation Centre to support the transformation of the administrative practices via digitalisation and streamlining of business processes.

iii. Dedicated teams to supervise and manage digital efforts with Faculty clusters with the support and direction of Students or Academic committees to research, and address the dramatic changes required in the education systems.

- With the increasing demand for IT services, universities need to find new sources for IT funding and strategies better to track the performance of IT department.

  i. Spending on tablets and e-readers, cloud solutions and applications is on the rise.

  ii. In applications, the focus is on SIS (Student Information System), LMS (Learning Management System), ERP HR, ERP Finance and Analytics.

  iii. In the US, network upgrades and storage and data centres are top priorities.

In the Higher Education Industry, the digital transformation trends have been supported by the following digital capabilities. Adaptive Learning, AI and Open Microcredentials are expected to be the most impactful technologies that would benefit both students and universities:

- **Adaptive learning:** Dynamically adjusts the way that instructional content is presented to students based on student responses or to learner preferences such as a visual presentation of materials.

- **Artificial Intelligence:** AI systems analyse massive amounts of data, and learn to identify and classify input patterns and predictive models. AI-based automation is likely to replace a number of IT roles and tasks but will give rise to a handful of new roles as well.

- **Open Microcredential:** Ecosystems of open digital "signs," "certificates" or "badges" of accomplishments that can be used by an individual to indicate skills learned, irrespective of circumstances.

- **Digital Assessment:** Refers to the application of digital technologies to create, administer, report and manage tests and examinations.

- **Predictive Analytics:** Involves extracting an analytical model from multiple sources of data to predict future behavior or outcomes.

- **Virtual Reality (VR)/Augmented Reality (AR):** VR technologies create computer-generated environments. AR technologies overlay digital information on the physical world to enhance, guide and allow for freedom of movement.

- **Hybrid Integration Platform:** Assemblages of a set of on-premises solutions such as ESB and cloud-based integration technology to link together business applications both on-premises and in the cloud.

- **Institutional Video Management:** Refers to the use of dedicated and college or university-branded software, appliances or SaaS to manage and facilitate the delivery of one-to-many, on-demand video.

- **Listening and sensing Technology:** A broad collection of virtual capabilities that range from social listening and sentiment analysis through capture and interpretation of social activities.

- **Robotic Telepresence:** Video endpoint technology implemented in conjunction with remotely controlled form factors that facilitate remote video presence where fixed endpoint solutions are too static.

These capabilities are being quickly embraced by the Higher Education institutions as best captured in the following industry examples:

1. Georgia Institute of Technology using Virtual Teaching assistants in an online course about AI. The AI assistants can answer frequently asked questions that students have about the course and curriculum.

2. Southern Connecticut State University used IBM Watson Analytics to generate new insights from millions of student data points to identify to help improve student retention rates.

3. Deakin University used IBM Watson as a powered online student advisory service which is used to answer student questions on a range of topics such as admissions; enrollment (courses); tuition and fees, financial assistance etc.

4. California State University partnered with Cognii, a leading provider of AI-based educational technologies to develop more interactive AI-driven tutorial experiences for students. The solution provides automatic grading to students' open-response answers along with qualitative feedback that guides them towards conceptual mastery.

5. Georgia State developed a text-message-based chatbot to help new Georgia State University students successfully transition to college. The chatbot, Pounce, is able to engage in conversations with incoming Georgia State students to guide them through key steps, such as filing the correct forms, applying for housing, and registering for classes.

6. California State University automated the accounts payable process by making all invoices digital and reroute in workflows automatically.

7. Pearson and IBM collaboration is an AI online tutor that can answer queries from students at any time while providing insight to professors about how students are learning. The tutor programmed to be capable of responding with hints, feedback and explanations to students.

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