

Higher education:
An 'A+' *opportunity* for
disruptive innovators

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WHY EDUCATION MATTERS: SIZE AND IMPACT

Higher education is one of the cornerstones of sustainable development – and of innovation. It teaches skills, creates knowledge and promotes freedom, tolerance and dignity. UNESCO is clear about the centrality of higher education to meeting the UN’s Sustainable Development Goals.

“Under the fourth sustainable development goal (SDG) on inclusive and equitable quality education and lifelong learning opportunities for all, target 4.3 states that, by 2030, countries should provide equal access for all women and men to affordable and quality technical, vocational and higher education, including university. Achieving this target will facilitate the achievement not only of SDG4 but also of all other SDGs.”

*Six ways to ensure higher education leaves no one behind
(UNESCO, 2017)*

It is also a vast market. For many individuals, higher education is the largest or second-largest consumer decision they will make in their lifetimes, from both a current-cost and future-income perspective.

Growth in the number of students and the high price of admission means that it is now a US\$2.5tn global market. Total spending on education globally is estimated to be over \$5tn, making it the second-largest component of GDP in most developed countries.

In the US alone, higher education employs 3.6m people, 2.6m of whom are professionals. Total direct spending on higher education is about 2% of GDP across the OECD and 3% in the US, where it also accounts for about 10% of state budgets¹.

But the importance of higher education is not solely defined by the cost of attending university. Academic institutions perform significant research and development: educational institutions performed 55% of basic research and 31% of total research in the US².

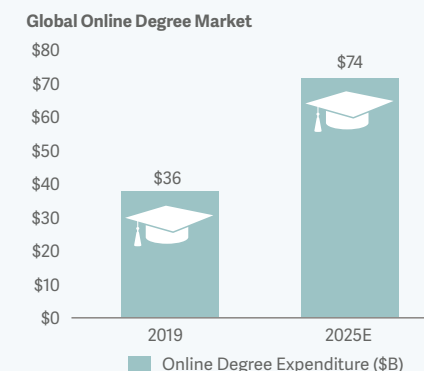
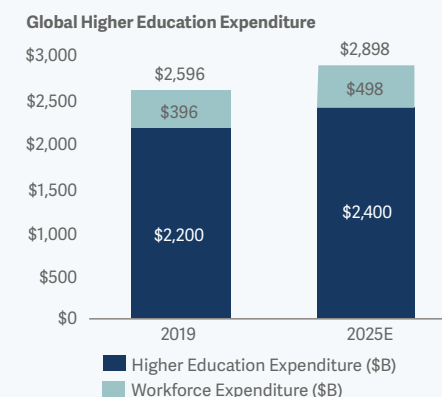
They also perform a critical role in societies as they respond to change. According to the Education Commission, two billion of today’s jobs are at high risk of disappearing by 2030 and expenditure relating to re-skilling and up-skilling is expected to reach nearly \$500bn

by 2025. The World Economic Forum estimates that 95% of employers plan to retrain their existing employees in response to re-skilling needs.

Crucially, the function and output of education is not simply economic; it is also social. And much of the value it creates for society cannot be statistically measured or captured. Educational investment is not motivated entirely by – and nor should it be measured against – a student’s future earnings. Being inspired, honing a craft, developing a passion and meeting like-minded collaborators or mentors are real, life-changing (and society-changing) outcomes of higher education that cannot be quantified. Furthermore, higher education often serves as a ‘rite of passage’ in many cultures, and putting a price on that is difficult.

Market Opportunity: TAM & Key Themes

- The global higher education market reached \$2.2tn in 2019, according to estimates from education market intelligence firm HolonIQ, and is expected to reach \$2.4tn by 2025 (1.5% CAGR).
- Global education expenditure related to workforce training, re-skilling and up-skilling is expected to reach \$498bn by 2025 (3.9% CAGR), according to HolonIQ.
- According to the World Economic Forum, 96% of U.S. employers plan to retrain existing employees in response to shifting skill needs.
- Approximately 2bn of today’s jobs are at high risk of disappearing by 2030, due to automation and other factors driving obsolescence according to the International Commission on Financing Global Education Opportunity.
- The global online degree market was \$36bn in 2019 and is expected to reach \$74bn by 2025 (12.8% CAGR), according to estimates from HolonIQ.



Source: Company documents, HolonIQ

¹ According to the National Association of State Budget Officers State Expenditure Report, 2011

² National Science Board, 2010

THE COST DISEASE: CHALLENGES AND LIMITATIONS

The wealth divide

A consistent characteristic of higher education systems is the large disparity in both access to and completion of qualifications based on wealth. Without policies and programmes to support students from disadvantaged backgrounds, a simple expansion of traditional structures and approaches to higher education risks exacerbating this inequality.

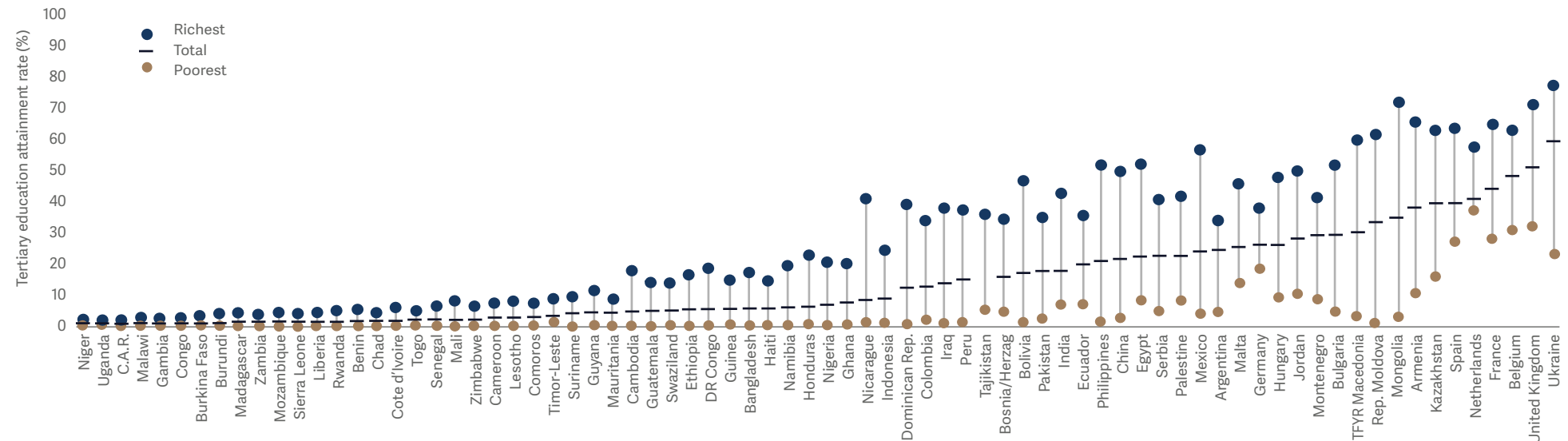
Higher education institutions vary widely in terms of size, cost, courses, locations, admission processes, traditions, governance, philosophy and quality. This can be further amplified by factors like access to funding and immigration status. So there are no simple policy solutions to this complex multi-factor problem. **Yet we believe that innovation when aligned with sensible policies will be able to significantly mitigate these disparities.**

The average cost of attending university in the United States was \$33,663 in 2019 while the average *annual* cost to acquire a four-year degree at a private university was \$50,770. These costs have grown at an above-inflation rate for decades. The average cost per 'credit hour' (i.e. cost normalised for time spent) is \$1,368 per credit at private institutions.

Versions of this problem are replicated across the world. In the UK, the average student leaves university with significant debt (over £40,000 in England) and students from lower-income families shoulder a much larger proportion of that debt personally. In short, high-quality higher education is becoming increasingly inaccessible for low-income households.

Vast differences exist in higher attainment between poor and the rich

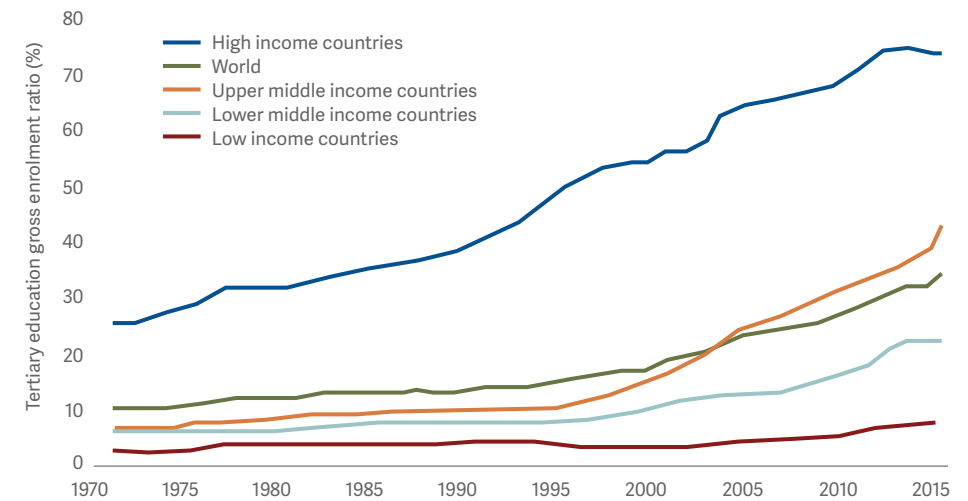
Percentage of 25-29 year olds who have completed at least four years of tertiary education, by wealth, selected countries, 2008-2014



Source: Six ways to make sure higher education leaves no one behind (UNESCO, 2017)

Enrolment in upper-middle income countries has grown by 7% per year in the past 20 years

Tertiary education gross enrolment ratio, by country income group, 1970-2014 (%)



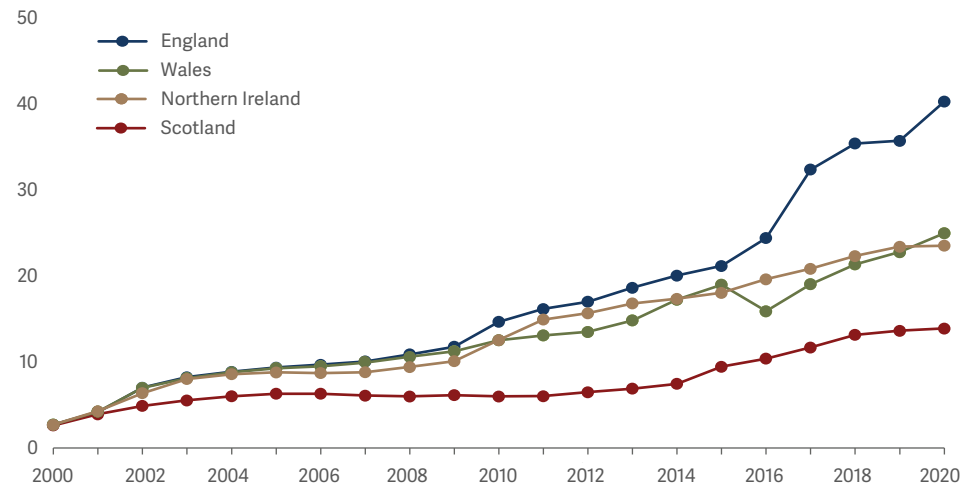
Source: Six ways to make sure higher education leaves no one behind (UNESCO, 2017)

The educational cost disease

Inequality is an inevitable consequence of cost inflation within education. But why has the cost of education outpaced general inflation so persistently? The best (or simplest) explanation is provided by Baumol's cost disease.

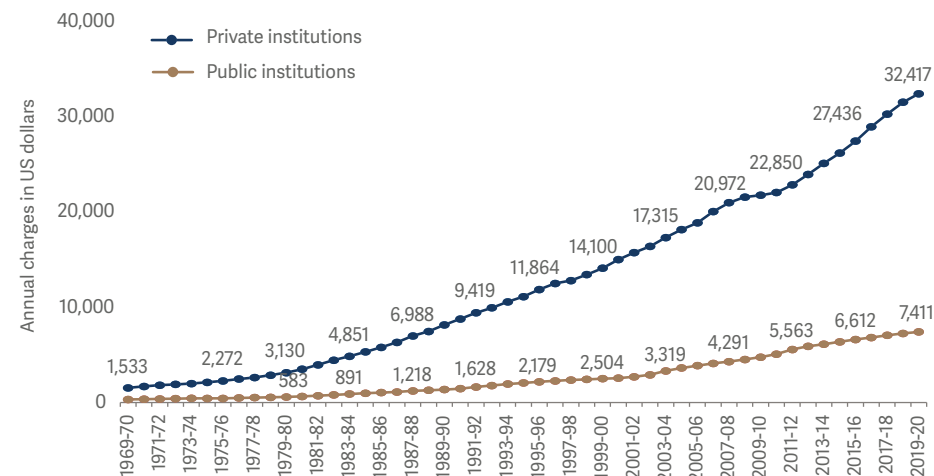
The Baumol effect explains the rise of salaries for jobs that have experienced no increase in labour productivity. It is caused by rising salaries in other areas where productivity growth

Average student loan debt on entry to repayment in the United Kingdom (UK) from 2000 to 2020, by repayment cohort (in 1,000 GBP) by country



Source: United Kingdom; Student Loans Company; 2000 to 2020

Annual college cost in the USA



Source: Statista

has been high. The phenomenon is an example of 'cross elasticity of demand'. For example, a tenured computer-science professor at Stanford will demand higher wages this year because she could go and work for Google – and not because she is a better teacher or researcher than she was last year.

Baumol's cost disease goes some way towards explaining cost inflation within higher education, but how do we actually know that the value of the service has not improved by an equivalent amount? Measuring value is far from simple.

This conundrum is wonderfully articulated in a paper published by the National Research Council in 2012. **Improving the Measurement of Productivity in Higher Education**³:

"It is possible to count and assign value to goods such as cars and carrots because they are tangible and sold in markets; it is harder to tabulate abstractions like knowledge and health because they are neither tangible nor sold in markets. Higher education is distinct, however, in the nature of its outputs and their prices. The student arrives at a university with some knowledge and capacities that are enhanced on the way to graduation. In this instance, the consumer collaborates in producing the product."

No single measure captures the performance of a university or college. Graduation rates, enrolment ratios, time taken to graduate, costs per credit or degree, and student-teacher ratios only tell a small part of the story. Higher education institutions produce multiple kinds of services, with diverse inputs and outputs that involve non-market (i.e. non-priced) variables, and are subject to quality variation that must be tracked over time. There are significant data gaps to bridge in all of these areas.

Diversity, equality and inclusion

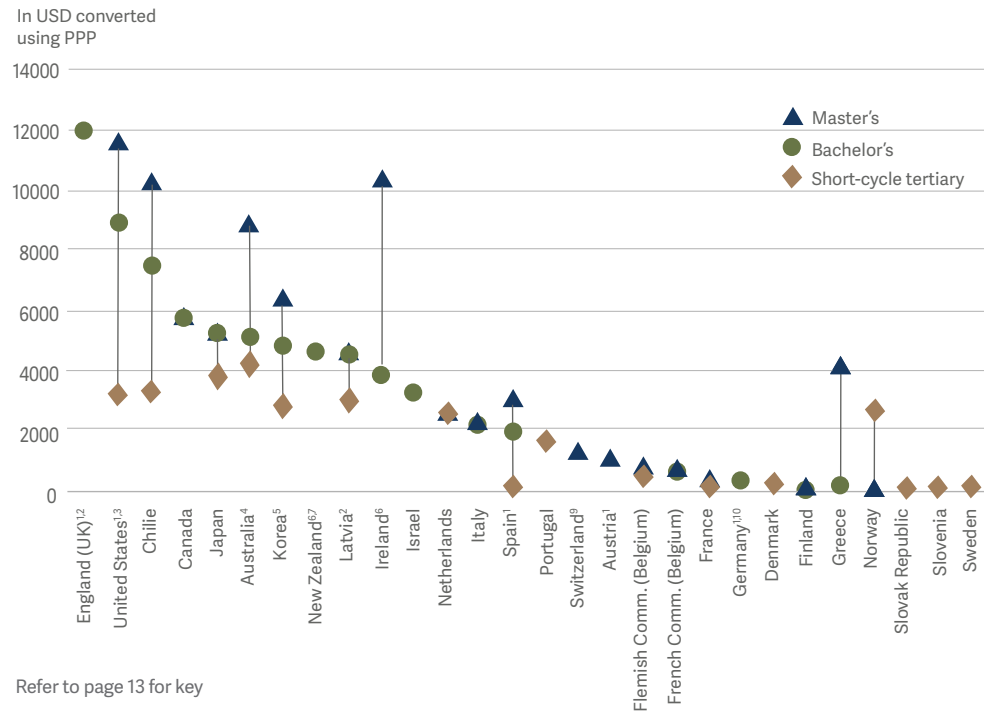
The educational cost disease is not just a US or UK phenomenon. The 2016 *Global Education Monitoring Report* highlighted these disparities, showing that across 76 countries, 20% of the richest 25-29 year olds had completed at least four years of higher education, versus less than 1% of the poorest. This indicates that the cost of education is a persistent problem across the world and is not confined to the US.

These disparities matter to individuals and for societies as a whole. There is mounting evidence that productivity is boosted by effective collaboration – and that collaboration is most effective where there is a diverse set of perspectives. Greater diversity requires that educational access is determined not by income but by merit.

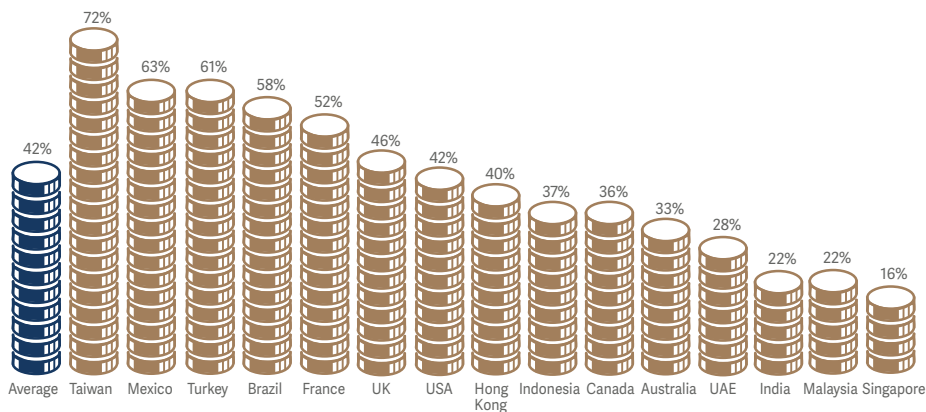
The good news is that public education is available in one-third of OECD countries and, where this is the case, annual tuition fees are below \$2,000. Fully subsidised degrees are often available to lower-income students. In Australia, Denmark, New Zealand, Norway and Sweden, at least 80% of students receive public financial support in the form of student loans, scholarships or grants.

³ <https://www.nap.edu/catalog/13417/improving-measurement-of-productivity-in-higher-education>

Annual average (or most common) tuition fees charged by tertiary public educational institutions to national students, by level of education (2017/2018)

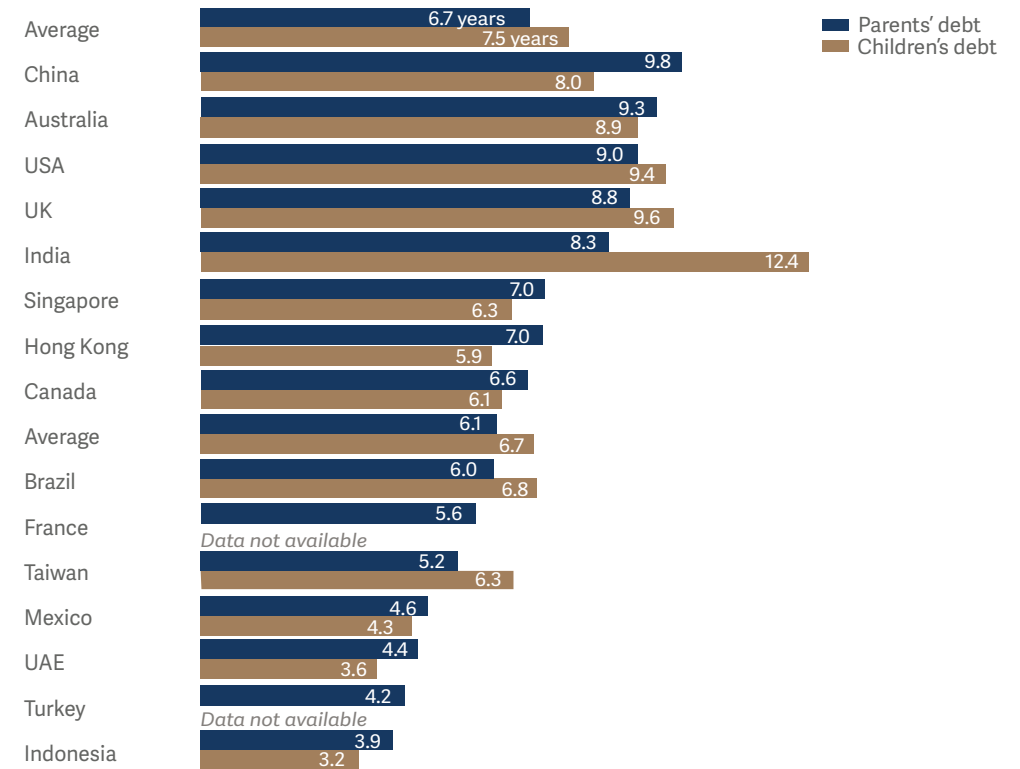


Less than half of parents think a university education is good value in their country



Source: HSBC - The value of education global report, 2015

How many years will it take to pay off your child's student debt?



(Base: Parents who expect to borrow money or have borrowed money to fund their child's university education)

Source: https://www.hsbc.fr/1/PA_esf-ca-app-content/content/pws/rbwm/static/pdf/HSBC-Value-of-Education/Learning-for-life-Global-Report.pdf

But despite the attainment gap highlighted above, access to higher education has been improving over the long-term in some respects. While only 30% of enrolments were women in lower income countries, in higher-income countries, women now graduate from undergraduate and graduate degrees at a similar rate to men. Only 44% of PhD graduates are women but this has also been improving.

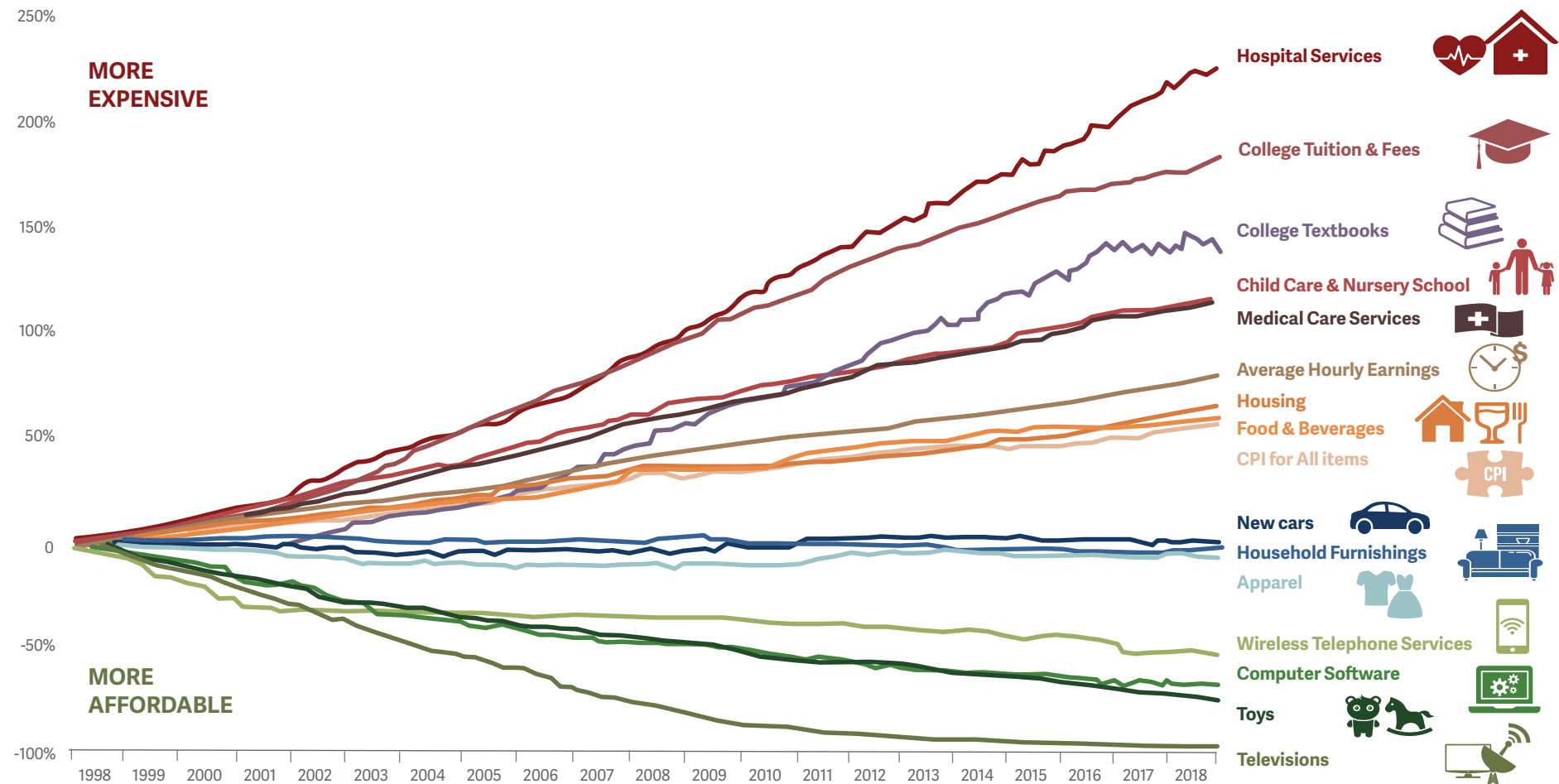
Another bright spot has been the increased participation in higher education of 'non-traditional' students, such as part-time students and working adults. This 'up-skilling and re-skilling' trend is likely to continue given the flexible study options that are now available. According to UNESCO, adults (those aged 25 and over) now make up more than a third of enrolled undergraduate students in 10 European countries and in five countries more than one-in-four students are part-time.

THE IMPACT OF INNOVATION: THE PATH TO A POSITIVE FUTURE

Many stagnant industries have been transformed by innovation. Technology has created opportunities for entrepreneurs to build business models that can disrupt decades-old (or even centuries-old) practices. The waves of disruption enabled by the internet and Moore's Law are not limited to the retail sector or social interactions. The rising costs and widening inequalities we have outlined strongly suggest that higher education is in need of a disruptive reordering. In fact, it is precisely because of its size, societal importance and inflated costs that education is such an attractive target market for entrepreneurs. It is ripe for disruption, if enabling technology allows...

20 years of price changes in the United States

Selected consumer goods & services wages (January 1998 to December 2018)

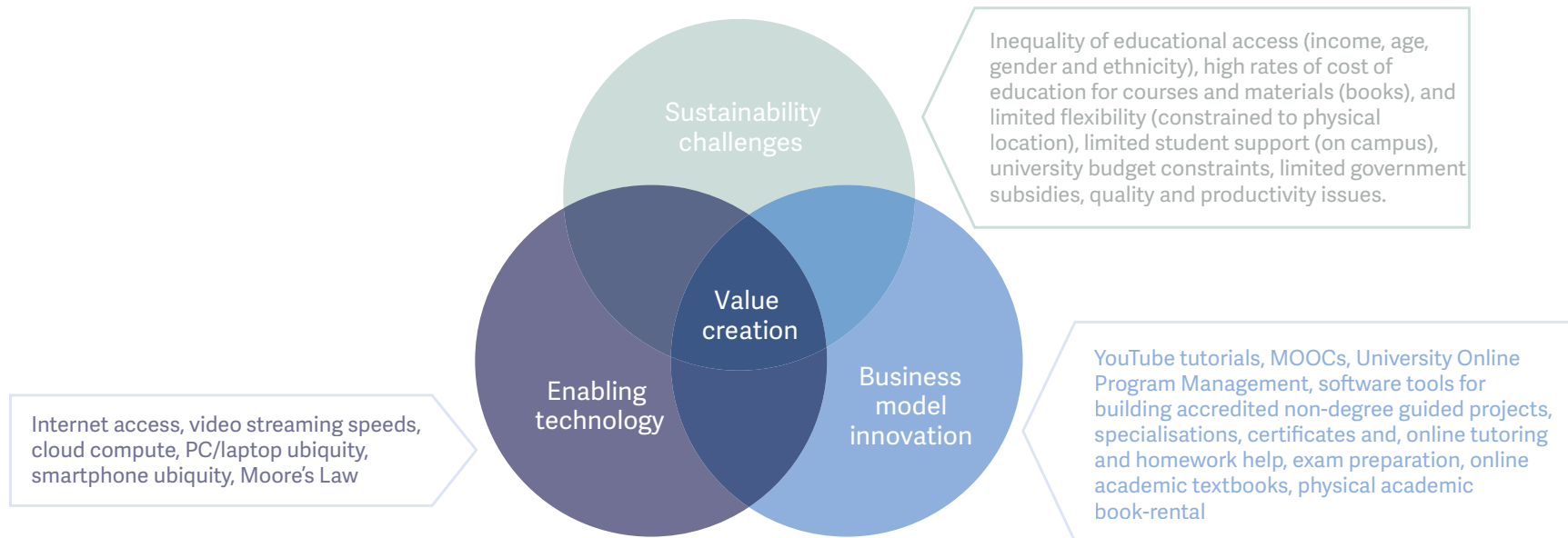
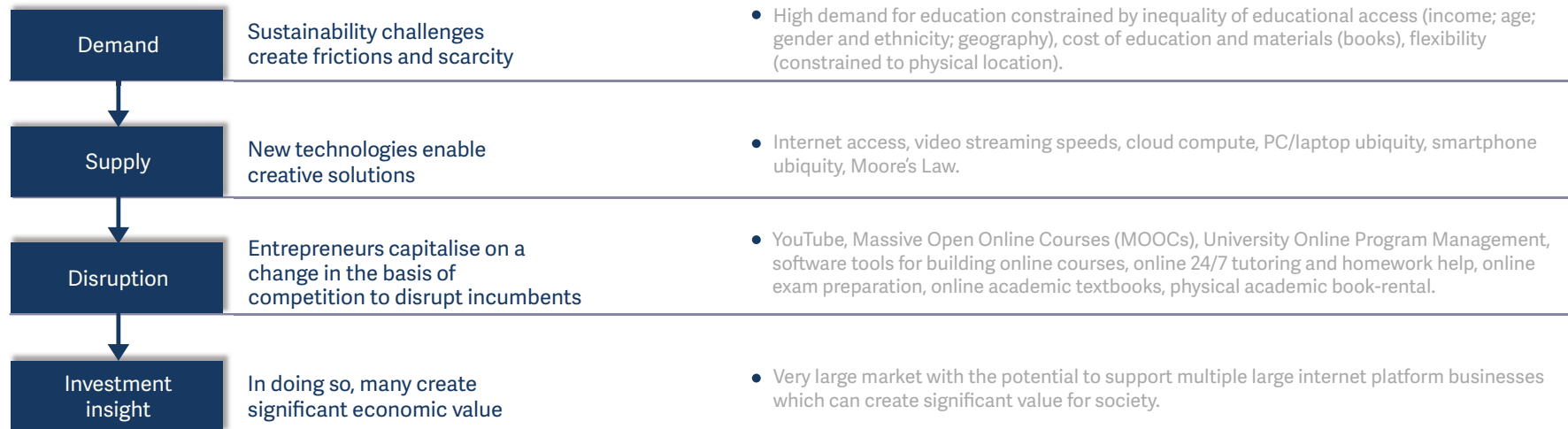


Source: <https://howmuch.net/articles/price-changes-in-usa-past-20-years>

INVESTING IN DISRUPTION: OUR POSITIVE INNOVATION FRAMEWORK

We focus on innovative companies because we believe the intersection between sustainability challenges, enabling technology and innovative business models, can create significant economic value.

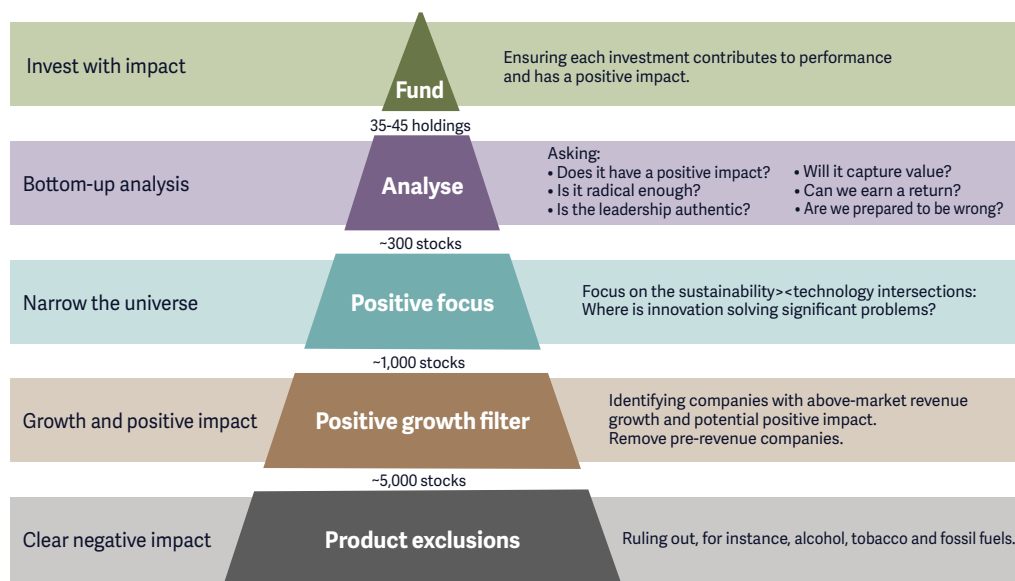
Applying our positive innovation framework to the education industry allows us to see the shifts in the basis of competition within the industry and identify where disruption might potentially take place. It is clear to us that all of the conditions are in place for transformative positive change to occur.



FINDING THE 'DISRUPTORS' OF HIGHER EDUCATION: THREE INVESTMENTS

Education is clearly not a negative impact sector which should be automatically excluded from our investment universe. Education stocks are not therefore removed at the 'product exclusions' stage of our process. But not all education stocks represent good investments for a positive-impact fund. So before any stock is considered, we look for evidence of above-market revenue growth. We do this because we believe it is a good indicator of emerging growth businesses that are early in their lifecycle and disruptive in their nature. It is, of course, possible that no such listed education company exists, in which case our interest in this investment theme would be constrained.

Investment process: Disruptive growth with positive impact



In this case, however, our proprietary growth filter highlighted six education-related companies globally that were early enough in their lifecycle to interest us:

Chegg

coursera

idp



VASTA
VOICE AND SPEECH TRAINERS ASSOCIATION



Conceptually, education is an attractive investment theme and we have been monitoring the sustainability challenges and enabling technology within it for some time. Good themes, however, do not necessarily lead to good companies or good investments. It is vital that we understand a company in detail before investing. And although education sounds like a great theme, the sector has an unfortunate history of exploitative business models. One example was the for-profit university segment in the US between 2005 and 2012, which exacerbated the student-loan crisis in that country.

So while we were (and are) interested in the sector and aware of the market sizes and emerging technologies applicable to it, we approached our research on these companies with a degree of caution; we know there are still a handful of listed companies operating in this area which we consider to be *negative*-impact stocks.

After initial investigations, all six of these companies looked like innovative, solutions-based business models operating at the intersection of enabling technologies and meaningful sustainability challenges. So there was merit in doing a detailed analysis of each in order to see if they passed our 'principle stack' of six questions.

To date, three of these companies have made it through this process with the result that Artemis Positive Future invests in:


Chegg

coursera

idp

The above information reflects the current view of the fund manager and may change over time. For information about formal investment restrictions relevant to this fund please refer to the prospectus. *Product exclusions: alcohol (>10% revenue), tobacco (>10% revenue), weapons, nuclear power (owners of facilities), gambling (>10% revenue), animal testing (cosmetics), adult entertainment, genetic modification (uncontrolled release) and fossil fuels (engaged in extraction).

The table provides a brief summary of our investment thesis for each of these companies.

Principle Stack			
Does it have positive impact?	<p>Coursera is leveraging enabling technology and partnering with leading universities to benefit learners of all ages, regions and income levels. It helps leading universities to put high-quality content online, which is made available either for free or at very low prices.</p>	<p>Chegg is leveraging enabling technology to help students get 'unstuck' and provide low-cost academic support to many that don't have it - and is also reducing the cost of academic materials more generally.</p>	<p>The International Development Program of Australian Universities, Colleges and Schools, IDP was operated as a 'not-for-profit' prior to its listing in 2006. IDP enables students to improve their English language skills and/or support them in selecting overseas universities.</p>
Is it radical enough?	<p>Changing the nature of what is possible in terms of how higher education is delivered while providing high-quality content to students globally at very low prices.</p>	<p>Disrupting the (very) high-cost academic textbook market and offering innovative online solutions across a wide range of academic subjects.</p>	<p>Building a platform ecosystem for students around university placement to help students manage finances, relocation, internship opportunities and post-university employment.</p>
Is the leadership authentic?	<p>Extremely high-calibre, passionate leadership keen to create significant societal value.</p>	<p>High-credibility leadership with an excellent record of building the business through a clear purpose and mission.</p>	<p>IDP is 40% owned by Education Australia so is clearly aligned with educational purpose. Its leadership's vision is to build a merit-based educational system that is not based on country of birth.</p>
Will it capture value?	<p>It has built a platform business within a very large market (~\$2 trillion) through counter positioning and with potential for powerful network effects.</p>	<p>Scale economics and strong brand recognition translate to low customer acquisition costs. The depth and breadth of Chegg's offering is orders of magnitude greater than that of any of its competitors. Database of 59 million answered and indexed academic questions.</p>	<p>A scale player in a fragmented market with emerging network effects via their two-sided platform which increasingly benefits both students and universities as it grows.</p>
Can we earn a return?	<p>The power of the business and sustainability of rapid growth within a very large market is unappreciated in the valuation.</p>	<p>Eight million subscribers in a market of 100 million students (who learn in English) offers long runway of growth with industry-leading margins funding its growth. Its competitive power and market size is under-appreciated.</p>	<p>Very large market for student placement combined with a demand from both students and universities to reduce frictions. Their first-mover scale advantage and its ability to fund growth is underappreciated.</p>
Are we prepared to be wrong?	<p>Potential for a successful platform to deliver high returns in a large market translates to revenues >5x current rate and significant future cashflow generation.</p> <p>So any evidence of platform failure/weakness would be a sell signal.</p>	<p>A dominant position in current markets offers revenue potential of \$3-4bn (>4x current revenue) with sustainably high ROIC and cashflow.</p> <p>But... evidence of rising customer acquisition costs would be a sell signal.</p>	<p>Evidence of English language test terms being altered - or a strong competitive alternative would be a sell signal.</p>

CONCLUSION: A POSITIVE-SUM OUTCOME

We believe all three of these educational innovators are delivering positive-sum outcomes, capturing value for their shareholders while also creating value for society. We should also note that these companies do not compete directly with each other. They offer innovative solutions in different segments of the large global education market.

All three are innovating to solve significant structural problems in the education sector such as inequality of access to education; diversity; inclusion and access to decent work.

We believe that they help the world move closer to achieving the UN's Sustainable Development Goal 4 while also helping progress towards goals 3 and 8.

Goal 4

Quality education

"Ensure inclusive equitable quality education and promote lifelong learning opportunities for all."

Goal 3

Good health and wellbeing

"Ensure healthy lives and promote well-being for all at all ages."

Goal 8

Decent work and economic growth

"Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all."

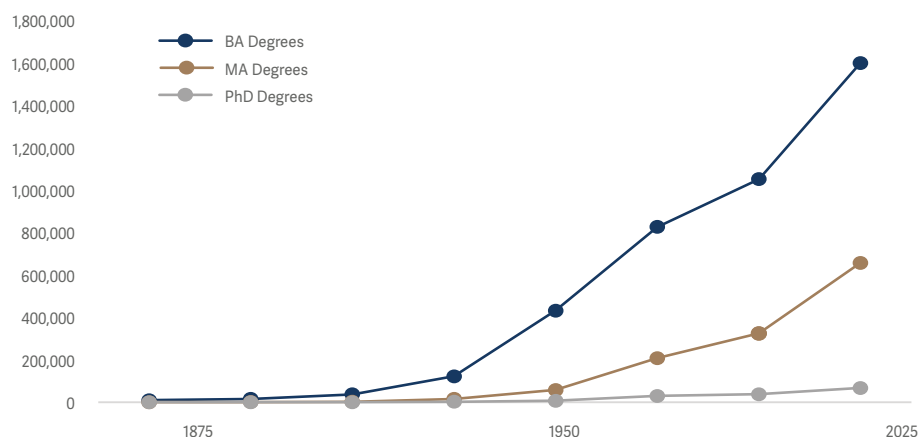
We believe all three of these companies are educational innovators, operating in the zone of transformation that will get us closer to achieving the positive future mapped out by the UN's sustainable development goals. If we are correct, this positive-sum outcome will benefit students, society, shareholders — and our clients.

APPENDIX - A BRIEF HISTORY OF HIGHER EDUCATION

The first known institution of higher education, The Platonic Academy of Greece, was founded in 387 BCE. The Library of Alexandria, The Chinese Imperial Training System and the Persian Medical Academy all evolved over the next thousand years, but then learning became confined to isolated monasteries during the medieval period after the 6th Century CE.

The first true university (in a modern sense) was formed in Bologna, Italy in 1088, with Oxford University founded shortly afterwards. The number of formal educational institutions grew rapidly in the 16th century and by the 18th century there were nearly 150 universities in Europe as well as many established in the United States, with the founding of the first (Harvard) in 1636. The idea of academic freedom, the scientific method and independence from the Church and State emerged in Germany in the 18th century. During the 19th Century, universities became less elite and religious, with women being increasingly accepted and a broader range of secular subjects offered.

US college degrees awarded, 1870-2009



Source: US Bureau of Labor Statistics, Census data

The 20th century saw the rise of the modern university system, with two major waves of new university growth in Europe and North America between 1900-1930 and 1960-1970. This led to a dramatic rise in the role of universities, both in terms of their role in society and their direct economic impact. The post-war boom led to a high rate of growth in the 'gross enrolment ratio'. This measures the percentage of the population who are in the five year age cohort immediately following high school (typically 19-23) who enrol in higher education.

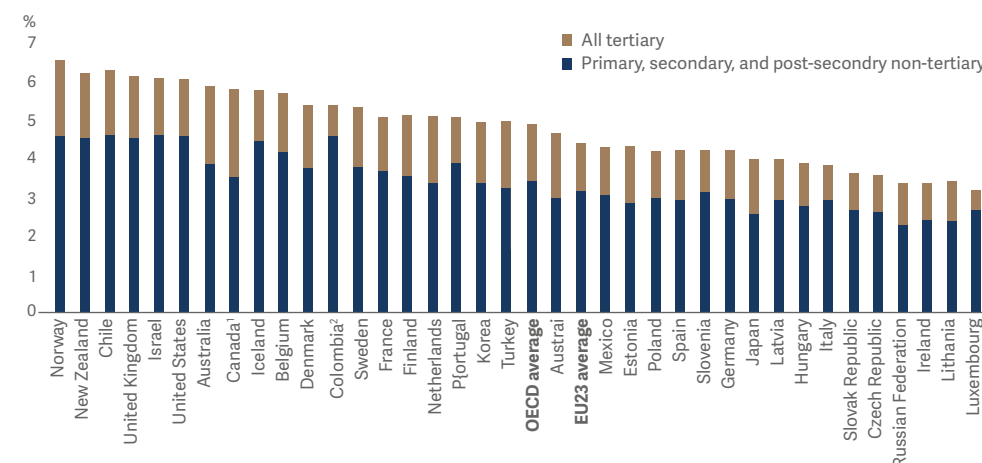
There are over 207 million students enrolled in higher education globally (according to a 2017 UNESCO report), which doubled from 2000. In the same period, the global gross enrolment ratio

increased from 19% to 34%. However, global figures obscure major differences between regions: The higher education gross enrolment ratio ranges from an average of 8% in sub-Saharan Africa to 75% in Europe and Northern America.

In 2020, >9.4m women enrolled in undergraduate degrees in the US vs. 7.2m men. In fact more than 50% of undergraduates in the US have been female every year since the late 1970s.

Total expenditure on educational institutions as a percentage of GDP (2017)

From public, private and international sources, by level of education



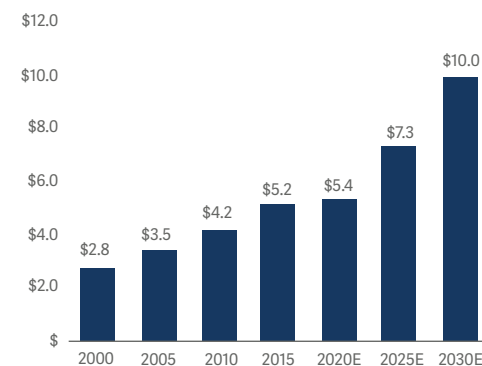
1. Primary and post-secondary non-tertiary education includes pre-primary programmes.

2. Year of reference 2018.

Countries are ranked in descending order of total expenditure on educational institutions as a percentage of GDP.

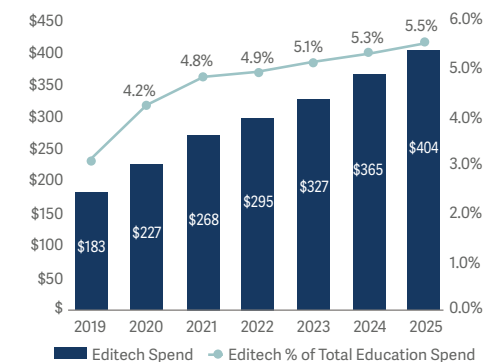
Source: OECD/UIS/Eurostat (2020), Table C2.1. See Source section for more information and Annex 3 for notes (<https://doi.org/10.1787/69096873-en>)

Total global education & training expenditures (\$ trillions)

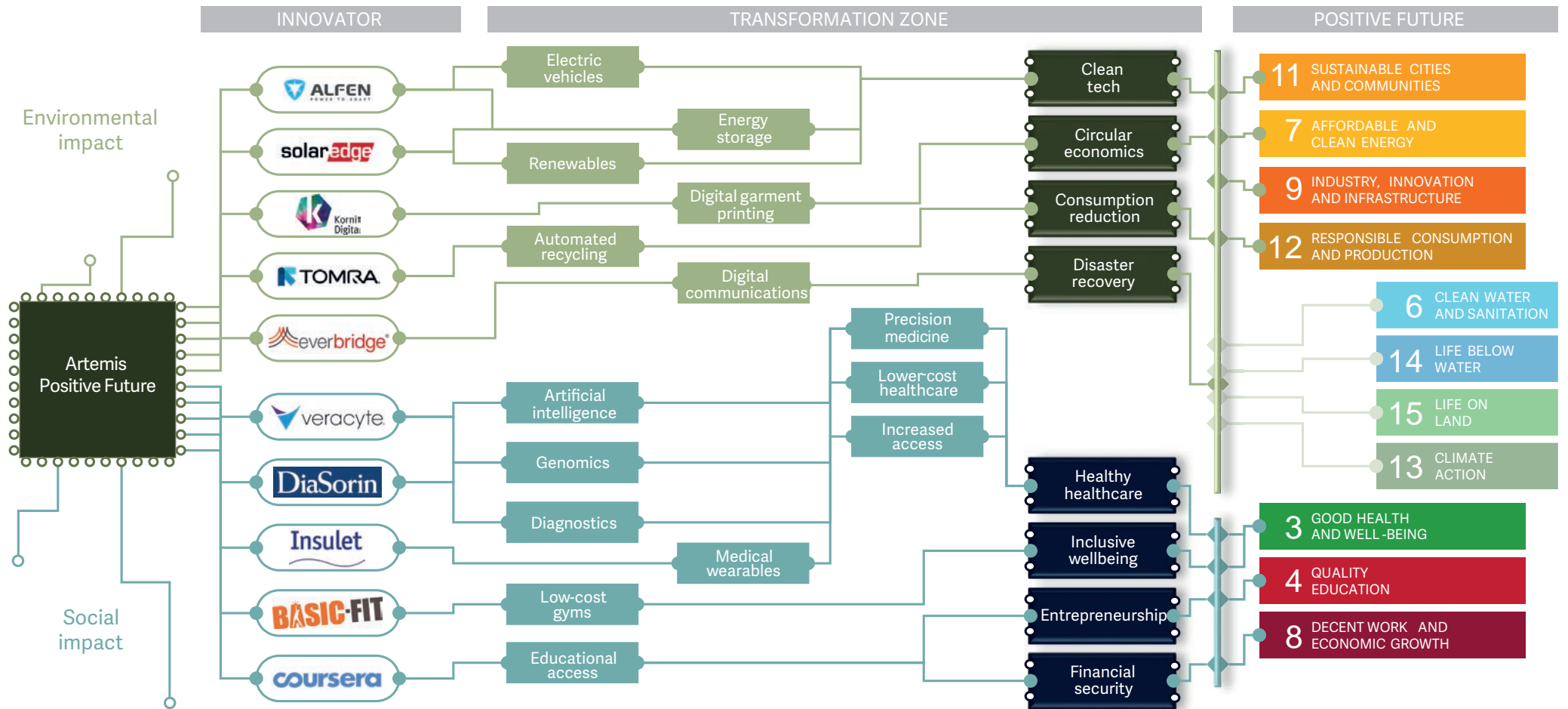


Source: HoloniQ

Education technology spend (\$ billions)



FLOW OF TRANSFORMATIVE POSITIVE IMPACT



Source: Artemis. Companies listed here are for illustrative purposes, are not a recommendation and may not necessarily form part of any implementation of the strategy

Stage 5: Initiate position at 1.5% of the fund with a view to building it to >2.5% **INVEST**

Stage 4: Six questions 'principle stack':

- 1) Detailed research indicated that leveraging enabling technology and partnering with leading universities benefits learners of all ages, regions and income levels and helps universities put high-quality content online.
- 2) Changing the nature of what is possible in terms of how higher education is delivered while providing high-quality content globally at very low prices.
- 3) Extremely high-calibre and passionate leadership keen to create significant societal value and will capture significant economic value.
- 4) They had built a platform business within a very large market (~\$2 trillion) with counter positioning and network effects.
- 5) The power of the business and sustainability of high growth within a very large market is unappreciated in the valuation.
- 6) Potential for high returns (platform) in large market translates to revenues >5x current rate and significant future cash flow generation. **PASS**

Stage 3: Team awareness of huge inequality and significant cost inflation within higher education and many of the technology trends that were enabling online learning. Initial research showed that Coursera was certified B Corp (balancing profit and purpose) and offered education at free or very low prices to ~80m people globally. **PASS**

Stage 2: Coursera grew revenues at 59.2% in 2020 and was estimated to grow revenues at 29% and 25% in 2021 and 2022 respectively. This is well above the market. **PASS**

Stage 1: An education technology company offering tools to produce online education at low prices in partnership with quality universities. Not participating in excluded activities. **PASS**

Stage 5: Initiate position at 1.5% of the fund with a view to building it to >2.5% **INVEST**

Stage 4: Six questions 'principle stack':

- 1) Detailed research indicated that by leveraging enabling technology, Chegg was helping students get 'unstuck' and providing low cost support to many that don't have it.
- 2) Disrupting the very high cost academic textbook market and offering innovative new online solutions across a wide range of academic subjects.
- 3) High-credibility leadership with excellent track record of building the business and with a clear purpose and mission.
- 4) Clear scale economics and brand recognition translating to low customer acquisition costs. Database of 59m answered and indexed academic questions. Depth and breadth of offering orders of magnitude greater than any competitor.
- 5) 8m subscribers in a market of 100 million students (who learn in English) offers long runway of growth with industry-leading margins funding growth. Competitive power and TAM underappreciated.
- 6) Dominant position in current markets offers revenue potential of \$3-4bn (>4x current revenue) with sustainably high ROIC and cash flow power. **PASS**

Stage 3: Team awareness of huge inequality and significant cost inflation within higher education and many of the technology trends that were enabling online learning. Initial research showed that Chegg was offering low cost online subscriptions services as an alternative to expensive academic textbooks and previously unavailable student services. **PASS**

Stage 2: Chegg grew revenues at 56.8% in 2020 and was estimated to grow revenues at 24% and 22% in 2021 and 2022 respectively. This is well above the market. **PASS**

Stage 1: An education technology company offering online study tools for students. Not participating in excluded activities. **PASS**

Key for page 4

1. Year of reference 2016/17.
 2. Government-dependent private instead of public institutions.
 3. Figures for master's and doctoral programmes combined.
 4. Year of reference 2017.
 5. Year of reference 2018.
 6. Bachelor's programmes refer to both short-cycle tertiary and bachelor's programmes combined.
 7. Estimates include universities only and exclude postgraduate certificates and diplomas.
 8. Tuition fees paid by students instead of fees charged by institutions combined.
 9. Figures refer to both public and government-dependent private institutions only.
 10. Bachelor's programmes refer to bachelor's, master's and doctoral academic programmes combined.
- Countries and economics are ranked in descending order of the annual tuition fees charged by public institutions for bachelor's or equivalent programmes.* Source: <https://www.oecd-ilibrary.org/docserver/69096873-en.pdf?expires=1622109758&id=id&accname=guest&checksum=2542360094C2BC7ABE6A5D84F0C2268A>.

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