

Message from the Publisher

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Volume 1.3 of the University Office of Planning publication on “Trends in Higher Education” focuses on the very pertinent issue of the economics of tertiary education especially as fiscal space becomes much tighter. From a close reading of the document, there is no doubt that the economic momentum of 2017 seems to carry forward into 2018. However; universities and colleges are still likely to face funding constraints. This therefore brings into sharp focus, the role of University leaders in espousing strategies and tactics for the short and medium term to deal with reduced government funding for the tertiary sector. They will also have to consider what new sources of revenue will have to be found to cover the shortfall. Further, there will need to be a conversation around what universities and colleges need to do to generate greater effectiveness, efficiency, and innovation as priority areas of management. Also, University leaders will have to think about what strategies are required for universities and colleges to place greater focus on commercialization, knowledge transfer, and industry partnerships to generate additional revenues. These are all important issues covered in this volume. I do hope you enjoy reading and that you find the information quite useful.

Economic Trends in Higher Education

This edition of *Trends in Higher Education* focuses on economic issues which influences developments in Tertiary Level Institutions (TLIs) around the world with implications for TLIs in the region. In this issue, we look at topics such as access and affordability of education for prospective students; jobs and skills needed for the labour market; managing costs in the face of constrained revenues; demands for increased institutional productivity; and sources of funding particularly for research.

Overview of global economic trends

In April 2017, The International Monetary Fund (IMF) indicated that world growth rate is expected to rise from 3.1% in 2016 to 3.5% in 2017 and 3.6% in 2018, resulting in the long-awaited recovery in investment, manufacturing, and trade. However, the IMF Report cautioned that structural impediments to a stronger recovery and a balance of risks remain tilted to the downside, especially over the medium term. The Report also indicated that activity is projected to pick up markedly in emerging markets and developing economies because of partial recovery in commodity prices. Moreover, growth is projected to remain strong in China and many other commodity importers. In advanced economies, the pickup is primarily driven by higher projected growth in the United States (IMF, April 2017).

PwC LLP (2017, 1) in their Global Economy Watch Predictions for 2017 identified economic themes they believe will dominate in 2017. For example, globalization will take a backseat since there will be a resurgence of economic nationalism in some parts of the world, resulting in the testing of World Trade Organization (WTO) rules.

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In addition, monetary policy in the United States is expected to revert to normalcy, with a gradual monetary tightening over the year.

Also, with new governments in some countries in the Eurozone, this will fuel uncertainty and impact on economies such as: Germany, France, the Netherlands and potentially Italy and Greece - equivalent to more than 70% of Eurozone GDP. Internationally, US-Russian relations, which could have spill-over effects in Eastern Europe, the Middle East and potentially East Asia as well as on the Iran nuclear agreement can impact the growth of the global economy.

SCUP notes in its Fall 2016 issue of *Trends in Higher Education* that “fiscal constraint is the new normal in higher education”, while in its Spring 2017 edition it notes that “for institutions as well as students, the economics of higher education are getting more challenging”.

Plunkett Research (2017) estimates that total global public and private spending on education (K-12 through university) was equal to about 6% of GDP, or \$4.5 trillion for 2016, making the sector only a bit smaller than the health care industry. There are an estimated 210 million students in higher education worldwide. The research shows that corporate training and education was a \$70.6 billion market in the US and a \$155 billion global market in 2016.

Access and Affordability

A report entitled “How America pays for college 2016” indicated that in choosing a college, some 67% of families in the US factored the price of a college education when narrowing their list of schools to choose from and 55% eliminated colleges from their prospects due to cost with another 44% waiting to receive financial aid before making their final school choice (Sallie Mae and Ipsos 2016, 7). The Report also stated that students preferred scholarships and grants rather than loans for colleges. Data from Sallie Mae and Ipsos publication demonstrated that scholarships and grants funded 34% of college costs in 2015/2016, up from 30% in 2014/2015 and represented the largest proportion of any resource used to pay for colleges in the past five years.

Based on a survey of financial aid administrations, UB Magazine notes that 31% of them indicated that merit aid will increase while 55% say it will stay the same (UB 2016). Moreover, 41% of the same target

indicated that needs-based aid will increase while 40% state it will stay the same (UB 2016). The Lawlor Group, a higher education marketing firm, noted that **students want free money not loans**) based on the results of a survey by Sallie Mae Ipsos, scholarships and grants reached 70% of all undergraduate families in 2016 compared to 61% in 2012. Approximately 50% of families took advantage of scholarships and 47% benefited from grants in 2016 compared to 35% and 45% in 2012. The average amount of scholarships grew by about \$1,300, to \$8,976, during the last five years, while increases in the average grant rose only by about \$200 over the last five years, to \$7,464.

Higher education is becoming less affordable because of high tuition fees and cost of living. The US Bureau of Labor statistics indicate that the price index for US college tuition rose by nearly 1,300% from early 1978 through early 2017 (Plunkett Research 2017). Affordability policies are particularly out of alignment with the financial realities of low-income students. Lawlor Group examined the colleges where most full-time undergraduates go based on tuition/fees. They found that 51% attended four-year colleges with tuition/fees under US\$12,000, 14% with tuition/fees between US\$12,001 and US\$14,999 and 16% are enrolled in four-year public colleges costing more than US\$15,000. .

Higher education is also becoming more expensive in some countries. Australia in its 2017 budget statement proposed an increase in tuition fees which would result in a 1.8% each year starting in 2018 and totalling a 7.5% increase by 2021 (Karp 2017). This means that students studying a four-year bachelor degree will pay between \$2,000 and \$3,600 more for their degrees. Further, the government suggested it would lift the average student share of fees from 42% to 46%, with the taxpayers’ share falling from 58% to 54%. The threshold for repaying student loans will be reduced from \$55,000 to \$42,000 from July 2018, with a repayment rate of 1% at an income of \$42,000 and rising to a maximum new threshold of \$119,882 with a repayment rate of 10%.

Given the affordability challenges, James, writing for the American Enterprise Institute (AEI), highlighted that private financing options for students could contribute to innovation in the higher education system and achieve a more dynamic and high-quality higher education system (James 2016, 1). Income share agreements (ISAs), in which a student agrees to pay a fixed percentage of his/her after-school income

for a set time period in exchange for funds to pay for school, was highlighted as an innovative funding solution for students in non-traditional post-secondary programmes.

The cost of college has fuelled discussions on affordability and student debt in the US and its impact on the national economy. According to both Plunkett Research (2017) and SCUP 2017, “some 40 million Americans have college loans, and together they owe more than \$1.3 trillion.” The average new US graduate with a 4-year degree left school in 2016 with \$37,000 in student loans, up from only \$18,600 in 2004 (Plunkett Research 2017). Nearly three-quarters of borrowers (70%) owe less than \$25,000 and only 8% owe more than \$75,000. Perhaps, what is more critical is that 40% of respondents in a 2015 Marketplace/Edison Research Poll said college debt is *not* worth the investment (SCUP 2017, 8). In the US, there have been calls to freeze tuition rates or cap tuition increases as well as free tuition. Recently, New York passed legislation that would allow for free tuition at two and four year colleges, although states like Tennessee and Oregon offer free tuition to high school graduates primarily at two-year public colleges. It is worth noting that universities in some EU countries (e.g. Belgium, Finland, Norway, Germany, Sweden, etc.) offer free tuition or charge low tuition fees for national and international students.

New learning and delivery models have emerged in the post-secondary market that offer students substantially better value for their money, whereby students are able to earn credentials quicker and at a lower cost with the belief that they will have a better chance of securing employment. These learning models include boot camp programmes built around highly relevant workforce skills, competency-based education (CBE) programmes designed to break free from the traditional credit hour, and unbundled online courses. However, some of these programmes can be costly. For instance, tuition for programmes at General Assembly, a provider focused on short-term, highly relevant skills training, can range from close to US\$10,000 to more than US\$20,000 for programmes lasting less than a year (James 2016, 2).

Student food and nutritional insecurity has become a major problem in some US University and college campuses because of changing demographics and rising tuition costs. According to *The Chronicle of Higher Education* “as college costs climb, state

support for public higher education shrinks, and more low-income and first-generation students enroll, a growing number of students are being forced to choose between tuition and food and shelter.” Nellum (2015), a higher education policy researcher, notes that Feeding America, a national non-profit network of food banks that provides food assistance to individuals and households, estimates that nearly half (49.3%) of its clients in college must choose between educational expenses (i.e., tuition, books and supplies, rent) and food annually, and that 21% did so for a full 12 months. In a 12-state survey of 3,800 undergraduate students, more than one in five students at eight community colleges said they had gone hungry in the past month and close to one in 10 said they had been homeless at some point in the past year. Nearly half described themselves as housing- or food-insecure, meaning that they could not regularly afford to pay rent or buy groceries. The *Chronicle of Higher Education* (2017) reported that some institutions have responded aggressively with meal-donation programmes, food banks, and emergency aid.

Labour markets prospects

The Lawlor Group notes that the most important reason students give for attending college is “to be able to get a better job” so, families put a premium on clear paths to employment success, knowledge and skills that are relevant to the job market, and experiential learning outside the classroom. Consequently, between 2005 and 2015, data from Cooperative Institutional Research Program (CIRP) cited by the Lawlor Group (2017, 4) shows that freshman students were choosing areas related to the STEM (Science Technology Engineering, Mathematics) disciplines. For instance, in 2005 approximately 8% of college students declared a major in the Biological Sciences and by 2015 this figure nearly doubled to 15%. A similar situation was noted for Engineering, where in 2005, 8% of students identified engineering as a major and by 2015, this figure increased to 13%. For the same period there were notable declines in Social Sciences and Humanities.

Graduate outcomes is a key outcome measure. The National Association of Colleges and Employers (NACE) undertook a first-destination/post-graduate survey of 2015 graduates six months after graduation. NACE indicates that the improvement in the overall outcomes rate for the Class of 2015 to 85.5% compared to the Class of 2014 with more than 80% is

How is The UWI first-degree graduates doing 16-18 months after graduation?

A Graduate Tracer Survey for two cohorts, 2009 and 2014 graduates, was conducted in early 2011 and 2016, respectively. The results at the aggregate level show that for all UWI Graduates:

- *The majority found employment one year after graduation:* Overall employment rates for UWI graduates for 2011 and 2016 reveal that the majority of graduates, just over 80%, found employment at least one year after graduation. There was a marginal decline in employment rates over the period moving from 83.5% in 2011 to 80.5% in 2016.
- *Employment rates varied across Faculty:* At the Faculty-level, there were some notable variations in employment rates. In 2016, there were above average rates - 80.5% of graduates responding in the 2016 survey indicated that they were employed, this represents a marginal decrease from the 2011 survey which stood at 82.6%. At the Faculty-level, some variations in employment rates were observed. The employment rates in 2016 (from highest to lowest) were Education (94.1%), Medical Sciences (83.7%), Engineering (82.7%), Social Sciences (80.5%), Humanities (80.2%), Science and Technology (73.8%) and Food & Agriculture (70.0%). Comparative figures for the 2011 period were - Education (97.6%), Medical Sciences (92.6%), Engineering (91.5%), Social Sciences (82.5%), Humanities (80.1%), Food & Agriculture (78.5) and Science and Technology (76.1%). Education (94.9%), Medical Sciences (83.6), Engineering (82.7%) and Social Sciences (80.5%) while below average employment rates were observed for Food and Agriculture (70%), Science and Technology (73.8%) and Humanities (80.2%).
- *Notable levels of underemployment were observed:* 19.1% of employed graduates in 2016 were underemployed i.e. in low-level jobs that require a minimum of secondary level education. The corresponding figure for 2011 was 14.7%. This level of under-employment revealed a "waste" of investment in higher education skills.
- *Underemployment was concentrated in specific Faculties -* Notable levels of underemployment were observed for graduates from Social Sciences (27.2% in 2011 and 28.3% in 2016), Humanities (17.7% in 2011 and 2016), Sciences and Technology (15.9% in 2016), Food and Agriculture (29% in 2011).

Source: UWI. "The Labour Market Experience of Recent UWI First-degree Graduates in Caribbean Economies An Analysis of Empirical Data from Two Graduate Tracer Surveys Conducted in 2011 and 2016" Prepared by the University Office of Planning. February 2018. 3, 6.

Source: NACE 2016, 8-13.

significant). Also, in considering employment after graduation there is a good deal of variety across majors in terms of post-graduation "success." The top five majors as measured by the percent employed full-time by a traditional employer (Computer Science, Business, Engineering Technology, Engineering and Communications) have employment rates that range from 59% to 72%, all career-oriented or professional majors. By contrast, the bottom five majors in terms of the percent in full-time employment with a traditional employer (History, Psychology, the Physical Sciences, Philosophy and Biology) have employment rates that range from 28% to 37% and would all be classed as Liberal Arts and Sciences (NACE 2016, 17).

SCUP (Spring 2016, 9) notes that the top five skills employers were looking for when recruiting were writing, critical thinking, problem-solving, communication, and organizational skills. The WEF (2016) notes that the skills required in the post-2020 world will include complex problem solving, critical thinking, creativity, people management,

coordinating with others, emotional intelligence, judgement and decision-making, service orientation, negotiation and cognitive flexibility. HEIs therefore will have to equip students with applicable soft skills via the curricula and co-curricula. Alternatively, this demand for skills can be met via online learning and boot camps. Stanford University, for instance, has created a learning studio – Stanford d.school – that focuses on real-world projects. This is a response to the students' and employers' demand for a close equivalency of work experience, with practicality provided through experiential learning, projects and application of classroom theory to real-world situations.

A publication by Brookings Institution (Care et al 2017, 7) notes that "the 21st century requires a wider range of skills than what was regarded as sufficient in the past" and that "these skills go beyond the traditional academic skills of numeracy and literacy to a broader set that includes interpersonal, intrapersonal, and technological skills." More specifically, teacher trainers/lecturers in Mexico, South Africa, Kenya, and the Philippines identified a set of skills and

characteristics most frequently associated with notions of what it takes to be a successful person (see Table 2).

A 2016 UK Engagement Survey, conducted by the Higher Education Academy (HEA) and based on the responses of 23,198 students at 29 institutions, supports a strong link between independent learning and skills development. Spending more time studying out of class was felt to be twice as beneficial in developing active learning skills, such as innovation and creativity, compared with spending more time in teaching sessions. Civic skills such as developing values and ethics, or being an informed and active citizen, there was a small difference between students who participated in 11 or more hours of taught session and those who participated in ten hours or fewer. For those who participated in sports/societies, stronger career skills development was noted (HEA 2016).

SCUP (2017, 9) citing Kevin Kelly (2016) notes that liberal arts provide a set of “timeless skills” by imbuing collaboration, creativity, synthesis, and communication, which Kelly argues is the best defense for a labour market in which all routine tasks are automated. In 2016 the WEF indicated that the global workforce will shed 7.1 million jobs over the period 2015–2020. Further, 65% children entering primary school today will ultimately end up working in completely new job types that do not yet exist (WEF 2016). Kelly is less pessimistic and refutes the argument about a jobless future. The age of technology may actually require the broad educational palette that the liberal arts imbues (SCUP 2017). Kelly notes that university and college

graduates with the right Liberal Arts background will enter careers that will be more beneficial to society. Kelly foresees a world where robots take on the routinized tasks (from truck driving to accounting), leaving occupations that are based on creativity and relationship building to an ever larger number of workers. This suggests that the academy will need to move faster to “prepare our graduates for a world of vastly smarter machines” (SCUP 2017).

Managing costs

HEIs are faced with addressing constrained revenues and increased institutional productivity. The usual response has been to either increase revenues from tuition and/or fees, or eliminate unproductive programmes, reduce administrative and student support services, eliminate discretionary spending and defer maintenance. The assumption is that cutting non-instructional functions and services would minimize impact on students (Jones and Johnstone 2016).

The authors also note that on the instructional side, the approach has been to utilize lower-cost inputs (substituting part-time/adjunct faculty for full-time/tenured faculty), which can impact quality of the educational outcomes (outputs). Declining revenues will also have implications for learners and learning. It will lead to an interrogation of the financial viability of academic programmes based on enrolment trends over a period of time. SCUP (Fall 2016) notes that in the current economic climate HEIs will have to give some thought to focusing on programmes in which they excel instead of providing a broad assortment of programmes.

Table 2: Identification of factors associated with a successful person by teacher trainers/lecturers		
Success	21 st century skills	Creativity
		Critical thinking
		Reasoning/decision-making
		Self-awareness
	Character traits	Adaptable/flexible
		Passionate/motivated/dedicated
	Workforce and society characteristics	Citizenship
		Job-readiness skills
		Productive member of society

Source: Esther Care, Helyn Kim, Kate Anderson and Emily Gustafsson Wright. *Skills for a Changing World: National Perspectives and the Global Movement*. Center for Universal Education Brookings Institution, March 2017, 12-13.

Based on a survey of chief financial officers, UB (2017) notes that the biggest spending increases for higher education will be staff salaries – 70% of financial administrators anticipate a modest increase in salaries, 57% expect modest or significant increases on technology. However, the largest "significant increase" will be health benefits, with 24% anticipating spending a lot more; an additional 38% will spend modestly more (UB 2016). Further, that there were a level of optimism for endowment income with 51% indicating that it should increase in 2017 and 46% anticipating an increase in advancement income (UB 2016). The UB 2016 survey found that keeping student tuition and fees down and controlling costs are the top priorities for 2017 for financial administrators and top campus leaders. (see Chart 1).

A report by Grant Thornton (2017, 9), an accounting firm, posits that mergers and partnerships present new potential for the higher education sector. The report notes that small colleges have merged or affiliated with larger institutions (e.g. Boston University and Hebrew University, Georgia State University and Georgia Perimeter College, etc.). Private/public and/or government partnerships are being formed and expanded for work-study collaborations, facility sharing and shared cost savings. For example, North Carolina State University Centennial Campus forged a union of university, industry and government to offer students business planning and commercial connections and Georgia Institute of Technology established a supply chain and logistic with university, alumni and corporate participants for projects that create value for all involved. Purdue University announced in May 2017 its deal for a long-term business relationship with Kaplan University, a for-profit university, with low upfront costs. The 32,000 Kaplan students and 3,000 employees will become part of Purdue University, which has almost no undergraduate presence in online-only programmes. Purdue will turn the former Kaplan University into a new legal entity, an online-focussed non-profit university structured as a public benefit corporation. The initiative is meant to address the need for postsecondary education for working adults, remote students and others, and the explosive growth of online technologies as a means of delivering education to students of all types. The new university will rely only on tuition and fundraising to

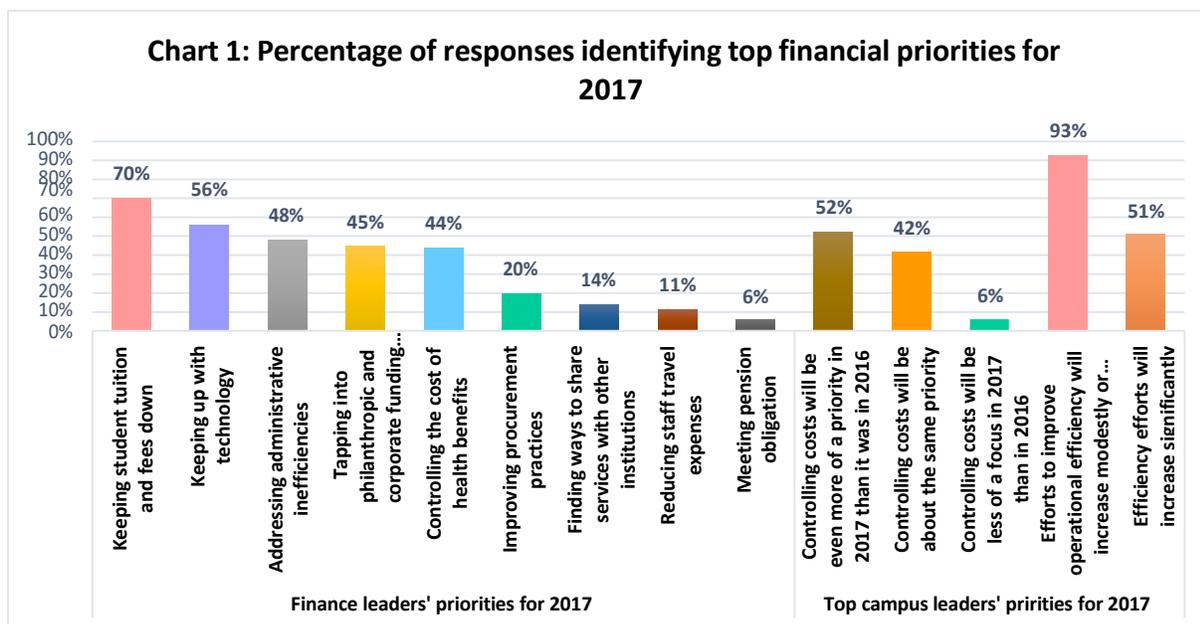
cover operating expenses and operate primarily online.

Sources of funding

Although economic activity may be picking-up, the higher education sector is still facing funding challenges. Higher education is also facing competition for public funds from lower levels of the education industry, health, security, and social programmes that impact on appropriations. SCUP (2017) notes that universities both in the United States and in the European Union are facing a financial squeeze.

According to SCUP (2017), as finances become more challenging for HEIs budgeting will get more sophisticated. Incremental budgeting, favoured by most universities, has two undesirable effects: it "enshrines the current state of affairs" and leads only to modest changes driven by "internal needs and constituency pressures" rather than big-picture thinking. According to the American Council on Education (ACE), 66% of institutions use an incremental budget model, where last year's budget is carried forward with an across-the-board increase or decrease based on institutional resources. The following budgeting models are proposed by Sirianni (2016) and Grant Thornton (2017): (i) "budgeting by substitution," in which new programmes are funded by reducing or eliminating old ones rather than from new sources of funding; (ii) a rolling zero-based budgeting process that critically examines the budget annually to determine what programmes/initiatives can be funded; (iii) multi-year budgeting, starting with the last year and working backward to help keep the focus on strategic goals; and (iii) responsibility-centered management (RCM) dictating that each academic unit carries its own costs and brings in its own revenue. However, performance-based funding (PBF) remains the most common efficiency approach aimed at incentivizing improved institutional outcomes with existing resources.

A 2016 Report from the European University Association (EUA) highlighted that public funding to universities between 2008 and 2015 increased in 11 countries and decreased in 13 others. However, there were differences in student enrolment across the countries. The Report (2016) also notes that the funding situation of universities is incredibly complex



Source: UB 2016.

as factors such as inflation, student enrolment, economic development and the state of infrastructure impact on cost. Generally, the decline in funding impacted on capital/infrastructure investment and staff leading to layoffs, lower replacement rates and reduced benefits. Funding constraints have led to the application of greater efficiency measures including PBF and a more active use of output indicators, including those related to graduate employability as in Slovenia (EUA 2015). In Italy, there was a shift from a historical allocation formula to a standard cost formula that weighed 30% of the base component while in Sweden decreased funding for capital investment has mobilized some large institutions to collaborate on joint infrastructure projects (EUA 2015). In the US, PBF is tied directly to institutional performance on such metrics as student retention, credit accrual, degree completion and job placement. The amount of state funding tied to performance indicators ranges from less than 1% in Illinois to as much as 80% to 90% in Ohio and Tennessee (*Dougherty et al 2016.*). *The American Association of State Colleges and Universities have raised questions as to whether PBF will lead to substantial improvements in institutional outcomes. It noted that colleges and universities in states with PBF could be responding to the policy by enrolling fewer low-income students thus exaggerating the differences between the “haves” and “haves not” of higher education by pulling funding from struggling institutions (AASCU 2017).*

Funding for research has also been impacted and the EU target of 3% GDP invested in research and development is being missed (EUA 2016). In the US, research universities are devoting more of their own funds to support basic research as research funds have contracted. Herman and Neuhauser (2016), research administrators from the University of Minnesota, note that federal support for research and development in the US has declined over the past 50 years from 0.71% of GDP in 1953; a max of 1.86% of GDP in 1964; and down to 0.77% of GDP in 2012 (or US\$124.6 billion). Business and industry stepped in to fill the funding gap and in 2014, industry supported 5.7% of higher education research and development in the US. Universities fund about 12% of research on campus in the 1950s and by 2014 almost 25% was secured from the university coffers. However, indirect costs crucial to building and maintaining the infrastructure needed to undertake academic research is being borne by universities. The authors cite the example at the University of Minnesota, where an increasing investment of institutional funds from US\$237.3 million to US\$287.3 million (2013-2015) resulted in a loss of 1.5% in indirect cost recovery. That is about US\$500,000 not available to spend on research, tuition assistance or the campus’ physical plant. Some countries such as The Netherlands have instituted efficiency cuts aimed at reducing the coverage of indirect cost in research. Herman and Neuhauser (2016) suggest that institutions could share research resources,

materials, data, and infrastructure as it reduce duplication and thus result in significant cost savings that could be reinvested in the research enterprise. Alternatively, the authors suggest aligning industry and academic interests by providing an incentive for businesses to invest more resources in higher education research and development. One estimate is that the return on investment for publicly funded basic research at 43%, and another places the value at \$10 to \$80 for every dollar spent on basic research (Herman and Neuhauser 2016).

Conclusion

The economic momentum of 2017 seems to carry forward into 2018, however; universities and colleges are still likely to face funding constraints. As such, managers will have to consider in the short term how will reduced government funding for the tertiary sector impact on the operations of their institution;

what counter measures will be instituted to cover the shortfall; what can universities and colleges do to make effectiveness, efficiency, and innovation a priority; what strategies are required for universities and colleges to place greater focus on commercialization, knowledge transfer, and industry partnerships to generate additional revenues; what is the economic impact/value of universities to national and regional economies; what implications would the rising cost of education have on demand and how could institutions support financing options for students; and given the rising unemployment and underemployment of university graduates, how could universities and colleges encourage graduates to be innovators and the creators of wealth and drivers of economic growth particularly in developing countries.

UWI Strategic Plan: Revitalizing Caribbean Development

Do you know that the current 2017-2022 Strategic Plan is the fifth Strategic Plan authored by the UWI? The first Strategic Plan was done in 1997. The UWI's Strategic Plan for the period 2017-2022, emerges from an understanding of the role of the university within its national, regional and global environments...Deemed the Triple A Strategy, this plan rests upon three primary pillars: Access, Alignment, and Agility.

To learn more about the Plan, click on the following link <http://www.uwi.edu/uop/strategic-plan-about-plan>

References

Adams Becker, S., Cummins, M., Davis, A., Freeman, A., Hall Giesinger, C., and Ananthanarayanan, V. *NMC Horizon*

Report: 2017 Higher Education Edition. Austin, Texas: The New Media Consortium, 2017. <http://cdn.nmc.org/media/2017-nmc-horizon-report-he-EN.pdf>.

Babson Survey Research Group. *Digital Learning Compass: Distance Education Enrolment Report 2017*. Prepared by I. Elaine Allen and Jeff Seaman. Babson, May 2017. <http://digitalllearningcompass.org/download-report>.

Babson Survey Research Group. *Opening the Textbook: Educational Resources in U.S. Higher Education, 2015-16*. Prepared by I. Elaine Allen and Jeff Seaman. Babson, July 2016. <https://www.onlinelearningsurvey.com/reports/openingthetextbook2016.pdf>.

Chester, Timothy. "Early Days for Drone Use in Higher Education." *EDUCAUSE*, July 11, 2016. <http://er.educause.edu/articles/2016/7/early-days-for-drone-use-in-higher-education>.

eCampus News. "14 hot higher ed trends for 2017." *eCampus News*. January 2, 2017. <http://www.ecampusnews.com/disruptions-and-innovations/hot-higher-ed-trends-2017/>.

Gartner. "Gartner's Top 10 Strategic Technology Trends for 2017." Contributor Kasey Panetta. October 18, 2016. <https://www.gartner.com/smarterwithgartner/gartners-top-10-technology-trends-2017/>.

Grant Thornton LLP. *The State of Higher Education in 2017. Sixth annual report*. US: Grant Thornton LLP. , 2017.

Howard, Doug. "Key Trends for 2017: Innovation in Educational Technology." <https://www.trainingindustry.com/ezone/current-issue/key-trends-for-2017-innovation-in-educational-technology.aspx>.

Plummer, Daryl C., Martin Reynolds, Charles S. Golvin, Allie Young, Patrick J. Sullivan, Alfonso Velosa, Benoit J. Lheureux, Andrew Frank, Gavin Tay, Manjunath Bhat, Peter Middleton, Joseph Unsworth, Ray Valdes, David Furlonger, Werner Goertz, Jeff Cribbs, Mark A. Beyer, Alexander Linden, Noah Elkin, Nick Heudecker, Tom Austin, Angela McIntyre, Fabio Chesini, Hung LeHong. "Top Strategic Predictions for 2017 and Beyond: Surviving the Storm Winds of Digital Disruption." Published: 14 October 2016. https://www.gartner.com/binaries/content/assets/events/keywods/cio/ciode5/top_strategic_predictions_fo_315910.pdf.

Pudwell, Sam. "Three Education Tech Trends For 2017." *Silicon UK*. March 16, 2017. <http://www.silicon.co.uk/data-storage/education-tech-trends-2017-204352>.

Society for College and University Planning. *Trends in Higher Education. Evolution of Higher Education. SCUP, Spring 2017*. http://www.scup.org/page/resources/ttw?utm_campaign=trends-2015-october-&utm_source=mega-menu-link-Trends2015.

Society for College and University Planning. *Trends in Higher Education. The Future of Learning. SCUP, Fall 2016*. http://www.scup.org/page/resources/ttw?utm_campaign=trends-2015-october-&utm_source=mega-menu-link-Trends2015.

Stone Peter, Rodney Brooks, Erik Brynjolfsson, Ryan Calo, Oren Etzioni, Greg Hager, Julia Hirschberg, Shivaram Kalyanakrishnan, Ece Kamar, Sarit Kraus, Kevin Leyton-Brown, David Parkes, William Press, AnnaLee Saxenian, Julie Shah, Milind Tambe, and Astro Teller. "Artificial Intelligence and Life in 2030. One Hundred Year Study on Artificial Intelligence." Report of the 2015-2016 Study Panel, Stanford University. Stanford, CA, September 2016. <http://ai100.stanford.edu/2016-report>.

Tyton Partners. *Learning To Adapt 2.0: The Evolution Of Adaptive Learning In Higher Education*. 2016. <http://tytonpartners.com/tyton-wp/wp-content/uploads/2016/04/tyton-Partners-Learning-to-Adapt-2.0-FINAL.pdf>.

University Business. "The latest trends and predictions for higher ed in 2017." *University Business*. December 28, 2016. <https://www.universitybusiness.com/article/latest-trends-and-predictions-higher-education-2017>.

World Economic Forum. "The future of jobs: employment, skills and workforce strategy for the fourth industrial revolution." World Economic Forum, Geneva, Switzerland, 2016. http://www3.weforum.org/docs/WEF_FOJ_Executive_Summary_J_obs.pdf.