COST EFFICIENCY VERSUS DISRUPTION: ARE TRADITIONAL UNIVERSITIES DOOMED?

C. Serfontein

School of Accountancy

University of the Free State

Bloemfontein, South Africa

https://orcid.org/0000-0002-9079-2552

ABSTRACT

Internationally, universities face the consequences of the disruption caused by the Fourth Industrial Revolution, accelerated by COVID–19. Traditional universities have lost their competitive advantage due to rapidly changing skills needed and online learning gaining momentum. Historically, universities benefitted from higher levels of enrolments, also increasing their tuition fees above inflation with researchers indicating their concern, but failing to address the reason(s) for this increase.

To assess the extent to which universities are geared to face the disruption of potentially declining enrolments with limited opportunity to increase tuition fees in the future (relevance of skills, more competition, students having more choices), it is imperative to assess why tuition fees increased above inflation in the past. The focus of this quantitative research study is to establish the level of efficiency of managing Expenses amongst a sample of sixteen publicly funded South African universities from 2010 to 2019. The data was secondary data in the public domain.

Serious levels of financial distress caused by declining enrolments have already been reported in many universities in the United Kingdom (UK), Europe, the United States of America (USA) and Australia. The research question addressed in this article is to assess what the reasons are for the abnormal increases in tuition fees in the past with the intent to assist universities in the future if (when) the disruption of declining enrolments and lower tuition fees is realised.

Although this study focused only on South African universities, the unique contribution of this research is the methodology applied using Management and Cost accounting to assess the efficient management of expenses at South African universities from 2010 to 2019.

Keywords: Economies of scale, Efficiency, Fixed costs, Fourth Industrial Revolution, Higher Education, Management and Cost accounting, Online Education, Tuition fees, Variable costs.

INTRODUCTION AND BACKGROUND

Globally, tuition fees at universities have increased above inflation to such an extent that many students can no longer afford to attend these institutions (Parker 2020, 1, Peters et al. 2020, 86; Schmidt 2020, par. 5, Dickler 2021, par. 16–17, Serfontein 2022, 13). This rise in tuition fees

accompanied a global increase in access to higher education from 19 per cent to 38 per cent from 2000 to 2018, according to a report by the United Nations Educational, Scientific and Cultural Organization (UNESCO) (2020, 8).

When considering the cost structure of universities with most of the costs committed and fixed (see section 4.2.1), increased enrolments should have decreased the cost per enrolment, resulting in decreased tuition fees and universities benefiting from economies of scale and increased efficiency (Moore 1998, 76, Szychta 2010, 49, Serfontein 2019, 9). However, universities did not benefit from economies of scale despite the increase in enrolments and have rather been on the receiving end of high cost rises over the last few decades, even though almost all industries experienced some form of increased efficiency and decreases in costs (Cooper 2020, par. 3). In contrast, over the last few decades, the entire higher education sector suffered serious cost inefficiencies (Pathak and Palvia 2021, 36). The rise in tuition fees experienced by universities clearly does not make any sense.

The mentioned increase in tuition fees accompanied by an increase in enrolments might be short–lived since industries worldwide are faced with disruption, and universities are no exception (Serfontein 2022, 143). The disruption experienced by universities has already led to declining enrolments in the United Kingdom (Adams 2022, par. 1–2). This declining headcount increases the pressure felt by UK universities. These universities could face a funding crisis of a shortfall of around £2 500 pounds for every home undergraduate with expectations increasing this amount to £5 000 by 2029/30 with government funding per student almost halving between 1975 and 2000 (Foster, Gross, and Borrett 2023, par. 5, 11).

According to the Student Headcount Report, as provided by the PowerHEDA dashboard, the headcount of enrolled students at the 26 publicly funded universities in South Africa declined from 1 094 808 in 2020 to 1 068 046 in 2021, a decrease of 2.4 per cent (Staff Writer 2023a). When considering this decline using full–time equivalent enrolments (FTEs), the decline was from 801 417 in 2020 to 787 228 in 2021 (1.8 per cent) (Staff Writer 2023a).

The first possible reason for the current and predicted future declines in enrolments at universities is that the competitive edge in terms of the geographical location of traditional universities is coming to an end (Serfontein 2022, 2). Technology became a major threat to universities, with online and open–source learning that was accelerated by COVID–19, and with students increasingly preferring it, implying that students can now study at the best universities in the world regardless of their location (Davies 2012, 66; Ostashewski Howell and Dron 2017, 184; Shah 2018, par. 1; Saayman 2020, 4–5).

The next reason for the predicted future declines in enrolments at universities is the

relevance in terms of what is taught. Due to the advancement in technology (also associated with the Fourth Industrial Revolution (4IR)), it is estimated that 50 per cent of the knowledge a first–year student enrolled in a four–year degree acquires is outdated by the time they graduate (Coetzee et al. 2021, 3). The relevance of a university education is further threatened by the increased oversupply of traditional graduates. The average percentage of 25 to 64 year olds that obtained any form of post–secondary degree across Organisation for Economic Cooperation and Development (OECD) countries increased from 30 per cent in 2010 to 40 per cent in 2021. In the United States, the same increase was from 42 per cent to 50 per cent (Editorial 2023a, 1). The expectation is that degrees would increase the income potential of the youth; however, in the UK, it was established that the financial investment to obtain the degree did not sufficiently justify the future earnings of at least 20 per cent of degrees obtained (Parker 2020, 4). In South Africa, 32 per cent of graduates are jobless (Editorial 2022a, par. 1). Regardless of the high graduate unemployment rate, South African higher education institutions saw 278 815 bachelor passes and 197 357 diploma passes in 2022 (Makwea 2023, 3). This puts a substantial question mark on the relevance and benefit of many conventional degrees.

The increased competition traditional universities face is the next threat to their levels of student enrolment. One form of said competition is that, as many industries are confronted with disruption, companies need graduates with job–ready skills, and it seems universities are failing to provide them. Consequently, many companies opt for in–house training rather than employing graduates (Parker 2020, 6). Further competition to traditional university education is E–learning, of which online education and MOOCs are two examples. E–learning is "A learning system based on formalised teaching but with the help of electronic resources. While teaching can be based in or out of the classrooms, the use of computers and the Internet forms the major component of E–learning" (Editorial 2022b, par. 1). In 2021, the global E–learning market size had a value of $214.22 billion, expected to increase to $475.6 billion by 2027. This amounts to a compound annual growth rate (CAGR) of 14.22 per cent (Editorial 2022c, par. 1). Many traditional universities are either unprepared or culturally unwilling to seriously take cognizance of this trend since the subsidies for face–to–face education are often higher than online or E–learning. This is the case for South African publicly funded universities, where students enrolled in an online course receive only 50 per cent of the subsidies for students enrolled in face–to–face courses (Department of Higher Education and Training (DHET) 2021, 7).

A further challenge traditional universities face is a decline in government funding, which they make up in tuition fee increases above inflation (Smit and Serfontein 2019, 1–2; Swartz,

Ivancheva et al. 2019, 571; Koornhof 2020, par. 7). Mtshweni (2022, 247) reiterated this challenge as not only a challenge faced by South African universities but by African universities. These increases have also sparked global protests, threatening the survival of traditional universities if they should continue (Ratcliffe 2015, 1). If universities want to mitigate the risk of substantial declines in enrolments, they must take some drastic decisions, changing these organisations completely (Cabrera and Fernández–Ferrer 2017, 48; Hess 2017, par. 3; Koornhof 2020, par. 1; Smit and Serfontein 2020, par. 4; Naidu, 2021 par. 1; Serfontein 2022, 13). These changes will require a considerable investment in resources to retrain staff and obtain the required capital assets (Yang et al. 2018, 224–225).

Bigger classes and limiting options in terms of choice (modules and degrees) are typical changes universities use to cross–subsidise increasing salaries and research to increase resources. However, as tuition fees and the debt of students are accumulating, equal opportunities are on the decline for poor students (Barr et al. 2019, 42). In South Africa, where most students are poor and seeking affordable education that will ensure employability, the outlook for traditional universities is bleak, emphasised by around R15 billion required just to settle student debt in 2021 (Smit and Serfontein 2019, 1332; Kgosana and Makinana 2021, 1). Rising tuition fees with student debt increasing are the current reality faced by traditional universities, and it is directly related to the inefficient management of universities from a Management and Cost accounting perspective.

This means that the only option for universities to obtain the resources required to address the disruption they face is to become more efficient (Saladrigues and Tena 2017, 118). However, the whole tertiary education industry has experienced severe cost inefficiencies in the last few decades, not fully capitalising on the additional efficiency brought about by an online platform (Pathak and Palvia 2021, 36–37).

The research question addressed in this study is whether there are legitimate reasons for the increases in Tuition fees of traditional South African universities? Based on historical data (2010–2019) specifically excluding the effect of COVID–19, how well did a sample of 16 (from a population of 26) South African publicly funded universities manage their expenses? This study aims to answer these research questions by conducting a literature review establishing the meaning of efficiency in the university sector by investigating the input–output relationship at these institutions. The literature review is then followed an explanation of the methodology followed in the empirical study. The next part of the study contains the results and a discussion of the results of the empirical study. In the empirical study, the author investigates the main reason for the increase in expenditure at a sample of traditional universities in South Africa by

analysing their total expenses followed by an analysis of the three categories of expenses at these institutions, i.e., academic salaries, other salaries and other expenses. The analyses offer insight into the efficiency with which expenditure is managed at the sampled universities. This insight and further findings from the analyses are discussed in detail, followed by a conclusion from the literature review and the findings of the empirical study.

RESEARCH OBJECTIVES

The primary objective of this article was to establish whether traditional universities in South Africa managed their expenses efficiently over a nine–year period from 2010 to 2019, benefiting from economies of scale. The primary objective is supported by the following secondary objectives:

- Investigate the cost structure of universities in terms of efficiency and economies of scale;
- Evaluate the performance of the expenses of South African universities in terms of the Budgeted Benchmark (related to inflation plus Teaching Input Unit (TIU[1]) and Teaching Output Unit (TOU[2]) growth) from 2010 to 2019 (see section 4.2.4);
- Evaluate the performance of the three expense categories of South African universities in terms of the Budgeted Benchmark (related to inflation plus TIU and TOU growth) from 2010 to 2019;
- Determine the growth in the three expense categories of South African universities from 2010 to 2019; and
- Evaluate the change in the composition of the three expense categories of South African universities from 2010 to 2019.

LITERATURE REVIEW

Over the last decade, universities experienced an abnormal increase in tuition fees as well as expenses (Parker 2020, 1, 5; Peters et al. 2020, 740; Schmidt 2020, par. 5; Dickler 2021, par.

[1] "A Full–Time–Equivalent Enrolment (FTE) that is weighed according to the funding grid as determined by the South African Department of Higher Education and Training (DHET)" (Serfontein 2019, 16).

[2] "A grant dependent on the actual total of non–research graduates as well as the normative total of non–research graduates as generated by a head count passed through the relevant weighting grid as determined by the South African DHET" (Serfontein 2019, 16).

17–18; Serfontein 2022, 7). The tuition fee increases were most likely a result of the rising costs of universities whilst the institutions faced decreased government funding, especially in low–income countries (Burer and Fethke 2016, 182; Tanaka et al. 2022, 2). Unfortunately, if universities want to reposition themselves amidst the disruption they face, they will first have to consider what they are currently doing wrong (or what they need to stop doing) before they can make the required changes (Smit and Serfontein 2019, 1341). This article considers the growth, composition and performance of the three Expense categories in a sample of South African publicly funded universities (pre–COVID) to evaluate where these organisations must adjust their spending to become more efficient in their efforts to adapt to the disruption they face.

The measurement of the efficiency of units within a university is one of the most important factors to understand when considering the management of universities. Efficiency concerns maximising the input–output relationship by optimising the use of scarce resources. The input–output relationship for a university typically constitutes costs (input) versus predominantly teaching revenue (output). Efficiency is, therefore, a fundamental financial management and economic principle to maximise outputs with minimum inputs (Mojahedian et al. 2020, 2).
Hence, when the efficiency of universities is addressed, a few Management and Cost accounting issues must be highlighted. The first issue is that the cost of presenting one module (existing or new) is fixed, regardless of the number of students enrolled in the module. Added to this fixed component, as the second issue, is a variable component that is influenced by the number of students enrolled. Thirdly, decisions to add modules in a department affect the academic staff in that department's capacity, since academic staff have a limited capacity to present modules. The fourth issue is that when the financial viability of universities is considered, the input–output relationship at a university must be understood, as it forms the basis of efficiency in any organisation (Serfontein 2022, 124).

A critical characteristic of a university to consider in understanding its input–output relationship is that a university is a service organisation. As a service organisation, a university delivers an intangible cost objective (Kamal Basha, Sweeney, and Soutar 2015, 173; Serfontein 2019, 6). Intangibility is the main factor separating the cost objective produced by manufacturing organisations from the cost objective produced by service organisations. The tangibility of a manufacturing organisation's cost objective means that these organisations can determine the various resources required (input) to produce one output unit with relative ease (Gripper 1995, 27). Service organisations, in contrast, produce their cost objectives by providing differing measures of support activities (input). Therefore, a large portion of the

inputs involved in providing the service does not explicitly relate to delivering the said service (Gripper 1995, 27; Terzioglu and Chan 2013, 32; Drury 2018, 26–27)

The result of this difference between manufacturing and service organisations is that within service organisations, there exists a less clear causal relationship between the outputs produced and the inputs required to produce the related outputs. This input–output relationship is more causal and direct in manufacturing organisations. When the cost structures of manufacturing and service organisations are compared, the difference in the input–output relationship is an important factor in understanding the classification of costs within these organisations (Serfontein 2019, 9).

Typically, in service organisations considering the final product or service as the cost objective, costs are predominantly indirect (top management, service and support departmental costs referred to as overheads) and fixed, with lower levels of direct costs (Serfontein 2022, 111). The advantage of the high levels of fixed costs, as is present in most service organisations, is that the related organisation benefits when revenue increases, but a decrease in revenue has a substantially negative impact on the bottom line. This impact is because only variable costs are directly related to rendering the service, which implies that revenue increases will only have a small impact on costs and vice versa. For a traditional university as a typical service organisation, if revenue should decrease, as is predicted with the arrival of the 4IR, or with a decrease in their competitive advantage brought about by an increasing number of students preferring to enrol in online and free international higher education, the impact on the financial survival of these universities could be severe (Serfontein 2022, 111).

Since the biggest portion of the costs (input) incurred at universities are fixed (salaries), an increase in enrolments (output) should not have a substantial impact on the additional costs incurred at universities; thus, it should potentially affect tuition fees positively (Serfontein 2022, 124). The increase in tuition fees experienced specifically at South African universities, indicates that these institutions did not benefit from economies of scale as is expected with an increase in student numbers (Koornhof 2020, par. 17; Mtshali 2020, par. 19; Peters 2020, 740; Serfontein 2022, 124). Efficiency can only improve if the input–output relationship is improved, which implies the service (tuition) can be offered at a more affordable price. The empirical focus of this study investigates the efficiency with which traditional, publicly funded universities in South Africa managed their expenses prior to 2020.

METHODOLOGY

Description of the sample

This study focuses on publicly funded traditional universities in South Africa (providing primarily face–to–face and on–campus teaching). South Africa currently has 26 publicly funded universities (Universities South Africa 2018, par. 1–2). From the 26 publicly funded universities, a sample of 16 universities was collected for the purpose of this study. This sample was selected based on the availability and applicability of the financial statements for 2010 and 2019. Some did not exist or were very small in 2010, some did not split their salaries between academic and service salaries, and their financial statements, in some cases, were not available for these specific years. The description of traditional universities provided also excludes the University of South Africa (UNISA) since it does not primarily provide face–to–face and on–campus teaching). The decision to use only 2010 to 2019 as the period for the study was specifically taken to exclude the effect of the COVID–19 pandemic on the financial results of the selected universities. This choice was to enable the researcher to determine the current efficiency with which universities are operating without distorting the results of the analysis of their operations by the disruption caused by the COVID–19 pandemic. The results from the study might, therefore, be used to determine what the possible impact of the disruption universities are facing could be on the financial sustainability of universities if they continue at their current level of efficiency.

When the selected sample is compared to the population, the researcher is satisfied that the sample is a sufficient representation of the population, even though it represents only 61.5 per cent of the publicly funded universities in South Africa. Table 1 compares the sample selected for this study to the population in terms of Teaching Input Units (TIUs) and Teaching Output Units (TOUs).

Table 1: Comparing the TIUs and TOUs of the population and the sampled universities

	Total Teaching Input Units (TIUs)		Total Teaching Output Units (TOUs)	
	2010	**2019**	**2010**	**2019**
Population	1,158,537	1,553,743	134,270	202,694
Sample	798,363	1,053,193	88,194	126,307
% of Population	68.9%	67.8%	65.7%	62.3%

From Table 1, it is seen that the sample in this study represents 67.8 per cent of the 2019 TIUs of the whole population (68.9 per cent in 2010) and 62.3 per cent of the 2019 TOUs of the population (65.7 per cent in 2010). Since Subsidies and Grants make up the biggest portion of the income received by publicly funded universities, TIUs and TOUs are regarded as an efficient measurement of the size of a university (Editorial 2020, par. 10). The researcher specifically excluded Research Output Units (ROUs) from the empirical part of this study, since

research–related income comprises only 8 per cent of the total Unrestricted revenue of the population for 2019 and varies quite substantially amongst the universities. In Table 2, the revenue and expenses of the sample to the population for 2019 are illustrated. These amounts are expressed in US$ as converted using the Big Mac Index (see section 4.2.5). The Big Mac Index is used since purchasing power differentials are only reflected in the long term in exchange rates, causing exchange rate conversions to be inappropriate (Ong and Mitchell 2000, 869; Loveridge and Paredes 2018, 367). A further concern for using exchange rate conversions is that exchange rates are highly volatile, which causes these conversions to be inaccurate (Ong and Mitchell 2000, 869).

Table 2: Comparison of average (mean) revenue and expenses per university between the sample and the population for 2019

Average	2019 ($1 million)		Sample /	2019 Composition	
	Population–26	Sample–16	Population	Population–26	Sample–16
Revenue[1]	516.7	451.14	87.3%	100.0%	100.0%
Expenses[2]	425.3	388.81	91.4%	82.3%	79.9%
Net Surplus	91.5	62.34		17.7%	20.1%

[1]The population universities include restricted revenue and student accommodation revenue, while the sample only reflects the unrestricted revenue.

[2]The population universities include Restricted expenses and student accommodation expenses, while the sample only reflects the unrestricted expenses.

Table 2 clearly indicates that the mean size of the sampled universities is very similar to the population in terms of both revenue and expenses. In terms of the mean revenue, the population has a revenue of 12.7 per cent higher and expenses 8.6 per cent higher than the sample (mainly explained by the restricted revenue and expenses being included in the population). From the representation of the sample in terms of TIUs, TOUs, revenue and expenses, the researcher regards the sample as sufficiently representative of the population.

Important terms, concepts, and assumptions

In the empirical study performed, the financial data of the sampled universities for a nine–year period from 2010 to 2019 were analysed. The financial data collected for the sample are secondary data in the public domain.

Fixed versus variable costs

Variable costs are costs that change in direct relation to the change in the level of a related activity. This means that a variable cost is incurred every time the related activity is performed. Per unit, these costs will remain constant, but the total will increase with an increase in the

activity level (Persaud 2020, 3–4). Fixed costs, in contrast, are incurred even when no activity was performed. Fixed costs will be incurred as long as the organization continues as a business. When considering fixed costs in decision–making, these costs will usually have no impact over the short to medium term whilst the organization operates within normal activity levels (relevant range), and no additional fixed costs are incurred. Per unit, fixed costs decrease with an increase in activity (economies of scale) but remain fixed in total for a period of time (Persaud 2020, 4).

Product versus period costs

Costs assigned to the cost objective are classified as product costs. Costs not assigned to the cost objective but rather reported in the period in which they are incurred are period costs (Drury 2018, 26–27). Distinguishing between product and period costs often becomes less relevant in service organisations since the majority of costs incurred by these organisations are not specifically related to the cost objective (product cost) but rather reported as a period cost in the period they were incurred (Terzioglu and Chan 2013, 32). Product versus variable costs and period versus fixed costs are often used as similar concepts.

Expenses

The analyses performed in this study focus mainly on the expenses incurred at the sampled universities. These expenses consist of council–controlled, unrestricted funds, which for the purpose of this study, were grouped into academic personnel costs, other personnel costs and other expenses. Other expenses include, but are not limited to, operating expenses and depreciation. Although depreciation is a non–cash operating expense, it represents less than 4.3 per cent of all expenses for the sampled universities. In addition, the focus of this article is more on both the academic and other personnel costs.

Growth

The analysis of the expenses of the sampled universities used the actual growth in TIUs and TOUs (TIOUs) and inflation from 2010 to 2019 (the term "Nominal TIOU growth rate" is used for the remainder of this study) applied to the 2010 actual expenses to determine a Budgeted Benchmark for 2019. This was done for each university individually. The growth in TIOUs was used as a proxy for growth in enrolments. The inflation component was determined based on the All items, Total country, Consumer Price Index (CPI) for the nine years, starting from 2010 to 2019 (Editorial 2022d). The formula to calculate the nominal TIOU growth rate is provided

in Equation 1:

Equation 1: Calculation of the Nominal TIOU growth rate

$$\text{Nominal TIOU growth} = (1 + \text{inflation}) \text{ x } (1 + \text{TIOU growth}) - 1$$

The total South African inflation rate of 59.41 per cent for the nine years applicable to this study was used for all universities; however, the growth rate for each university (TIOUs) was determined separately to calculate the Budgeted Benchmark for each university individually. In Table 3, the Nominal TIOU growth rate for the period 2010 to 2019 of the sampled universities is reflected.

Table 3: Inflation and growth in TIOUs for the sampled universities: 2010 to 2019

	9 years		Per Annum
2010 – 19	**% Increase**	**50%**	
Inflation	59.41%	59.41%	**5.32%**
Growth in TIOUs	33.04%	**16.52%**	**3.22%**
Inflation and 100% Growth in TIUOs	**112.08%**		**8.71%**
Inflation and 50% Growth in TIOUs		**85.75%**	**7.12%**

From the data in Table 3, the South African inflation rate for the nine–year period applicable to this study was 5.32 per cent per annum, while student enrolments and graduates (TIOUs) grew by 3.22 per cent per annum. It is also important to note that only one university had a negative growth in TIOUs of –2.4 per cent over the nine–year period. Combining inflation and the growth in TIUOs for the nine–year period produces a compounded growth rate of 112.08 per cent. This was used as the benchmark for expense growth of the sampled universities to calculate the maximum budgeted increase in expenses from 2010 to 2019. Any additional expense increases above 112.08 per cent would, therefore, indicate that the sampled universities did not manage their expenses efficiently. However, given the fixed nature of university expenses, this is an extremely conservative approach. In an environment of predominantly fixed and indirect costs, any increase in outputs should benefit service organisations in terms of economies of scale and the input–output relationship. To reflect the supposed economies of scale benefit, a second benchmark was calculated as inflation plus 50 per cent of the increase in TIOUs (Serfontein 2022, 121). This was again done for all the sampled universities individually, since they all had different TIOU growth rates for this period; thus, the budgeted projections of expenses were performed separately for each university. The author is of the opinion that this 85.75 per cent benchmark (50 per cent of TIOUs and 100 per cent inflation) is still regarded as a very conservative projection of expenses for typical service organisations.

Currency

Given that the South African Rand (ZAR) is not a well–known exchange rate, the author decided to convert ZAR to the United States Dollar (US$) to make the data more palatable for an international audience (R14.175 to US$1 in July 2019) (Editorial 2023b). The author also decided to use the Big Mac Index to do the conversions. The main reason for this decision was that the Big Mac Index provides a more realistic and stable indication of the relative purchasing power amongst various countries with different exchange rates. We accept that this is a contentious decision, but fortunately, it does not change the results in any way (only the US$ value of the various categories of expenses is impacted, but no impact on the percentage deviations between actual versus budgeted projected expenses).

Research method

The two Nominal TIOU growth rates as mentioned in section 4.2.5. of inflation and 100 per cent growth in TIUOs, as well as inflation and 50 per cent growth in TIUOs, were used to project the total expenses, including the three categories of expenses, i.e., academic salaries, other salaries and other expenses, for the sampled universities for 2019, using the actual figures of 2010 as a base. The result of this projection is a Budgeted Benchmark for each expense category for 2019. This 2019 Budgeted Benchmark was then compared to the corresponding actual 2019 amounts to determine the level of efficiency with which the sampled universities managed their expenses. The methodology applied in this study, although applied to a sample of South African universities, could be applied to any traditional, publicly funded university. The main change when applying the methodology to the related universities in a different country would be to determine the appropriate measuring unit for growth as explained in section 4.2.4. This measurement unit should be equivalent to TIUs and TOUs as used in Equation 1. Once this measurement unit is established, Equation 1 can be applied to the related universities to determine the Budgeted Benchmark for the applicable year and line item. The rest of the methodology, as explained in this section, can then be followed.

For the analysis of total expenses, including the three mentioned expense categories, the 2019 actual expense amount was deducted from the 2019 Budgeted Benchmark for each of the related expense categories. This analysis was applied taking both 100 per cent and 50 per cent TIOU growth into account, as explained above (section 4.2.4). A negative result indicates that the related universities spent more than reasonably expected. This overspending could possibly indicate a lack of efficiency when it comes to the management of university expenses.

For each expense category, the results of the analyses described in the previous paragraph were used to split the sampled universities into two categories, i.e., eight best–performing universities and eight worst–performing universities. This distinction between the eight best– and eight worst–performing universities (in terms of their level of overspending on the 2019 Budgeted Benchmark) was used to assess the universities' ability to manage the related expense category efficiently. Added to the analyses performed using the 2019 Budgeted Benchmark is the composition of each expense category in relation to total actual expenses and the growth of each category from 2010 to 2019.

Ethical considerations

Ethical clearance for this study (UFS–HSD2021/1793/21) was received in writing from the General/human research ethics committee (GHREC) based at the institution the author is affiliated with. This is, however, a non–human study primarily using secondary data in the public domain. Regardless, all universities forming part of this study were anonymised to ensure that no bias could be included in the interpretation of the findings and that no university could suffer any reputational damage as a result of the findings from this study. The following section reports on the findings from the analyses performed.

RESULTS AND DISCUSSION

The author of this study focused on the extent the sampled South African universities, from a financial point of view, managed their expenses efficiently from 2010 to 2019. Even though universities are typically not–for–profit (publicly funded) organisations, proper financial management remains essential to ensure that higher education is affordable whilst still ensuring sufficient resources to enable universities to adapt to the needs of the global business environment, which is rapidly changing.

When considering the categories of expenses used for the purpose of this study, both other salaries and other expenses are predominantly indirect and fixed, considering academic teaching as the primary cost objective of a university and should thus increase only marginally above inflation with an increase in student numbers (TIOUs). If the benefits of technology are added, one would expect a relative decline in at least other salaries (after inflation was considered) (Serfontein 2022, 202).

In Table 4, the methodology of how the projected budgeted expenses were determined using the Big Mac Index to convert ZAR to US$ is reflected. The actual mean expenses for 2010 were used to calculate the budgeted expenses for 2019 using a growth rate of 112,08 per

cent for inflation and 100 per cent growth in TIOUs, and 85,75 per cent for inflation and 50 per cent growth in TIOUs. Take note that 112.08 per cent and 85.75 per cent are the mean proxies for all the sampled universities, but the TIOU growth was individually calculated for all sampled universities.

Table 4: Mean actual (2010 and 2019) and budgeted expenses (2019) for the sampled universities

100% Inflation + 100% TIOU Growth	**100%TIOU**	**Per University US$ ('000)**		**50%TIOU**
Mean total expenses	**MEAN**	**8 Worst**	**8 Best**	**MEAN**
– Actual mean 2010	183,262	170,534	195,990	183,262
– Actual mean 2019	**388,809**	**364,237**	**413,381**	**388,809**
– Budget mean 2019	**393,332**	**337,388**	**449,276**	**340,731**
Difference (Budget – Actual)	**4,523**	**–26,849**	**35,896**	**–48,078**
% Difference (1–Actual/Budget)	**1.15%**	**–7.96%**	**7.99%**	**–14.11%**
Difference (16 Universities):	**72,374**	**–214,792**	**287,166**	**–769,242**

In Table 4, the budget for 2019 is firstly calculated using inflation plus 100 per cent growth in TIOUs. The author is of the opinion that this already reflects inefficiency, given the fixed and indirect nature of the cost structures of universities. The difference between the budgeted and actual total expenses of $4,52 million or 1.15 per cent of budgeted total expenses is small and positive. However, if these universities had benefited from economies of scale, the positive difference should have been bigger. Also indicated in Table 4 is a comparison between the eight worst and the eight best universities in terms of managing their total expenses. The eight worst–performing universities overspent $26,85 million, or 7.96 per cent, on budget ($214,79 million for all 16 universities), while the best–performing universities underspent 7.99 per cent on total expenses. This substantial difference between the best– and the worst–performing universities is a clear indication that the increase in total expenses is not the consequence of external factors, but rather an indication of bad management from a financial perspective. The last column in Table 4 is, however, the true reflection of the performance of the sampled universities where inflation plus 50 per cent of TIOU growth was used. The overspending was $48,08 million, or 14.11 per cent above budget per university. This difference amounts to a negative total difference of $769,24 million for all 16 universities, which is clearly indicative of inefficiency, with the sampled universities not benefiting from economies of scale. In the next few tables, academic and other salaries, as well as other expenses, were analysed over the same period of time.

Table 5: Mean actual (2010 and 2019) and budgeted salaries (2019) for sampled universities

100% Inflation + 100% TIOU Growth	100%TIOU	Per University US$ ('000)		50%TIOU
Mean total salaries:	**MEAN**	**8 Worst**	**8 Best**	**MEAN**
– Actual mean 2010	112,306	118,733	105,879	112,306
– Actual mean 2019	**241,962**	**261,449**	**222,475**	**241,962**
– Budget mean 2019	**240,635**	**236,347**	**244,924**	**208,630**
Difference (Budget – Actual)	**–1,327**	**–25,102**	**22,449**	**–33,332**
% Difference (1–Actual/Budget)	**–0.55%**	**–10.62%**	**9.17%**	**–15.98%**
Difference (Total):	**–21,229**	**–200,817**	**179,588**	**–533,320**
% of Total actual expenses	**MEAN**	**8 Worst**	**8 Best**	**MEAN**
– Actual mean 2010	**62.47%**	**61.03%**	**63.90%**	**62.47%**
– Actual mean 2019	**62.58%**	**64.07%**	**61.08%**	**62.58%**
% Growth: Actual 2010–19				
– Total expenses	**112.16%**	**113.59%**	**110.92%**	**112.16%**
– Total salaries	**115.45%**	**120.20%**	**110.12%**	**115.45%**

The main deductions from Table 5 when considering inflation plus 100 per cent of TIOUs are that the sampled universities a) spent more than 62 per cent of total expenses on salaries; b) overspent on total salaries, even using inflation and 100 per cent growth in TIOUs; c) have eight worst performing universities that spent 10.62 per cent above the budgeted total salaries, while the best–performing universities spent 9.17 per cent below budget, a clear indication of inconsistency; and finally that d) the worst–performing universities increased their salary bill relative to total expenses from 61.03 per cent in 2010 to 64.07 per cent in 2019, while the best–performing universities decreased their salary expenses from 63.90 per cent to 61.08 per cent. This, again, is indicative of inconsistency amongst the worst– and best–performing universities. The last column focusing on inflation plus 50 per cent TIUO growth is the real concern, with the sampled universities overspending 15.98 per cent, or $33,33 million, per university above budget on total salaries. Table 5 highlights a critical problem universities are facing, i.e., not benefiting from technology or economies of scale to increase their efficiency. The big question, however, is whether the problem lies with academic or other salaries (see Table 6).

Table 6: Mean actual (2010 and 2019) and budgeted academic salaries (2019): Sampled universities

100% Inflation + 100% TIOU Growth	100%TIOU	Per University US$ ('000)		50%TIOU
Mean academic salaries:	**MEAN**	**8 Worst**	**8 Best**	**MEAN**
– Actual mean 2010	58,286	45,139	71,433	58,286
– Actual mean 2019	**118,530**	**100,951**	**136,110**	**118,530**
– Budget mean 2019	**125,771**	**92,410**	**159,132**	**108,686**
Difference (Budget – Actual)	**7,241**	**–8,540**	**23,022**	**–9,844**
% Difference (1–Actual/Budget)	**5.76%**	**–9.24%**	**14.47%**	**–9.06%**
Difference (total):	**115,853**	**–68,322**	**184,175**	**–157,508**
% of Total actual expenses	**MEAN**	**8 Worst**	**8 Best**	**MEAN**
– Actual mean 2010	**32.61%**	**32.06%**	**33.16%**	**32.61%**
– Actual mean 2019	**31.22%**	**32.63%**	**29.80%**	**31.22%**
% Growth: Actual 2010–19				
– Total expenses	**112.16%**	**113.59%**	**110.92%**	**112.16%**
– Academic salaries	**103.36%**	**123.64%**	**90.54%**	**103.36%**

Academic salaries are the only expenses at universities that are directly related to student enrolments and, therefore, should consist of some level of variable component if TIOUs increase. However, Table 6 indicates that actual academic salaries were well below (5.76 per cent) the budget in 2019 and declined from 32.61 per cent to 31.22 per cent of total expenses, taking inflation plus 100 per cent TIOU growth into account. What is most concerning is that total expenses grew by 112.16 per cent from 2010 to 2019, while academic salaries only grew by 103.36 per cent. If inflation plus 50 per cent growth in TIUOs were used as the benchmark, actual academic salaries exceeded the budget by 9.06 per cent. As mentioned previously, given the more variable and direct nature of these expenses to an increase in student enrolments, this could at least be justified to some extent. From a financial perspective, categorising the best and the worst universities based on under– versus overspending is reasonable. However, focusing on the urgent need for academic staff to upgrade their skills to address the changing challenges of the 4IR, it might be appropriate that universities increased the amount spent on academic salaries. However, the opposite is true about the spending on other salaries and other expenses. These two categories of expenses typically refer to the cost of top management, service and support departments. For the purpose of this study, it is called overheads. Given that these expenses are typically indirect and fixed, not directly related to the cost objective, or not really influenced by an input–output relationship to the number of enrolments, there is no real reason for the increase in these expenses above inflation based upon the increase in student numbers. Add the impact of technology that should have led to salary savings in service and support functions, the author is of the opinion that an increase in other salaries above both

inflation and even 50 per cent of TIOU growth is a very conservative assumption. In the next table, the focus is on other salaries.

Table 7: Mean actual (2010 and 2019) and budgeted other salaries (2019): Sampled universities

100% Inflation + 100% TIOU Growth	**100%TIOU**	**Per University US$ ('000)**		**50%TIOU**
Mean other salaries:	**MEAN**	**8 Worst**	**8 Best**	**MEAN**
– Actual mean 2010	54,020	57,414	50,626	54,020
– Actual mean 2019	**123,432**	**140,654**	**106,209**	**123,432**
– Budget mean 2019	**114,864**	**117,654**	**112,074**	**99,943**
Difference (Budget – Actual)	**–8,568**	**–23,000**	**5,865**	**–23,488**
% Difference (1–Actual/Budget)	**–7.46%**	**–19.55%**	**5.23%**	**–23.50%**
Difference (Total):	**–137,081**	**–183,998**	**46,917**	**–375,812**
% of Total actual expenses	**MEAN**	**8 Worst**	**8 Best**	**MEAN**
– Actual mean 2010	**29.85%**	**28.29%**	**31.42%**	**29.85%**
– Actual mean 2019	**31.36%**	**31.79%**	**30.93%**	**31.36%**
% Growth: Actual 2010–19				
– Total expenses	**112.16%**	**113.59%**	**110.92%**	**112.16%**
– Other salaries	**128.49%**	**144.98%**	**109.79%**	**128.49%**

In Table 7, the real problem is identified with other salaries growing from 29.85 per cent of total actual expenses in 2010 to 31.36 per cent in 2019, with a growth rate of 128.49 per cent from 2010 to 2019, more than 16 percentage points above the increase in total expenses. There also seems to be a substantial difference between the worst– versus the best–performing universities (144.98 per cent increase from 2010, as opposed to only 109.79 per cent for the eight best–performing universities). In addition, focusing on the budget (inflation plus 50 per cent growth in TIOUs), the actual other salaries were 23.50 per cent or $23,49 million above budget in 2019. Given the fixed and indirect nature of other salaries (to TIOUs), these salaries should have benefited from efficiency and economies of scale, which clearly did not happen. Technology should also have had a positive (declining) impact on other salaries, which highlights the inefficient management of these salaries at the sampled universities. Table 8 analyses other expenses in more detail.

Table 8: Mean actual (2010 and 2019) and budgeted other expenses (2019): Sampled universities

100% Inflation + 100% TIOU Growth	100%TIOU	Per University US$ ('000)		50%TIOU
Mean other expenses	**MEAN**	**8 Worst**	**8 Best**	**MEAN**
– Actual mean 2010	70,956	60,672	81,240	70,956
– Actual mean 2019	**146,847**	**131,616**	**162,077**	**146,847**
– Budget mean 2019	**152,697**	**123,139**	**182,255**	**132,102**
Difference (Budget – Actual)	**5,850**	**–8,477**	**20,177**	**–14,745**
% Difference (1 – Actual / Budget)	**3.83%**	**–6.88%**	**11.07%**	**–11.16%**
Difference (Total):	**93,603**	**–67,816**	**161,419**	**–235,922**
% of Total actual expenses	**MEAN**	**8 Worst**	**8 Best**	**MEAN**
– Actual mean 2010	**37.53%**	**34.24%**	**40.83%**	**37.53%**
– Actual mean 2019	**37.42%**	**36.67%**	**38.18%**	**37.42%**
% Growth: Actual 2010–19				
– Total expenses	**112.16%**	**113.59%**	**110.92%**	**112.16%**
– Other expenses	**106.95%**	**116.93%**	**99.50%**	**106.95%**

Table 8 confirms that other expenses are not the real culprit driving the increase in total expenses above inflation and 100 per cent TIOU growth. Actual other expenses were at 37.42 per cent, the biggest expense at universities (compared to academic salaries and other salaries at 31.22 per cent (Table 6) and 31.36 per cent (Table 7) respectively for 2019), but within budget, growing from 2010 to 2019 at 106.95 per cent, as opposed to a 112.16 per cent growth in total expenses. If the focus was on inflation and 50 per cent TIOU growth, the sampled universities showed actual other expenses of 11.16 per cent above budget, indicating that the sampled universities did not control these expenses effectively. Other expenses are typically committed fixed costs, indirect to the main cost objective, with almost no reason to increase with an increase in enrolments (thus, only inflation should have been considered with a very small allowance for additional enrolments).

CONCLUSION

The main focus of this study is on how well the top management of South African universities were managing their expenses from 2010 to 2019, intentionally excluding the effect of COVID–19. Increasing tuition fees above inflation has been an international phenomenon, with students, governments and researchers highlighting the problem but nobody really focusing on the reasons why it happened. Although the findings in this study relate to a sample of South African universities, universities globally have also experienced the same challenges with regards to increasing tuition fees to fund increases in spending instead of benefiting from economies of scale as indicated by Parker (2020).

The unique contribution of this study is not only identifying whether the increase in tuition

fees was justified but also the unique way Management and Cost accounting was used to analyse the financial data of the 16 sampled universities using both inflation as well as the increase in TIUs and TOUs to compare actual expenses with budgeted expenses for the various expense categories. Given the fixed nature of most of the expenses of universities, typical of service organisations, universities should have benefited from the increase in student enrolments, eventually being able to increase tuition below inflation, but this did not happen.

Focusing on the actual total expenses compared to the budget for 2019, the results indicate that at 100 per cent TIOUs growth and inflation, the sampled universities managed their expenses reasonably well. However, comparing the eight best– versus the eight worst–performing universities, it is clear that there is no consistency among the universities. Also, inflation plus 50 per cent TIOU growth is, according to the author, more appropriate to demonstrate efficiency. The sampled universities overspent 14.11 per cent (US$14.1 million per university) (see Table 4) if this norm was applied. If the sampled universities overspent on academic salaries, it would be at least justifiable, given the need for the changing skills students require in a world impacted by the 4IR and the direct input–output relationship with student enrolments, but this did not happen. Actual academic salaries were well within budget (5.76 per cent), as indicated in Table 6.

Hence, the main reason for the increase in tuition fees was the increase in other salaries, which amounted to 7.46 per cent above the budgeted benchmark (Table 7). Given the fixed nature of the salaries of top management, service and support departments, with almost no direct relationship to increasing student enrolments, this is clearly indicative of the inefficient management of overheads. If inflation and 50 per cent growth in TIOUs are taken as the measure for the budgeted benchmark, the overspending on other salaries is 23.5 per cent, or US$375.8 million, for the 16 sampled universities for 2019. More than 30 years ago, Smit (1989) highlighted the problem that conventional Management and Cost accounting budgeting is relatively ill–equipped to manage overheads. The reasons for this trend were provided as a) no direct causal relationship between overheads and outputs (in the case of universities, student enrolments); b) it is difficult to measure the productivity of overheads; c) top management and managers of service and support departments are often more concerned with their professional status than rendering a service to line management (in the case of universities, academic staff); and d) service and support departments are often the favourites of top management, to mention a few. The solution to the problems identified by Smit (1989) and the findings from this study is a possible research area for future studies. However, according to Daniel Keys Moran, an American computer programmer and science fiction writer, “You can have data without

information, but you cannot have information without data" (Editorial 2019, para. 2). This study ultimately provides data to top management at universities that they can use as information to enable them to effectively apply Management and Cost Accounting tools to make the right decisions at the crossroads they are at that could assist them in improving their cost efficiency, and in effect ensure their financial survival.

Two limitations of this study are that only 16 of the 26 publicly funded South African universities were included, with no international universities forming part of the study. However, regardless of these limitations, the study opens the door for more similar studies to be conducted internationally to assess the reasons for the abnormal increase in tuition fees at universities globally. Top management will most probably justify their behaviour by focusing on their intent to improve the international ranking of their university, but these ranking criteria do not focus on the primary objectives of a university, namely, to provide **affordable** education to ensure **employability** (Staff Writer 2023b, par. 7). Taking into account that students have more options than ever before to choose where, how and what they want to study, the redundancy of many of the current degrees presented by universities, the changing needs of employers and the impact of the 4IR on education, top management at universities should seriously consider decreasing their spending on other salaries and rather invest in academic salaries if they want to ensure both the financial sustainability and relevance of their university. Declining student numbers are already happening at traditional face–to–face universities, impacting the very survival of these institutions. Given the fixed nature of the costs of service organisations, if student enrolments decline with almost no opportunity to increase tuition fees further above inflation, in the very near future, most traditional universities could be confronted with even more serious financial survival problems.

REFERENCES

Adams, R. 2022. "Thousands of students drop out of university as pandemic takes its toll." *The Guardian* March 17. https://www.theguardian.com/education/2022/mar/17/ thousands-of-students-drop-out-of-university-as-pandemic-takes-its-toll. (Accessed 15 October 2022).

Barr, N., B. Chapman, L. Dearden, S. Dynarski. 2019. "The US college loans system: Lessons from Australia and England." *Economics of Education Review* 71: 32–48.

Burer, S., and G. Fethke. 2016. "Nearly–efficient tuitions and subsidies in American public higher education." *Economics of Education Review* 55(2016): 182–197. https://doi.org/10.1016/j.econedurev.2016.09.003. (Accessed 8 January 2024).

Cabrera, N., M. Fernández–Ferrer. 2017. "Examining MOOCs: A comparative study among educational technology experts in traditional and open universities." *International Review of Research in Open and Distance Learning* 18(2): 47–67. https://doi.org/10.19173/irrodl.v18i2.2789. (Accessed 14 May 2018).

Coetzee, J., B. Neneh, K. Stemmet, J. Lamprecht, C. Motsitsi, W. Sereeco. 2021. "South African

universities in a time of increasing disruption." *South African Journal of Economic and Management Sciences* 24(1): 1–12. https://doi.org/10.4102/sajems.v24i1.3739. (Accessed 3 August 2023).

Cooper, P. 2020. "A new study investigates why college tuition is so expensive." *Forbes* August 31. https://www.forbes.com/sites/prestoncooper2/2020/08/31/a-new-study-investigates-why-college-tuition-is-so-expensive/?sh=7e32e27017a0. (Accessed 23 August 2021).

Davies, M. 2012. "Can universities survive the digital revolution?" *Quadrant* 56(12): 58-66.

Department of Higher Education and Training (DHET). 2021. *Ministerial statement on university funding 2022/23 and 2023/24*. Pretoria, South Africa: DHET.

Dickler, J. 2021. "Fewer kids are going to college because they say it costs too much." *CNBC* March 14. https://www.cnbc.com/2021/03/14/fewer–kids-going-to-college-because-of-cost.html. (Accessed 27 October 2022).

Drury, C. 2018. *Management and cost accounting*. 10th ed. Hampshire: Cengage Learning EMEA.

Editorial. 2019. "Data Management Quotes." *Infocentric*. https://www.infocentric.com.au/2022/04/28/data-management-quotes/. (Accessed 21 September 2022).

Editorial. 2020. *Universities depend more on government funding*. Pretoria, South Africa: Statistics South Africa. http://www.statssa.gov.za/?p=13719. (Accessed 21 April 2021).

Editorial. 2022a. *South Africa's youth continues to bear the burden of unemployment*. Pretoria, South Africa: Statistics South Africa. https://www.statssa.gov.za/?p=15407 (Accessed 19 July 2022).

Editorial. 2022b. "What is 'e-learning." *The Economic Times*. https://economictimes.indiatimes.com/definition/e-learning. (Accessed 28 November 2022).

Editorial. 2022c. "E-learning market – global outlook and forecast 2022–2027." Arizton. https://www.arizton.com/market-reports/e-learning-market-size-2025. (Accessed 28 November 2022).

Editorial. 2022d. *Consumer Price Index (CPI)*. Pretoria, South Africa: Statistics South Africa. https://www.statssa.gov.za/?page_id=1854&PPN=P0141&SCH= 73037. (Accessed 19 October 2022).

Editorial. 2023a. *International Educational Attainment*. National Centre for Education Statistics. https://nces.ed.gov/programs/coe/indicator/cac. (Accessed 30 July 2023).

Editorial. 2023b. "Our Big Mac index shows how burger prices are changing." *The Economist* August 3. https://www.economist.com/big-mac-index. (Accessed 29 March 2023).

Foster, P., A. Gross, and A. Borrett, A. 2023. "The Looming Financial Crisis at UK Universities." *Financial Times* July 18. https://www.ft.com/content/0aca64a4-5ddc-43f8-9bba-fc5d5aa9311d. (Accessed 18 January 2024).

Gripper, A.L. 1995. "An examination of the application of activity–based costing in the service sector: A descriptive study." PhD dissertation. Walden University.

Hess, A. 2017. "HBS prof says 50 per cent of US colleges will be bankrupt in 10 to 15 years." *CNBC* August 30. https://www.economist.com/briefing/2014/06/27/the-digital-degree. (Accessed 30 January 2019).

Kamal Basha, N., J.C Sweeney, and G. Soutar. 2015. "Effects of country and delivery mode on perceived risk in international higher education." *Journal of Marketing for Higher Education* 25(2): 171–203. https://doi.org/10.1080/08841241.2015.1031313. (Accessed 24 April 2023).

Kgosana, C. and A. Makinana. 2021. "No cash for ANC's expensive big plans." *Sunday Times* September 12, p. 1.

Koornhof, C. 2020. "Covid–19: The impact on universities and how their business models need to flexible." *News24* October 9. https://www.news24.com/news24/columnists /guestcolumn/opinion-covid-19-the-impact-on-universities-and-how-their-business-models-

need-to-flexible-20201009. (Accessed 19 October 2020).

Loveridge, S. and D. Paredes. 2018. "Are Rural Costs of Living Lower? Evidence from a Big Mac Index Approach." *International Regional Science Review* 41(3): 364–382. https://doi.org/10.1177/0160017616650488. (Accessed 2 August 2023).

Makwea, R. 2023. "Not enough space at tertiary institutions for all new matrics." *The Citizen* 25 January, p. 3.

Mojahedian, M.M., A. Mohammadi, M. Abdollahi, A. Kebriaeezadeh, M. Sharifzadeh, S. Asadzandi and S. Nikfar, S. 2020. "A review on inputs and outputs in determining the efficiency of universities of medical sciences by data envelopment analysis method." *Medical Journal of the Islamic Republic of Iran* 34(1): 1–11.

Moore, D.H. 1998. "A comparative evaluation of financial and activity–based cost accounting systems in a private university." PhD dissertation. Texas Tech.

Mtshali, N. 2020. "Three SA vice–chancellors paint a post–COVID picture for universities." *The South African* September 10. https://www.thesouthafrican.com/lifestyle/south-africa-post-covid-universities/. (Accessed 19 October 2020).

Mtshweni, B. V. 2022. "COVID–19: Exposing Unmatched Historical Disparities in the South African Institutions of Higher Learning." *South African Journal of Higher Education* 36(1): 234–250.

Naidu, E. 2021. "Online learning set to continue, financial outlook gloomy." *University World News* January 21. https://www.universityworldnews.com/post.php?story= 20210120053728829. (Accessed 12 April 2021).

Ong, L.L. and J.T. Mitchell. 2000. "Professors and hamburgers: an international comparison of real academic salaries." *Applied Economics* 32: 869–876.

Ostashewski, N., J. Howell, J. Dron. 2017. "MOOCifying courses: Delivery of a MOOC to enhance university course activities." *Journal of Learning for Development* 4(2): 184–195.

Parker, S. 2020. *The future of higher education in a disruptive world*. KPMG International.

Pathak, B.K. and S.C. Palvia. 2021. "Taxonomy of higher education delivery modes: a conceptual framework." *Journal of Information Technology Case and Application Research* 23(1): 36–45. https://doi.org/10.1080/15228053.2021.1901351. (Accessed 24 April 2023).

Persaud, N. 2020. "Adopting tools from Cost and Management accounting to improve the manner in which costs in social programs are analyzed and evaluated." *Journal of Multidisciplinary Evaluation* 16(34): 1–13.

Peters, M.A. 2020. "Beyond technological unemployment: The future of work." *Educational Philosophy and Theory* 52(5): 485–491. https://doi.org/10.1080/00131857.2019.1608625. (Accessed 24 April 2023).

Peters, M.A. et al. 2020. "Reimagining the new pedagogical possibilities for universities post–COVID–19." *Educational Philosophy and Theory* 54(6): 717–760. https://doi.org/10.1080/00131857.2020.1777655. (Accessed 2 August 2023).

Ratcliffe, R. 2015. "University protests around the world: A fight against commercialisation." *The Guardian* March 25. https://www.theguardian.com/higher-education-network/2015/mar/25/university-protests-around-the-world-a-fight-against-commercialisation. (Accessed 16 August 2018).

Saayman, H. 2020. "A business generator for online undergraduate programme offering at a dual mode university." PhD dissertation. University of the Free State.

Schmidt, U. 2020. "Higher education in the UK is morally bankrupt. I'm taking my family and my research millions, and I'm off." *The Guardian* September 8. https://www.theguardian.com/education/2020/sep/08/higher-education-in-the-uk-is-morally-bankrupt-im-taking-my-family-and-my-research-millions-and-im-off?utm_term=1cef6b54ddc9b26f1a6b78c160d42b63&utm_campaign=GuardianTodayUK&utm_source=esp&utm_medium=Email. (Accessed 20 October 2020).

Saladrigues, R. and A. Tena. 2017. "Cost accounting in Spanish and Catalan universities: Its current status of implementation." *Intangible Capital* 13(1): 117-146. https://doi.org/10.3926/ic.915. (Accessed 24 April 2023).

Serfontein, C. 2019. "Financial viability – costing teaching modules at a South African university', Master's thesis, School of Accountancy, University of the Free State.

Serfontein, C. 2022. "Cost efficiency at South African universities." PhD dissertation. University of the Free State.

Shah, D. 2018. "By the numbers: MOOCs in 2018." *Class Central* December 11. https://www.class-central.com/report/mooc-stats-2018/. (Accessed 15 February 2019).

Smit, A.V.A. 1989. ""n Ondersoek na die bestuur van bokoste in geselekteerde Suid–Afrikaanse ondernemings." PhD dissertation. Universiteit van die Oranje–Vrystaat.

Smit, A.V.A. and C. Serfontein. 2019. "Does the youth have reason to be angry at South African universities?" *International Business Conference 2019*: 1332–1343.

Smit, A.V.A., C. Serfontein. 2020. "Traditional varsities must adapt or die." *Mail&Guardian*, August 28, p. 30.

Staff Writer. 2023a. *Student Headcount Report.* PowerHEDA. https://www.heda.co.za/powerheda/dashboard.aspx. (Accessed 28 July 2023).

Staff Writer. 2023b. "New global ranking of all 26 universities in South Africa." *BUSINESSTECH* March 5. https://businesstech.co.za/news/lifestyle /670131/new-global-ranking-of-all-26-universities-in-south-africa/?utm_source= everlytic&utm_medium=newsletter&utm_campaign=businesstech. (Accessed 20 March 2023).

Swartz, R., M. Ivancheva, L. Czerniewicz, and N.P. Morris. 2019. "Between a rock and a hard place: Dilemmas regarding the purpose of public universities in South Africa." *Higher Education* 77(4): 567-583. https://doi.org/10.1007/s10734-018-0348-9. (Accessed 24 April 2023).

Szychta, A. 2010. "Time-driven activity–based costing in service industries." *Social Sciences* 1(67): 49–61.

Tanaka, N., T. Poulsen, P. Cerdan–Infantes, M.J.A. Vital, A. Vital, M. Antoninis, Y. Murakami,. and M.R. Andreescu. 2022. *Education Finance Watch 2022*. Washington DC and Paris.

Terzioglu, B. and E.S.K. Chan. 2013. "Toward understanding the complexities of service costing: A review of theory and practice." *Journal of Applied Management Accounting Research* 11(2): 29–44.

United Nations Educational, Scientific and Cultural Organization (UNESCO). 2020. *Towards universal access to higher education: International trends*. Paris.

Universities South Africa. 2018. *Public universities in South Africa*. Universities South Africa. http://www.usaf.ac.za/public-universities-in-south-africa/. (Accessed 05 May 2018).

Yang, P., Y. Yanyue, B. Penprase, B , E. Muller, T. Marwala, C. Malpas, L. Marwala, R. Lee, L. Perciles, Y. Cheng, L. Dempsey, N. Gleason et al. 2018. *Higher education in the era of the Fourth Industrial Revolution*. Singapore: Palgrave Macmillan.