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Economic impact assessment of a South African university campus: A case for promoting on-campus contact learning

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Authors:
David Dyason[1]
Riaan Rossouw[1]
Ewert P.J. Kleynhans[1]

Affiliations:
[1]School of Economic Sciences, TRADE Research Entity, North-West University, Potchefstroom, South Africa

Corresponding author:
David Dyason,
david.dyason@gmail.com

Background: Public universities in South Africa play an extremely important role in preparing students for productive and fulfilling careers. Universities also, directly and indirectly, benefit the economy through high levels of operational and capital expenditure and by providing employment to both academic and administrative staff.

Aim: The aim of this article is to quantify the economic benefits of one of South Africa's largest universities, and to determine what strategic view the university should take to maximise the benefit for the economy.

Setting: The Potchefstroom campus of the North-West University in South Africa is used for the analysis.

Methods: The primary method to determine is a social accounting matrix of the North West province, while data collected through a staff and student survey are used to refine and apply the analysis for the university campus.

Results: The economic benefits of a university are much more significant than might initially be assumed. Among the findings is that North-West University should absorb relatively higher numbers of contact, rather than distance learning, students if it is to make a sustainable contribution to the provincial economy.

Conclusion: Student spending has a direct and significant impact on the economy and helps to promote national income and employment creation within the province. The results of the study provide valuable insights for cities and provinces that have established new public universities.

Keywords: Social accounting matrix; economic impact; university; consumer expenditure; higher education.

Introduction

Universities are currently attracting a great deal of attention in South Africa, particularly in connection with accessibility and affordability of tertiary education. As recently as 2014, two new public universities were established with a view to addressing the growing demand for higher education. In addition, in December 2017 the South African government announced a policy of free higher education for families with an annual household income below R350 000. This enables deserving candidates from such families to receive full bursaries for their studies (at least in 2018) where previously they might not have been able to attend university because of financial constraints (National Treasury 2018:14). The funding of free education has necessitated changes to the fiscal framework – notably new tax measures to increase revenue and a reduction in expenditure amounting to R85 billion (National Treasury 2018:10). This could potentially lead to higher numbers of students attending university which in turn might lead to an increase in operational and capital expenditure (Dyason & Kleynhans 2017:13). With more students having the chance to study, the economies of the host towns or cities of universities could theoretically benefit.

In light of these developments, this article sets out to estimate the impact of a South African university campus on the provincial economy. There are some references in the literature to the economic contribution made by universities in South Africa. For example, Kleinsmith and Horn (2015) attempted to highlight the potential benefits of universities for host cities but lacked evidence of a quantitative assessment. Furthermore, no economic impact assessments have been carried out, either of the new universities or the more established ones in the country. This article

addresses this gap, using a particular South African university campus – the Potchefstroom campus of the North-West University (NWU) – as an example to measure the economic impact of a university on the provincial economy.

The aim of the study that gave rise to this article was twofold: firstly, to illustrate the economy-wide impact of the Potchefstroom campus of the NWU on the provincial economy using a social accounting matrix (SAM) and, secondly, to determine the effect on the provincial economy of various modelled scenarios relating to the spending patterns of first-year students.

The rest of the article is structured as follows: Section 2 describes the Potchefstroom study area, while Section 3 provides an overview of the literature and identifies best practice modelling techniques from existing theoretical and empirical work on the topic. Section 4 explains the methodology used to quantify the economic impact, with the research results being presented in Section 5. Section 6 concludes.

Study area: Potchefstroom

A tertiary institution, especially a university or college, offers a number of benefits to the local community, particularly in an economic sense. Universities are large, economically active organisations that have spin-off effects throughout the economy (from local to national). Thus, an increase in a university's expenditure (operational or capital) could potentially have a transformative effect on the economy (Love & McNicoll 1990). In this regard, an economic impact assessment provides an economy-wide picture of the contribution that a university makes.

The Potchefstroom campus has significant purchasing power. In 2006 the campus spent approximately R659 million on operational and capital expenses, which had increased to R1.75 billion by 2015 (NWU 2016). Between 2006 and 2015, the total number of students increased from 16 079 to 21 320 (NWU 2018). Figure 1 illustrates the increase in expenditure and staff and student numbers on the campus during this period.
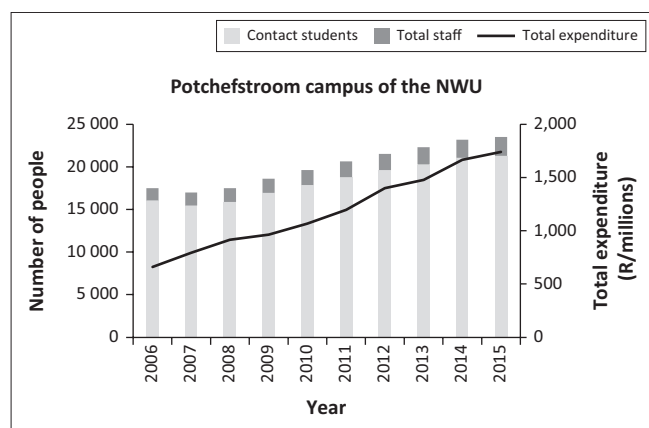

FIGURE 1: Expenditure, staff and student numbers, 2006–2015.

Figure 1 shows that while there has been an increase in staff and student numbers on the campus, the university's total expenditure has also increased. For many years the local economy (i.e. Tlokwe municipal area) has been increasing its economic contribution to the provincial economy, rising from 5.2% in 1993 to 5.9% in 2016 (Quantec 2018). The economic contribution of the Potchefstroom campus of the NWU has most likely played a role in this result, and the impact assessment would most likely indicate if this was indeed the case.

Literature review

Ways of measuring the economic impact of a university campus have evolved since their initial appearance in the 1960s, prompting a growing number of studies (see Brown & Heaney 1997; Stewart et al. 1989). Early studies mainly quantified the direct economic impact and neglected the indirect and induced impacts (Bonner 1968:339). Although the direct impact is often the greatest, the indirect and induced impacts highlight the significance of universities' operations for the economy as a whole, which extends beyond the initial benefit. Bonner (1968) and later Caffrey and Isaacs (1972) introduced methods to broaden the level of aggregation that measured the economic impact to include the entire economy. Their findings revealed that a university has a much wider influence than merely the direct economic benefits and, as a result, the majority of university economic impact studies have since incorporated multipliers, sourced from input-output analyses.

The method used to estimate the economic impact has not changed significantly over time. Input-output (IO) tables and SAMs are mostly used. The IO model is a linear model that illustrates the sale and purchase relationship between producers and consumers in an economy, in matrix form (OECD 2018). The consuming industry (demand) is shown in the columns while the supplying industry is shown in the rows. This infers that for each industry or product, input must equal output; hence, total supply must equal total demand (StatsSA 2017). The SAM is a natural extension of the IO model and shows the circular flow of income, representing all transactions involving production activities, factors of production, households, the government, the corporate sector and the rest of the world.

A benefit of the SAM is that the structure of the matrix makes it possible to analyse the effect of disruptions or shocks within the economy (Polo & Valle 2012). This makes it possible to incorporate and quantify the economic impact – of, for example, the Potchefstroom campus of the NWU – in the North West (NW) province, using existing SAM data.

A further benefit of the SAM is that multipliers can be extracted from the matrix. A multiplier quantifies the effect of income injected into one part of the economy and shows the impact of this injection on the rest of the economy (Round 2003:14–2). Multipliers extracted from a SAM quantify the direct, indirect and induced impacts, while the IO matrix can

only extract the direct and indirect multipliers. In this respect, the SAM and SAM-based multiplier analysis were the preferred data set and methodology when setting out to quantify, analyse and evaluate the economic impact of the Potchefstroom campus.

The underlying reasons for quantifying the economic impact vary. The majority of studies aim to quantify the economic benefit of a university for a specific geographical area. Sen (2011) estimated the employment and local income benefit of the Izmir University of Economics on the Izmir metropolitan area in Turkey. Tavoletti (2007) evaluated the regional and local economic impact of the University of Cardiff in Wales, while Carroll and Smith (2006) estimated the economic injection of the Bowling Green State University into Ohio's economy. Smith and Bissonnette (1989), in turn, showed the impact on the economy of West Virginia, with particular attention given to the impact of students who hail from outside West Virginia but opt to study at tertiary institutions within the state. These analyses all highlight how students' spending constitutes a valuable financial injection into the economy.

It is also possible to illustrate the differences in economic impact between universities in metropolitan areas and rural areas. Beck et al. (1995:250) explain how the delineation of the area surrounding a university, and whether a campus is situated in a metropolitan area or a rural area, can significantly affect the value of the economic contribution to the surrounding area.

Studies are also sometimes directed at motivating additional government grants for tertiary education institutions (Love & McNicoll 1990). Studies estimating the economic value of a university often describe the benefit for the local economy in qualitative terms, ignoring the capital and operational expenses associated with the university (Booth & Jarrett 1976). With the advent of economic modelling, though, politicians and academics have realised that quantifying this impact can greatly support the development and expansion of such institutions (Brown & Heaney 1997:229).

Results are typically based on multipliers, which illustrate the amount by which one dollar or rand spent by the university will benefit the economy through the multiplier process. The majority of studies tend to consider the impact for a particular year; however, future estimates are also possible. For example, in 1968 Bonner (1968:341) forecasted the economic impact of the University of Colorado in the year 1980 based on the predicted number of students. The study revealed that every dollar spent by the university stimulated US$1.37 of production and that its annual expenditure of $47 million in 1968 resulted in $64 million worth of sales in the surrounding geographical area.

An alternative to the economic base approach with multipliers is a skill-based approach. This approach, which was developed by Bluestone (1993), argues that a university produces higher-skilled workers who in turn earn higher wages compared with those without an education. This then leads to higher incomes earned and higher taxes paid to the government (Brown & Heaney 1997). Consequently, the skill-based approach quantifies the economic impact at a higher yield than the economic-based approach. Brown and Heaney (1997) question whether the skill-based approach is indeed more realistic than the economic-based approach, asserting that there is substantial overestimating when the skill-based approach is used.

Methodology
The model

A SAM was used to measure the economic impact of the Potchefstroom campus of the NWU on the provincial economy. The SAM provides a detailed framework of the economy in a matrix form, showing the interdependencies within the regional economy in a given year (Round 2003:14–2). It is a tool used by economists to, inter alia, illustrate the structure of the economy, determine the effect of changes in production and quantify economic injections or shocks in an effort to explain the impact on the economy (Polo & Valle 2012:227). The SAM is not a model in itself; however, the relationship between production and income in particular signals a relationship that is illustrated through coefficients or multipliers and is used to evaluate changes in the economy (Round 2003:14–5). The advantage of using a SAM analysis is that it allows for the modelling of various scenarios. A SAM is flexible in its application due to disaggregation and the emphasis that can be placed on different elements of the economic system to measure the impact of various scenarios (Round 2003:14–1).

The benefits of using a SAM in this context were twofold: firstly, it allowed the economic significance of the campus within the provincial context to be quantified and, secondly, it allowed an economic analysis of shocks within the economy. Figure 2 shows how an incident in the economy can change the economic value over time.

Figure 2 illustrates the impact of a shock on the economy, resulting in a benefit or a cost, or no substantial change in the economy.
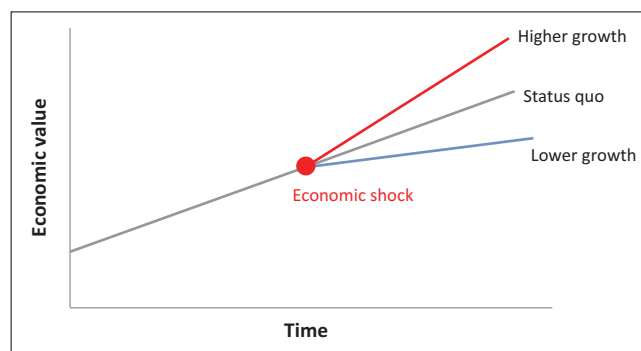

FIGURE 2: Social accounting matrix as an impact-quantifying tool.

The suite of models usually applied for the current type of analysis includes computable general equilibrium (CGE), partial equilibrium and (input-output or SAM-based) multiplier models. According to Dixon et al. (1992), CGE models are the dominant framework among these models. However, because CGE models are mainly used to conduct an ex-ante analysis of the potential impact of a policy change (see, e.g., Bellù 2011), and because this article aims to quantify the economic contribution of a South African university campus, a CGE model will not be appropriate. Preferably, a simpler fixed-price model, such as a SAM multiplier model, will provide a better indication of the contribution of the university campus within its current locality.

The 2006 NW provincial SAM, commissioned by the Development Bank of South Africa (DBSA) and developed by Conningarth Economists, was used for analysis. This was the most recent and lowest level of aggregation available for a SAM in South Africa. The SAM was adjusted, and the Potchefstroom campus activity was extracted from the original SAM and included as an individual entity in the SAM that transacted with the rest of the economy. The economic value of the campus was extracted from the community, social and personal services sector which was the sector to which the educational component of the provincial SAM had been allocated. The values obtained were based on the operational and capital expenditure of the campus. Once this was done, the adjusted SAM was complete, and the economic analysis could be conducted.

Lastly, it is essential to bear in mind that the justification of SAM-based economic multipliers as a methodology for the current study rests on the appropriate interpretation of the results. Thus, the critical assumption of fixed relative prices and perfectly elastic supply of economic multipliers must be kept in mind when interpreting the results. Moreover, the data reflects a snapshot of the provincial economy during 2006; that is, the provincial multipliers are calculated for 2006 constant South African rand. We assume that the structure of the provincial economy has remained the same and, therefore, use the SAM as is to calculate the required multipliers.

The SAM was adopted to suit the particular research needs of this study. Table 1 shows the NW SAM framework.

Each account is represented twice, in a row and in a column. The row represents the income received (from supplying the product) and the column represents the expenditure incurred (in response to demand for the product) from the corresponding account (Round 2003:14–3).

The corresponding totals of the rows and columns should be equal to one another, as the total income received should be equal to the total expenditure incurred. This framework represents the basic structure used for the economic analysis.

The data

University operational and expenditure data, as well as survey data, were used to quantify the economic impact. The survey data considered the spending patterns of first-year students to determine the effect of government's new financial support model on the economy of the NW province. The analysis considered only first-year students to try and highlight the initial additional injection by students that were granted access to the university after the announcement of free higher education.

The university expenditure data were sourced from the university's finance department and included a detailed breakdown of expenditure on various goods and services. Operational expenditure and capital expenditure were provided separately and also integrated into the SAM to determine the economic impact. The values of university expenditure from 2006 to 2015 were provided. The 2006 expenditure values were used to adjust and develop the SAM with a focus on the Potchefstroom campus and its contribution to the NW provincial economy. The Standard Industrial Classification (SIC) and the NW SAM report (2006) were used to classify the value of expenditure within sectors. This ensured that the allocation of expenditure for the province and the campus were aligned. In some instances, the provincial SAM did not have values for specific commodities and activities. In these cases, the values were apportioned to similar activities to ensure that equilibrium was still achieved within the matrix.

The economic impact assessment of the campus was carried out using the latest available expenditure data from the

TABLE 1: North West social accounting matrix framework.

Expenditures and/or receipts	Factor	Activities	Commodities	Factor payments		Enterprises	Households	Government	Capital account	Rest of the world	Total
				Labour	Capital						
		1	2	3	4	5	6	7	8	9	
Activities	1	-	-	-	-	-	-	-	-	-	-
Commodities	2	-	-	-	-	-	-	-	-	-	-
Factor payments – Labour	3	-	-	-	-	-	-	-	-	-	-
Factor payments – Capital	4	-	-	-	-	-	-	-	-	-	-
Enterprises	5	-	-	-	-	-	-	-	-	-	-
Households	6	-	-	-	-	-	-	-	-	-	-
Government	7	-	-	-	-	-	-	-	-	-	-
Capital account	8	-	-	-	-	-	-	-	-	-	-
Rest of the world	9	-	-	-	-	-	-	-	-	-	-
Total		-	-	-	-	-	-	-	-	-	-

Source: North West Province (NW SAM), 2006, *Provincial social accounting Matrix for the North West Province*, Department of Provincial and Local Government, Mmabatho

university, which in this case was 2015. The 2015 campus expenditure is illustrated in Table 2.

The campus expenditure values represented the direct impact from university expenditure with the impact of this spending within the provincial economy being quantified through the SAM.

Survey data were used to measure the impact of a stimulus (shock) on the economy. Student spending represents an exogenous demand stimulus. To determine the value of this stimulus, student surveys were conducted during September 2016. The survey obtained expenditure data based on monthly spending on goods and services typically undertaken by students studying at the Potchefstroom campus. A total of 497 surveys were completed of which 110 were completed by first-year students. Only full-time contact students were surveyed. The student spending values were then reclassified in terms of sector spending, integrating the results with the SAM to determine how student spending stimulates the provincial economy.

Ethical consideration

Based on approval by the Ethics Committee of the Faculty of Economic and Management Sciences (EC-EMS) on 30/08/2016, the North-West University Institutional Research Ethics Regulatory Committee (NWU-IRERC) approved this project. Ethics Number: NWU-00224-16-A4.

Simulation results

The economic contribution of the campus extends beyond the expenditure values emanating from the campus. The economic value or impact is threefold, namely direct, indirect and induced impacts. The direct impact refers to the value that is transferred to the NWU's direct suppliers, such as payment to a firm that provides a service to the campus. The indirect impact refers to the value that is transferred to a supplier's suppliers. Lastly, the induced impact refers to the money spent by suppliers and their

TABLE 2: Campus expenditure (R/millions), 2015.

Activity	Expenditure value (R/millions)
Operational expenditure:	**607**
Paper and paper products	1.3
Publishing and printing	17.6
Electricity	48.1
Water	11.9
Building and other construction	28.7
Trade	153.1
Accommodation	49.5
Transport	40.7
Communication	13.9
Insurance	3.1
Business services	239.1
Capital expenditure	87
Labour cost	1058
Total cost	**1752**

Source: NWU campus finances, 2015

employers within the economy as part of their living expenses – also referred to as the income effect (Econex 2017:2).

Two analyses were conducted. Firstly, the economic impact of operational and capital expenses associated with the Potchefstroom campus of the NWU was presented for 2015. This was to quantify the economic impact of the campus on the provincial economy. Secondly, various scenarios pertaining to first-year student expenditure were modelled to identify the specific implications for the provincial economy.

The impact of university expenditure

The economic benefits of a university are much more significant than might initially be assumed. To understand the impact, it is appropriate to quantify it in terms of monetary value. In a provincial context, such value is illustrated using the contribution to the gross domestic product, employment, production and labour income. The SAM provides a detailed analysis of the above indicators, which is summarised in the following sections.

Impact on production and gross domestic product

The impact on production is revealed in those activities that benefit from the university's expenditure. This is indicative of the inputs used by the university to function. Figure 3 shows the value associated with the direct, indirect and induced impacts as a result of the campus spending R1753 million on capital and operational expenditure during 2015. The figure illustrates the activities (or sectors) that benefit due to the indirect and induced effects from university expenditure, with the total impact value or the economy-wide value illustrated in the last right-hand bar.

The economy-wide impact totalled R3167 million. Spending by the university, which is mainly in tertiary sectors (see Table 1), also benefits production in primary sectors (agriculture and mining). The implication is that the spending of R1 by the university has a multiplier effect (or creates additional production) of R1.81 in the economy.

The implication for the provincial gross domestic product (GDP) is illustrated in Figure 4.

The impact of the campus's operations on the GDP shows a total economy-wide impact of R1791 million for 2015. This represents a 0.37% contribution to the provincial GDP for the corresponding year.

Impact on employment

South Africa had an unemployment rate of 26.7% during the fourth quarter of 2017 (StatsSA 2018). Providing employment is one of the most critical impacts that an institution can make in South Africa. The university represents an economic entity that relies on human capital to function appropriately and
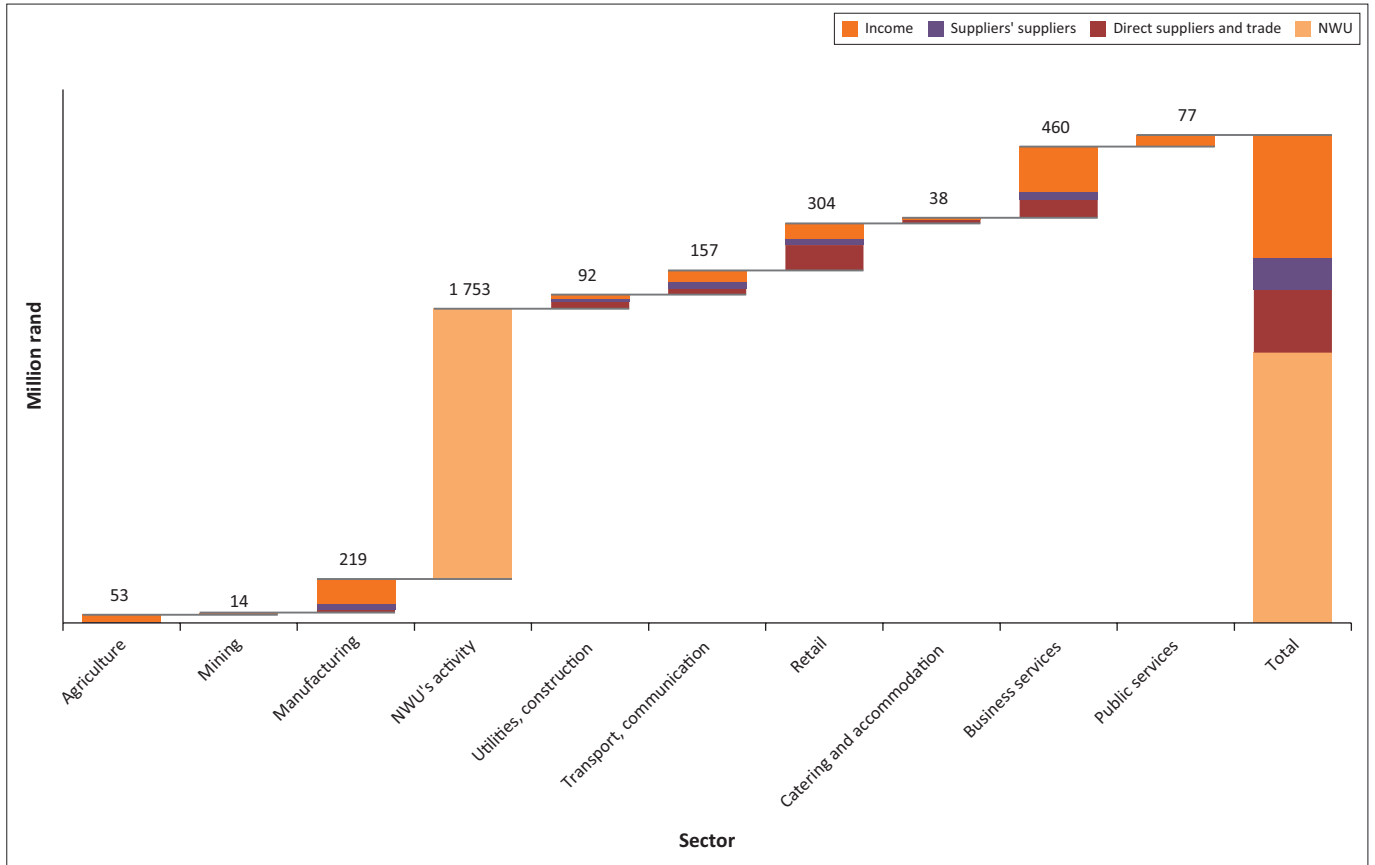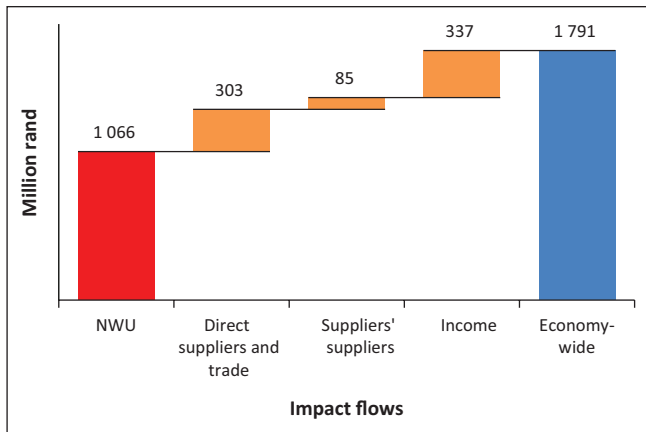
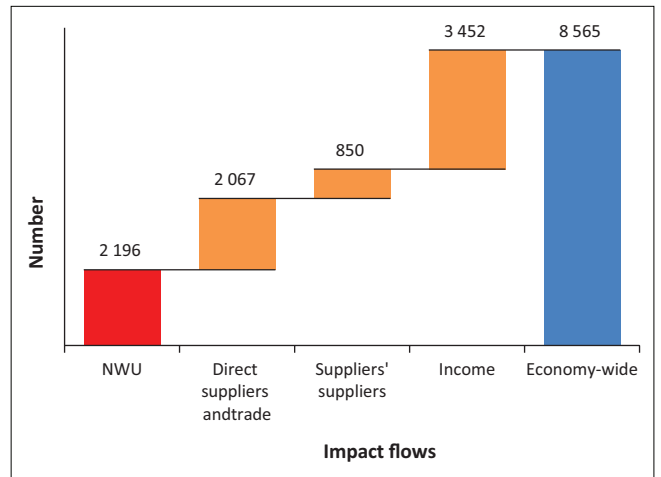**FIGURE 3:** Economy-wide impact on production (R/millions), 2015 values.

NWU, North-West University; ZAR, South African rand

FIGURE 4: Economy-wide impact on gross domestic product (R/millions), 2015 values.

Source: Based on North West Province (NW SAM), 2006, *Provincial social accounting Matrix for the North West Province*, Department of Provincial and Local Government, Mmabatho NWU, North-West University.

FIGURE 5: Economy-wide impact on total employment numbers, 2015.

plays an essential role as an employer. The employment provided by the campus itself and the employment created by the university's purchasing activities are illustrated in Figure 5.

In 2015 a total of 8 565 jobs were created throughout the economy. The largest component of employment opportunities was the result of the induced impact (income effect) which generated a total of 3452 jobs. Every R1 million of spending by the campus created an additional four jobs throughout the economy. This equated to 1.1% of total

formal employment within the NW province. The sectors that benefited the most from this employment are shown in Figure 6.

Apart from the direct employment provided by the NWU, the sectors that benefited most in 2015 included retail, business services, agriculture and manufacturing. Figure 7 shows the employment that was created according to skill level and gender throughout the economy.
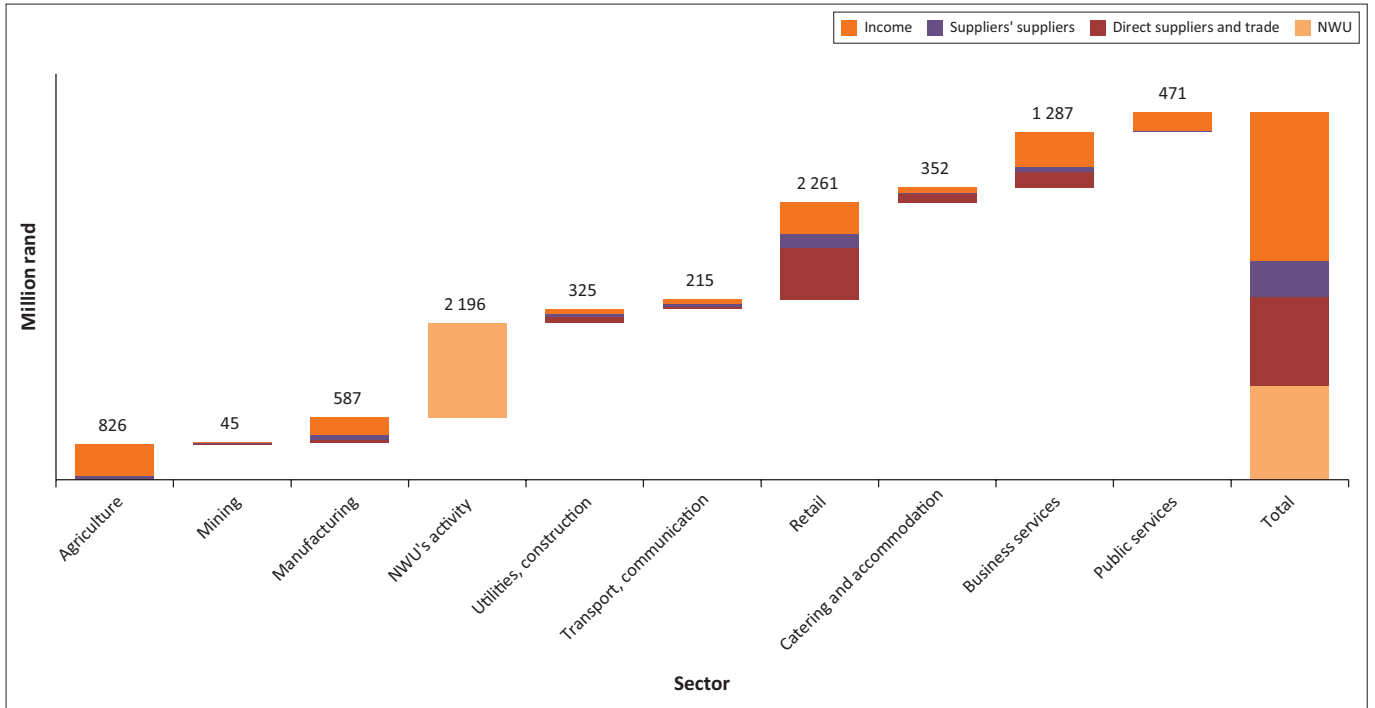
NWU, North-West University.

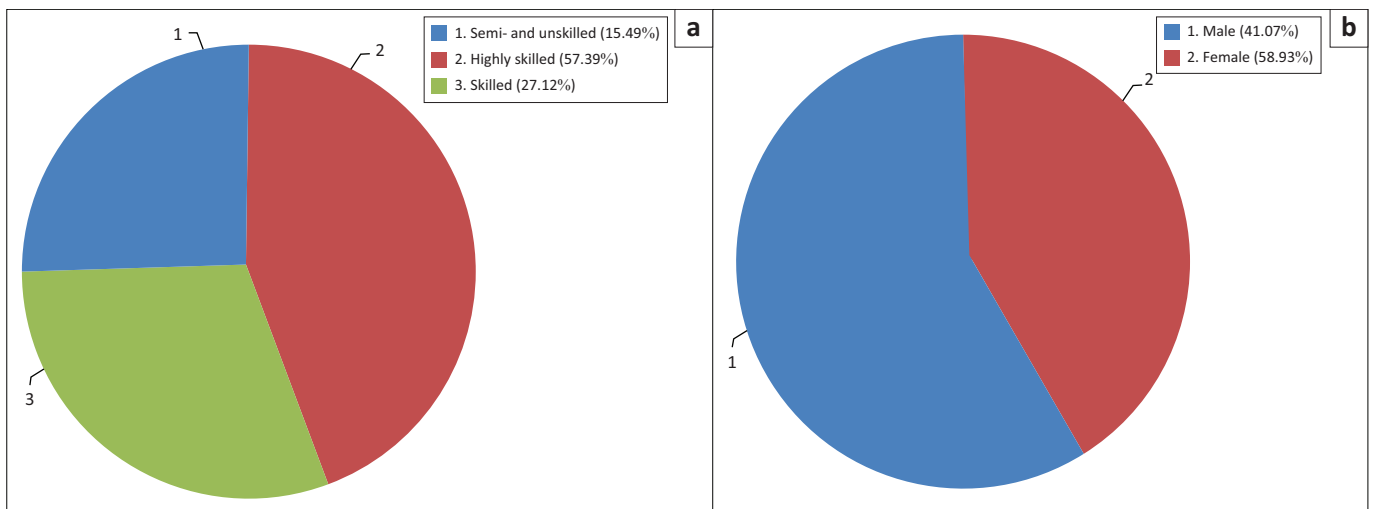**FIGURE 6:** Economy-wide impact on total employment per sector (number), 2015.

FIGURE 7: Economy-wide impact on (a) skill level and (b) gender, 2015.

Impact on labour income

Figure 8 illustrates the impact on household income by the salaries and wages paid by the campus to its employees. The figure illustrates the remuneration paid to university employees by the campus and by the university's suppliers and their suppliers.

The Potchefstroom campus's total remuneration bill in 2015 was R1.06 billion (direct impact) while the economy-wide impact amounted to R1.8 billion.

The income benefit that accrued to labour is illustrated in Figure 9. The figure shows the labour income generated by expenditure on-campus activities or, in other words, the
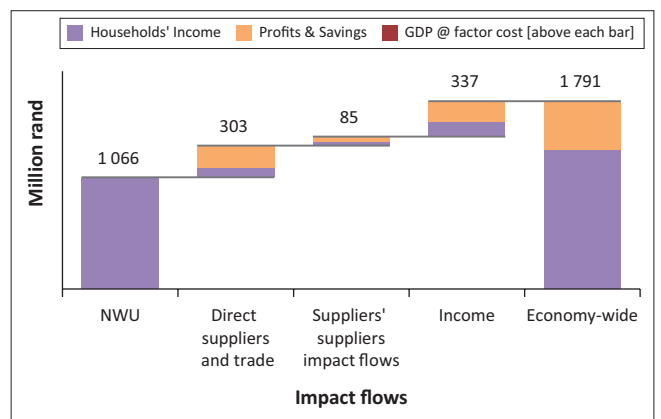
NWU, North-West University; GDP, gross domestic product.

FIGURE 8: Economy-wide impact on household income (R/millions), 2015.
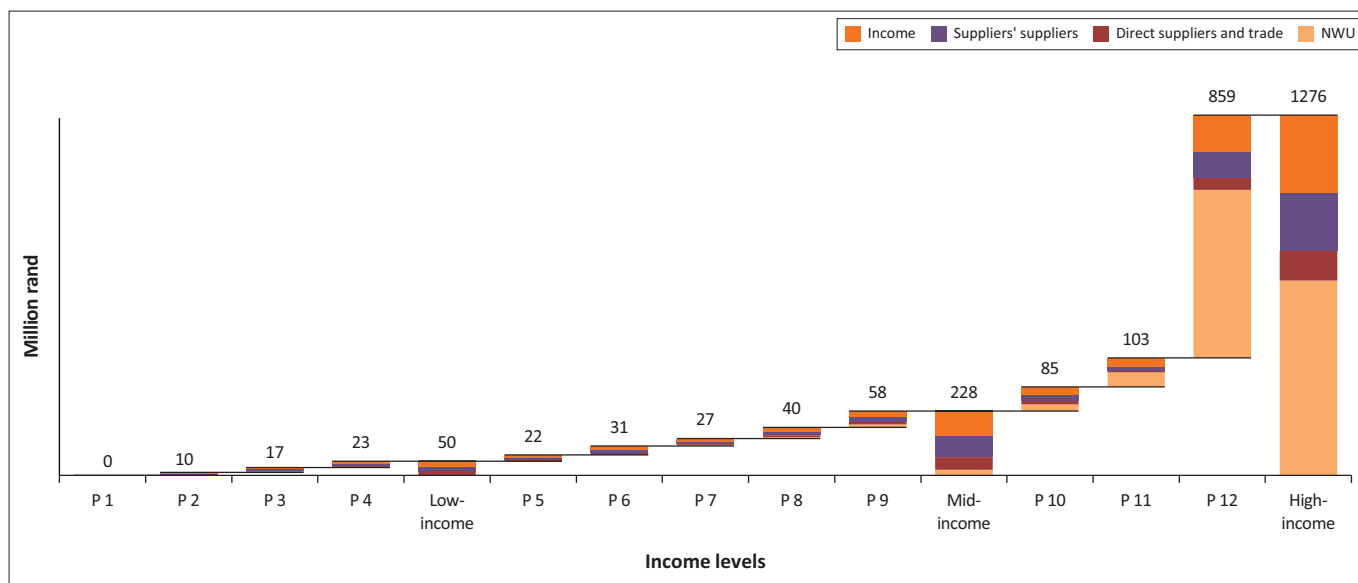
NWU, North-West University.

FIGURE 9: Economy-wide impact on labour income (R/millions), 2015.

labour income associated with the value of production in Figure 3. The figure shows labour remuneration (R/millions) for various income levels, from lower-income households (P1 to P4) to middle-income households (P5 to P9) to higher-income households (P10 to P12).

The direct impact on labour remuneration by a university campus mostly benefits high-income households, which might be attributed to the strong link between university expenditure and the services sector.

The impact of student expenditure

Most universities have capacity constraints, which limit indefinite growth in the student population. The result is that not all students who want to attend university are able to do so. The study considered three possible scenarios for the Potchefstroom campus over the next five years (up to 2022), with recent developments in the tertiary education sector influencing the growth trajectory of the campus. Among these developments are the recent announcement of free education for disadvantaged first-year students in 2018 and the growth in numbers of online student in recent years.

The first scenario examined the impact of first-year student spending on the economy where future enrolment trends are similar to those at present, that is, assuming that the status quo is maintained. The second scenario considered the impact of free higher education on student spending in the host city of the university, that is, Potchefstroom. The third scenario estimated the economic impact of a move away from full-time contact study on campus towards online learning.

In all three scenarios, the direct, indirect and induced impacts were assessed. The findings from the analysis (which took the form of student surveys) showed that students spend

TABLE 3: First-year student spending patterns, 2016.

Percentile	Number of first-year students	Average spending per month
25th	1182	R 2348
50th	2363	R 3574
75th	3545	R 4782
Total	**4726**	**R 6641**

locally, that is, in the host city of Potchefstroom, with the result that the direct impact is largely felt in the economy of Potchefstroom. The indirect and induced impacts, on the other hand, extend further afield into the surrounding region.

Scenario 1: Status quo

This scenario assumes that the status quo in terms of growth in student numbers will continue until 2022. The average annual growth in first-year admissions on the campus between 2010 and 2017 was 195 students. This has resulted in an increase in first-year admissions from 3480 in 2010 to 4842 in 2017. The same rate of growth up to 2022 will result in approximately 5815 first-year students. It is assumed that student spending patterns will remain in line with the student survey results from 2016. The market size of first-year student spending by 2022 will be approximately R46.9 million.

The economy-wide impact of spending by 5815 first-year students in 2022 is illustrated in Table 3 column A and B. The table shows the GDP and employment benefits per sector.
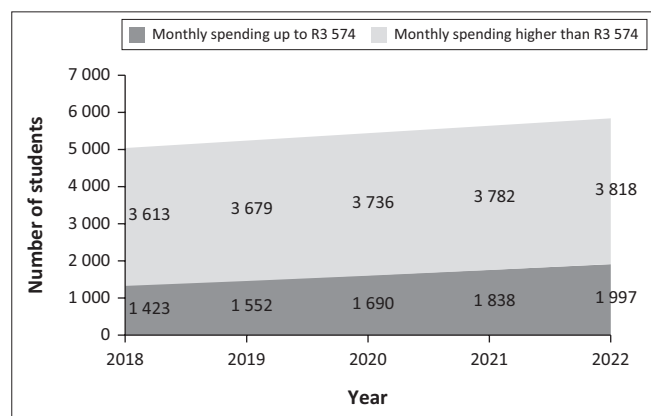
Scenario 2: Free education

In 2018, first-year students are allowed to study for free if their household income is below R350 000 per annum (approximately R29 000 per month). There was a realistic chance that this announcement would result in additional demand from students who fall within this segment of the market. This scenario estimated the economic impact on

the economy of changed spending patterns by students as well as a proportional shift in the number of students towards an increase in qualifying students from lower-income households. The 2016 student survey captured the average monthly spend of first-year students, who totalled 4726 that year. Table 3 illustrates the average monthly spending by students who fell within the 25th, 50th and 75th percentiles.

The average spend value per month for students within the 50th percentile amounted to R3574. This is also the segment that is expected to benefit from the free education announcement. The impact assessment accepted that the total number of first-year students would continue to increase by 195 each year until 2022, while there would be a proportional increase (out of total new enrolments) of 5% per year in the number of students that benefit. Figure 10 illustrates the changes in the composition of first-year students who are forecast to enrol at the campus between 2018 and 2022.

The number of first-year students is expected to increase from 5037 in 2018 to 5815 in 2022, which represents the same increase as in Scenario 1 (195 per year), the only difference being a proportional change in the number of students who tend to have a lower spending value per month. The market size of first-year student spending is estimated to be R44.2 million by 2022. Table 3 column C and D illustrate the economic impact of this scenario.

Scenario 3: Distance education

The third scenario considered a move to more distance-oriented education instead of full-time contact studies on campus. This scenario implied that the campus would attract a smaller number of first-year students annually as online study becomes more popular. The spending value of first-year students in this scenario, and its impact on the economy, is illustrated in Table 4, column E and F.

The three scenarios provided an initial indication of what the impact on the economy would be in the wake of changing student spending. The direct impact in all three scenarios would mostly be felt in Potchefstroom, the host city of the campus. As expected, more spending on the part of students would be beneficial for the host economy, with the local and provincial economies likely to experience stronger benefits than the university itself.

The results of the study indicated that the continued increase in the number of full-time first-year (contact) students would deliver the most significant economic benefit to the local and provincial economy. The NWU attracts a large number of students who reside outside of the province and their spending within the host city of Potchefstroom is beneficial for the local economy. The implementation of the free education policy could be positive for the economy if it enables more people to attend the university as full-time contact students. In contrast, a move to online learning is the least favourable scenario for the local and provincial economies.

Conclusion

Given their high levels of expenditure on salaries, goods and services, universities in South Africa have the potential to stimulate local and provincial economies. The purpose of this article was to highlight the economic significance of a South African university campus to the surrounding region

Source: Based on North-West University (NWU), 2018, Management information system, NWU, Potchefstroom

FIGURE 10: Composition and monthly spending of first-year students, 2018–2022.

TABLE 4: Economic impact of first-year student spending, 2022.

Sector	Scenario 1		Scenario 2		Scenario 3	
	GDP (R/millions)	Emp. (number)	GDP (R/millions)	Emp. (number)	GDP (R/millions)	Emp. (number)
	A	*B*	*C*	*D*	*E*	*F*
Agriculture	0.3	13	0.3	13	0.3	11
Mining	0.2	1	0.2	1	0.2	1
Manufacturing	1.3	16	1.3	15	1.1	13
Electricity and water	0.2	0	0.1	0	0.1	0
Construction	0.4	10	0.4	9	0.3	8
Trade and accommodation	10.1	152	9.6	144	8.6	129
Transport and communication	3.4	11	3.2	10	2.9	9
Financial and business services	10.9	66	10.3	62	9.3	56
Community services	1.7	16	1.6	15	1.4	14
Total	**R28.5**	**284**	**R26.9**	**270**	**R24.2**	**242**

Source: Based on North West Province (NW SAM), 2006, *Provincial social accounting Matrix for the North West Province*, Department of Provincial and Local Government, Mmabatho.
GDP, gross domestic product; Emp., Employment

and to quantify the impact of first-year student spending on the economy. The methodology used in the underlying study comprised surveys and impact modelling using SAM analysis. A SAM provides for the assessment of stimuli in the economy to quantify the direct, indirect and induced impacts. The Potchefstroom campus of the NWU was used as an example.

Over the past decade, the Potchefstroom campus has experienced growing numbers of full-time contact students, and the university's expenditure has correspondingly increased during this period. This continued rise in both student enrolments and university expenditure has led to a positive financial injection for the host city and province, especially since a significant proportion of students at the university reside outside the province. Among the results of the assessment was that for every R1 million spent by the university, a total of R1.81 million is added to production and four jobs are created throughout the provincial economy. Campus expenditure has a major direct economic impact on its suppliers, which is expected to benefit the local economy. It is proposed that further research be conducted to determine if the direct impact is on the host city's economy or more on the regional economy.

Student spending has a direct and significant impact on the economy and helps to boost GDP and employment creation within the province. The modelling exercise involving three different scenarios for student spending revealed that an expanding full-time (contact) student population is beneficial for the economy and should be encouraged at the NWU as many students come from outside the province to study at the Potchefstroom campus. Their spending is of major benefit to the provincial and local economy. If faced with a choice of how to help fuel the provincial economy, the university would much rather increase the number of students who qualify for free education than actively promote online tertiary learning as a contact learning substitute.

The results of the study provide valuable insights for cities and provinces that have established new public universities. The establishment of the Sol Plaatjie University in Kimberley and the University of Mpumalanga in Mbombela is expected to be an essential driver of the Northern Cape and Mpumalanga provinces. As time goes by, as these universities expand their curricula and enrol more full-time students, the benefits will expand accordingly. In the face of a fast-changing higher education landscape in South Africa, more in-depth research (of a quantitative nature) into the relationship between universities' operations and local and regional economic development should be prioritised. This article has taken an important step in demonstrating that the value of higher education should be seen not only in terms of preparing young people for the workforce; it is also an important vehicle for economic growth and development at a local and regional level – an aspect that is not given

sufficient attention by university administrations and municipal and regional governments.

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Author's contributions

D.D. formulated the main concept and did the original research. He conducted most of the research and wrote the original manuscript. He is an expert on the topic, and was a lecturer and doctoral fellow at North-West University (South Africa). E.P.J.K. assisted in the development of the concept, interpretation of some of the empirical findings and the development of the manuscript. E.P.J.K. assisted in the writing and the finalisation of the article for publication. R.R. assisted with the SAM modelling and interpretation of the results.

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Data availability statement

Data may be available from the authors on request.

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