Assessing the economic impact of a South African university campus

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“You are my strength, I sing praise to you; you, God, are my fortress, my God on whom I can rely.”

Psalm 59:17

“For the Lord gives wisdom; from his mouth come knowledge and understanding.”

Proverbs 2:6

- To my wife and children, thank you for your support, love and encouragement. I am very grateful to have you as my support team, my rock and my cheerleaders. You made this journey with me without complaints and for that I am forever grateful.
- Thank you to my promotors. Your encouragement, wisdom and inputs made this thesis possible.
- Thank you to Riaan Rossouw for your assistance and guidance during the SAM analysis. I am grateful for your help.
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- To the NWU and those individuals who assisted me in obtaining the required data to conduct the study, thank you very much.
- To my parents and extended family, your prayers and encouragement will forever be appreciated.

“He is the one you praise; he is your God, who performed for you those great and awesome wonders you saw with your own eyes.”

Deuteronomy 10:21

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ABSTRACT

Various data sources show that the economy of Potchefstroom in South Africa’s North West Province delivered consistently positive economic growth rates from 2002 to 2016. Even during times of recession, the local economy has shown resilience. The presence of the Potchefstroom Campus of the North-West University is one of the contributing factors to this positive growth trend. Over the years, the campus has increased its numbers of full-time contact students, employed more staff members and invested heavily in real estate infrastructure. Consequently, the residential land in suburbs surrounding the campus has undergone significant densification, while many new stores have been built to cater for the growing retail trade.

A university campus is not only where teaching, learning and research take place and where ideas and talents are nurtured. It also plays an important role in stimulating the economic growth and development of its host city since it attracts a critical mass of staff and students who together have significant buying power. Yet the existing literature on the economic impact of university campuses in South Africa reveals that there have been few attempts to quantify this impact. This thesis addresses this gap by applying a mixed-method research approach to quantify the impact of the Potchefstroom Campus of the North-West University on the economy. Using the bill-of-goods method to identify university–sectoral linkages (a first for a study of this nature), the author is able to show that there are specific sectors that benefit more from university expenditure than others. Such sectors predominantly fall into the category of services, such as retail, business and financial services, transportation, communication and personal services. In terms of growth prospects, the retail and accommodation sectors, as well as business services are ahead of the rest as they are the natural beneficiaries of the university’s spending activities. In addition, by integrating the university–sectoral linkages with a social accounting matrix (SAM), the author is able to determine, in a quantitative sense, the economy-wide impact of a university’s operation.

The SAM analysis highlights the clear benefit of the Potchefstroom Campus to the North West Province and the fact that the economic value of higher education institutions should be given greater attention. As the larger of the two North-West University campuses in the province, the Potchefstroom Campus has a significant multiplier effect throughout the provincial economy as a result of expenditure incurred by the university, its staff and its students. For example, every R1 million spent by the university contributes R0.61 million to provincial gross domestic product (GDP) and creates four new jobs. Also noteworthy is the fact that the university is a major employer, with the Potchefstroom Campus boasting a workforce in 2015 of more than 2 700 people.
The campus acts as an economic anchor for Potchefstroom and also attracts consumers from outside the municipal area, who then spend locally. The positive spinoffs from this can especially be seen in the growth of the real estate sector. The author uses real estate demand modelling to quantify the impact of staff and student spending on the city’s real estate market, with the results of the modelling confirming that such spending has been a strong driver of new and/or expanded real estate developments in and around the city. The retail, residential and office real estate markets gain the most from staff and student expenditure. At present the staff and student population absorb approximately 25% of the existing retail stock in the city. If the Potchefstroom Campus continues to attract increasing numbers of students and staff over the next few years, the resultant spike in spending will translate into greater demand for residential, retail and office goods and services and associated real estate. The real estate modelling approach, in particular, has great potential among other universities in the country which are grappling with a changing policy environment and a growing demand for affordable and accessible higher education.

**Key terms:** University–sectoral links, real estate, real estate demand modelling, social accounting matrix, bill-of-goods approach, consumer spending, economic impact assessment, South Africa.
OPSOMMING

Die ekonomie van Potchefstroom, Suid-Afrika, het gedurende die tydperk 2002 tot 2016 positiewe ekonomiese groei beleef. Selfs gedurende resessies het die plaaslike ekonomie redelike stabiliteit ervaar. Die invloed wat die Potchefstroomkampus van die Noord-Wes Universiteit op hierdie positiewe ekonomiese groei het, word in die proefskrif nagevors. Gedurende hierdie periode het die kampus se studente getalle en personeel toenemend gestyg, terwyl die addisionele uitgawes in infrastruktuur en eiendom ook gestyg het. Die gevolg hiervan is ’n verandering in die omliggende woonbuurt, veral ten opsigte van verdiging in residensiële grond gebruik, sowel as nuwe kleinhandelaktiwiteite. ’n Universiteit is nie net belangrik omdat dit die kennis en vaardighede van die land se arbeidsmag verbeter nie, maar dit dien ook as ’n belangrike instansie omdat dit ekonomiese groei en plaaslike ontwikkeling te bevorder. Die doel van hierdie proefskrif is om die ekonomiese impak van ’n universiteitskampus op die ekonomie te bepaal. Die Potchefstroomkampus word as gevallestudie gebruik om hierdie impak te bepaal deur die gebruik van verkilende navorsingsmetodes.

Die rekening van goedere metode word gebruik om die sektore te identifiseer wat meeste baat by die besteding van die universiteit. Die metode maak dit moontlik om die grootte van die verband tussen ekonomiese sektore en die universiteit te bepaal. Hierdie verhouding toon aan dat dit die dienste sektore (kleinhandel, besigheid en finansiële dienste, vervoer, kommunikasie en persoonlike dienste) die meeste bevoordeel. Die groei vooruitsig, gebaseer op historiese data, wys dat kleinhandel, akkommodasie en besigheidsdienste steeds hoë groei kan verwag, veral aangesien hierdie aktiwiteite jaarliks meer besteding ontvang. Die resultate van die universiteit-sektorale verhoudings is ook gebruik as inset in die sosiale rekeningkundige matriks (SRM) metode om die totale ekonomiese impak van die universiteit te bepaal.

Die SRM analyse toon die voordeel wat die kampus se ekonomiese aktiwiteit vir die provinsiale ekonomie het aan. Die Potchefstroomkampus is die grootste van twee kampusse van die universiteit wat in die Noord-Wes provinsie geleë is en die vermenigvuldingseffek van universiteitse studente- en personeelbesteding is beduidend positief vir die provinsiale ekonomie. Vir elke R1 miljoen wat persone van die kampus bestee, word R0.61 miljoen tot bruto binnelandse produk (BBP) toegevoeg en vier werksgeleenthede geskep. Die universiteit dra nie net tot die provinsiale BBP by nie, maar dit is ook ’n werkgewer wat gedurende 2015 sowat 2 700 direkte werksgeleenthede op die Potchefstroom kampus verskaf het.

Die kampus dien verder as ’n ekonomiese entiteit in Potchefstroom wat verbruikers van buite die omgewing na die stad aantrek en dan plaaslik bestee, tot voordeel van die plaaslike ekonomie. Die voordeel vir die dorp is merkbaar in die mate waartoe die eiendomsmark ontwikkel. Hierdie
voordeel is kwantifiseerbaar deur die gebruik van eiendomsmark-modellering. Hierdie modellering kwantifiseer die vraag na eiendom in die dorp wat deur die besteding deur studente en personeel in die ekonomie bepaal word. Die empiriese analyse bevind dat die vraag na kleinhandel, residensieel en besigheidsruimte (kantore) die meeste uit hierdie bestedingspatrone voordeel trek. Dit impliseer dat die vraag na hierdie eiendomme gaan toeneem indien die groeiende tendens van studente en personeelgetalle op kampus voortduur. Die besteding deur studente en personeel in die stad, het gedurende 2016 sowat 25% van vraag na kleinhandelsruimte bepaal.

Die rekening van goedere metode gee ‘n goeie aanduiding van watter sektore wat voordeel trek uit universiteitsbesteding, asook die omvang daarvan. Die SRM illustreer die waarde van tersiëre onderriginstellings as drywers van ekonomiese groei en ontwikkeling. Die impak op die plaaslike eiendomsmark word gekwantifiseer deur die gebruik van ‘n eiendomsmark model. Hierdie model verteenwoordig ‘n nuwe benadering tot die ontleiding van die impak wat ‘n universiteitskampus in ‘n dorp of stad het.

**Kern terme:** Universiteit-sektorale skakel, eiendomsmark, eiendomsmodellering, rekening van goedere, sosiale rekeningkundige matriks, verbruikersbesteding, ekonomiese impak-ontleding, Suid-Afrika

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DECLARATION

This thesis conforms to an ‘article format’ in which the middle chapters consist of discrete articles written in a style that is appropriate for publication in peer-reviewed journals in the field. The first, second and final chapters present synthetic overviews and discussions of the field and the research undertaken.

Chapter 3 was published in *Acta Commercii* as: A university in a small city: Discovering which sectors benefit.

Chapter 4 will be submitted to the *South African Journal of Economics* as: Economic impact of a South African university campus: A case for promoting on-campus contact learning.

Chapter 5 will be submitted to the *Environment and Planning A: Economy and Space* as: University population expenditure and its impact on real estate demand: Evidence from South Africa.

The author contributions are as follows: David Dyason was responsible for all aspects of data collection and data analysis and the writing of the manuscript; E.P.J. Kleynhans and W.F. Krugell were responsible for providing feedback on the study design and corrections to the manuscript.

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# TABLE OF CONTENTS

## CHAPTER 1: INTRODUCTION

1.1 Introduction ....................................................................................................................... 1
1.2 Motivation .......................................................................................................................... 2
1.3 Literature review ............................................................................................................... 4
1.4 Problem statement ............................................................................................................. 8
1.5 Research question and objectives ....................................................................................... 8
1.6 Research method ............................................................................................................... 9
1.7 Structure of the thesis ....................................................................................................... 10
  1.7.1 Chapter 2: Methodology ............................................................................................... 10
  1.7.2 Chapter 3: A university in a small city: Discovering which sectors benefit (Article 1) .................................................................................................................. 10
  1.7.3 Chapter 4: Economic impact assessment of a South African university campus: A case for promoting on-campus contact learning (Article 2) .......... 11
  1.7.4 Chapter 5: University population expenditure and its impact on real estate demand: Evidence from South Africa (Article 3) ......................................................... 11
  1.7.5 Chapter 6: Conclusion and recommendations ............................................................. 11
1.8 Summary and conclusion .................................................................................................. 11

## CHAPTER 2: METHODOLOGY .................................................................................................. 12

2.1 Introduction ....................................................................................................................... 12
2.2 Primary data collection ...................................................................................................... 12
  2.2.1 Staff and student survey .............................................................................................. 13
2.3 Bill-of-goods methodology ............................................................................................... 14
2.4 Social accounting matrix .................................................................................................. 17
  2.4.1 SAM of the North West Province ................................................................................ 17
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4.2 Reconstructing the SAM</td>
<td>18</td>
</tr>
<tr>
<td>2.5 Real estate demand modelling</td>
<td>19</td>
</tr>
<tr>
<td>2.6 Conclusion</td>
<td>20</td>
</tr>
<tr>
<td><strong>CHAPTER 3: A UNIVERSITY CAMPUS IN A SMALL CITY: DISCOVERING WHICH SECTORS BENEFIT (ARTICLE 1)</strong></td>
<td>22</td>
</tr>
<tr>
<td>3.1 Title page and abstract</td>
<td>22</td>
</tr>
<tr>
<td>3.2 Introduction</td>
<td>24</td>
</tr>
<tr>
<td>3.3 Literature</td>
<td>28</td>
</tr>
<tr>
<td>3.4 Methodology</td>
<td>30</td>
</tr>
<tr>
<td>3.5 Empirical analysis</td>
<td>33</td>
</tr>
<tr>
<td>3.5.1 Identifying the sectors that benefit</td>
<td>33</td>
</tr>
<tr>
<td>3.5.2 Sectoral trends</td>
<td>37</td>
</tr>
<tr>
<td>3.5.3 Strengthening sectoral linkages</td>
<td>38</td>
</tr>
<tr>
<td>3.5.3.1 District sector relative growth</td>
<td>39</td>
</tr>
<tr>
<td>3.5.3.2 Local sector relative growth</td>
<td>39</td>
</tr>
<tr>
<td>3.6 Interpretation of the results</td>
<td>42</td>
</tr>
<tr>
<td>3.7 Summary and conclusion</td>
<td>45</td>
</tr>
<tr>
<td><strong>CHAPTER 4: ECONOMIC IMPACT OF A SOUTH AFRICAN UNIVERSITY CAMPUS: A CASE FOR PROMOTING ON-CAMPUS CONTACT LEARNING (ARTICLE 2)</strong></td>
<td>50</td>
</tr>
<tr>
<td>4.1 Title page and abstract</td>
<td>50</td>
</tr>
<tr>
<td>4.2 Introduction</td>
<td>51</td>
</tr>
<tr>
<td>4.3 Study area: Potchefstroom</td>
<td>52</td>
</tr>
<tr>
<td>4.4 Literature review</td>
<td>53</td>
</tr>
<tr>
<td>4.5 Methodology</td>
<td>55</td>
</tr>
<tr>
<td>4.5.1 The model</td>
<td>55</td>
</tr>
<tr>
<td>4.5.2 The data</td>
<td>56</td>
</tr>
</tbody>
</table>
CHAPTER 5: UNIVERSITY POPULATION EXPENDITURE AND ITS IMPACT ON REAL ESTATE DEMAND: EVIDENCE FROM SOUTH AFRICA (ARTICLE 3)........ 71

5.1 Title page and abstract........................................................................................................... 71
5.2 Introduction ............................................................................................................................ 72
5.3 Literature review.................................................................................................................... 74
  5.3.1 Input‒output analysis and real estate integration............................................................ 74
  5.3.2 Real estate demand.......................................................................................................... 75
  5.3.3 Estimating the demand for real estate space................................................................. 76
    5.3.3.1 Retail market ........................................................................................................... 77
    5.3.3.2 Office market ......................................................................................................... 78
    5.3.3.3 Residential market ............................................................................................... 79
5.4 Study area: Potchefstroom..................................................................................................... 80
  5.4.1 Expanding university population .................................................................................. 80
5.5 Research approach and key results ...................................................................................... 84
  5.5.1 Retail market ................................................................................................................... 87
LIST OF TABLES

Table 1-1: Staff members employed per university, 2015 ...................................................... 3

Table 2-1: Example of the SIC for South Africa – Wholesale and retail trade (SIC 6) .......... 16

Table 2-2: North West SAM framework .................................................................................. 18
LIST OF FIGURES

Figure 1-1: Students Enrolled at South African Public Universities (contact & distance) 2000 – 2015 .......................................................... 2

Figure 1-2: Number of Permanent Employees at Public Universities in South Africa, 2000 – 2015 .......................................................... 3

Figure 1-3: Summary of existing literature and thesis focus .......................................................... 7

Figure 2-1: Example of data in the bill-of-goods for the Potchefstroom Campus, 2009-2015 ............................................................................. 15
CHAPTER 1: INTRODUCTION

1.1 Introduction

The purpose of this study is to determine the economic impact of a university campus. The economic importance of university campuses, especially for host cities, is reinforced through the continued development in nodes where these institutions are located. However, a comprehensive economic impact assessment of a South African university campus has to date not been conducted. This study aims to address this gap. The basic objective of an economic impact study is to measure the benefit of a university for the economy – in other words, what it contributes to economic activity (Elliott, Levin & Meisel, 1988:17).

Universities are recognised worldwide as institutions that offer the highest qualifications in education, thereby enhancing the quality of human capital which is crucial for economic development. The benefit of an educated workforce for South Africa is widely acknowledged, with the South African government wanting to improve higher education by giving greater attention to skills-based curricula and research (Department of Higher Education and Training, 2015:9). This in turn will ensure that more skilled professionals are able to participate in the economy. The importance of education is highlighted in South Africa’s National Development Plan (NDP), the country’s strategic economic blueprint for the period 2012–2030. The NDP sees improvements in the quality and accessibility of education as one of the keys to economic development (National Planning Commission, 2012:16). To this end, government has, for example, established two new public universities in provinces that have until recently lacked such institutions, i.e. the Northern Cape and Mpumalanga Provinces. With these latest additions, the country now has 26 public universities.

Universities facilitate knowledge creation through teaching, learning and research and offer a platform for sharing such knowledge among students, academics, industry professionals and members of society at large, which ultimately benefits the economy. However, knowledge is not the only benefit emanating from tertiary institutions. As early as the 1970s, impact studies conducted on universities started to show that these institutions also offer direct economic benefits as buyers and sellers of goods and services, and as employers (Booth & Jarrett, 1976:565). This benefits relate not only to the national economy but also to the local economy.

The rest of this chapter is structured as follows: Section 1.2 provides the motivation for the thesis. Section 1.3 provides a literature overview. Section 1.4 presents the problem statement. Section 1.5 presents the research statement and related questions as well as the research objectives.
Section 1.6 explains the research method used. Section 1.7 elaborates on the content of the different chapters in the thesis, and Section 1.8 brings the chapter to a close.

1.2 Motivation

The impact of a university within the local economy is evidenced in, among other things, the patterns of land usage that have developed in cities where these institutions are located (Parrillo & De Socio, 2014:3). The presence of a university has a direct impact on the spatial economy of a city through the type of land-uses that are developed. The factors contributing to a change in the spatial economy include, but are not limited to, university expenditure and employment (Sen, 2011:25; Armstrong, Darrall & Grove-White, 1997:342), as well as student expenditure (Bonner, 1968:342). This suggests that changes in university expenditure and student numbers would lead to changes in the local economy.

Trends in student numbers at universities in South Africa indicate a fairly steady increase in the number of enrolments over the years. Figure 1–1 illustrates the increase in student enrolments at public universities in South Africa from 2000 to 2015.

**Figure 1-1: Students Enrolled at South African Public Universities (contact & distance) 2000 – 2015**

![Graph showing enrolments at South African public universities from 2000 to 2015](image)

*Source: Department Higher Education and Training, 2017*

The number of enrolments at public universities increased from 610 131 students in 2000 to 985 212 students in 2015, representing a 61% increase during that period. One of the factors helping to stimulate the increase in enrolments was a target set by national government. In 2001 the then Ministry of Education announced that it aimed to increase student participation in higher education from 15% to 20% (Ministry of Education, 2001:5). The result of the increased
enrolments for individual universities is expected to have already influenced development trends in the local economy. With a total of 26 public university campuses nation-wide, full-time contact students do not necessarily have a university near their place of residence, which means that they have to relocate in order to attend. Students that attend universities, especially non-local students, have a positive economic impact on the local economy through their individual spending patterns (Smith & Bissonnette, 1989:237).

A university also employs large numbers of individuals. To illustrate the important role played by universities as employers in South Africa, Figure 1–2 shows the number of permanently employed individuals in public universities from 2000 to 2015.

**Figure 1-2: Number of Permanent Employees at Public Universities in South Africa, 2000 – 2015**

![Graph showing the number of permanent employees at public universities from 2000 to 2015](image)

*Source: Department Higher Education and Training, 2017*

Figure 1–2 illustrates that from 2003 to 2015 universities were a source of growing employment opportunities. A rising employment trend translates into a local economic benefit for a city in which a university is located because it is associated with increased spending power in the economy. Table 1-1 shows the employment opportunities associated with some of the larger universities in South Africa.

**Table 1-1: Staff members employed per university, 2015**

<table>
<thead>
<tr>
<th>University</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of South Africa (Unisa)</td>
<td>4 977</td>
</tr>
<tr>
<td>North-West University (NWU)</td>
<td>3 864</td>
</tr>
</tbody>
</table>
Table 1-1 illustrates that the universities in South Africa are major employers. The employment figures show the employment benefit of universities for a local economy, which grows every year as employment levels at these institutions rise.

Regarding spatial distribution, the universities in South Africa are located in rural and urban areas, small cities and metropolitan areas. As a collective they all contribute to the national economy; however, their impact on local development – due to increased economic participation and employment opportunities – is expected to be particularly significant. Identifying the local sectors that benefit from these institutions and forecasting their impact on the local economy help to drive home the importance of these institutions as local development drivers. Of particular interest is the extent to which a university influences the economic growth of the local economy. Universities are considered to be relatively resistant to business cycle fluctuations (Steinacker, 2005:1161) and as such represent a stable economic presence in the cities in which they are located. It is expected that the economic impact of a university in a metropolitan setting would be different from that of a university in a small city in a rural setting. Nonetheless, the economy of any city that hosts a university campus, and situated outside or within a metropolitan area tends to benefit as they are able to attract students from outside the area (Beck, Elliott, Meisel & Wagner, 1995:250).

1.3 Literature review

The 1960s signalled the start of a period of significant growth in the number of economic impact studies being conducted on universities (Stewart, Prinzinger, Dias, Bowden, Salley & Smith, 1989; Brown & Heaney, 1997). A seminal study was that of Caffrey and Isaacs (1972) who developed a formal method to estimate the economic impact of a university. Their intention was to develop a universal approach to conducting impact assessments. Their method used an economic base approach (Brown & Heaney, 1997:230) to estimate the impact of the operational expenditure by a university on the economy. The majority of university impact studies that followed made use of the economic base approach, including subsequent adjustments to the model that were proposed by Caffrey and Isaacs (1972). The initial and refined models gave a quantitative representation of direct and indirect impacts of a university on the economy in terms of the institution’s operational and capital expenditure, and employment activities (Drucker & Goldstein, 2007:24). The
information was then used to calculate multipliers, which show the additional benefit that accrues to the economy as a result of a university's spending and employment practices.

However, this method of assessing the economic impact of a university has its limitations. It considers the economic impact in the short term only (a period of one year), making its application rather static. It does not take long-term or cyclical changes in the economy into consideration (Martin, 1998:678). Furthermore, the delineation of the geographical area is not consistent across studies to which the method is applied (Beck, Elliott, Meisel & Wagner, 1995:249), which leads to varying interpretations and results discrepancies, which can complicate comparisons between studies.

Recently, studies have begun to include more wide-ranging data sets to address the static nature of the economic base approach. This change in approach is described by Drucker and Goldstein (2007) who cite a number of studies that have included aspects such as patent rights, spin-off companies, alumni employment and migration trends to gain a more holistic impression of the economic impact of universities.

Considering that there are various methods that can be used to determine the economic impact of a university, a scenario exists where universities may report on their economic impact based on various impact analysis methods. In essence universities are in a position to choose economic impact findings to justify increases in spending or to request more funding from government. However, to minimise the risk of discrepancies in impact estimation, Brown and Heaney (1997:237) promote the use of the economic base approach when conducting economic impact assessments of universities.

Within the South African context, limited academic research has been conducted on the economic impact of universities. Snowball and Antrobus (2006) compared the spending patterns of foreign and South African students in order to estimate their economic impact on the Grahamstown economy. The study, which sourced spending values through student surveys, revealed that the economic impact of student spending among both student groups was very similar. For example, the total economic impact of one South African student was R43 865 per annum while that of a foreign student was R47 281.

In a more recent study, Kleinsmith and Horn (2015) evaluated the expected impacts that a new university would have on the host city of Kimberley in South Africa. The study considered the existing literature to identify the possible impacts that could be expected. The anticipated impacts were an increase in economic activity and employment opportunities resulting from direct university expenditure, an increase in real estate demand, enhanced levels of education and higher-quality human capital.
The abovementioned studies reveal some very important benefits of a university campus for the economy; however, the scale on which a university campus impacts the economy is even more significant.

Figure 1-3 summarises the existing literature on university impact analysis and some examples of these studies. Most of these are discussed in the chapters that follow.

The figure shows that university impact studies can typically be divided into five types, namely: an impact assessment that makes use of the economic base approach and multipliers; a study of spin-off developments from research-related expenditure by universities; an investigation into increases in production resulting from investment in tertiary education and research; a survey to quantify spending patterns among students and the impact on the economy; and lastly, an investigation into land usage adjacent to campuses which changes due to the presence of a university.

The red arrows in the figure indicate the themes in the literature that are applicable to this thesis and also the areas in which the thesis will make a contribution.
Figure 1-3: Summary of existing literature and thesis focus

**University Economic Impact Literature**

- Sen (2011)
- Tavoletti (2007)
- Carroll and Smith (2006)
- Garrido-Yserte and Gallo-Rivera (2010)

**Focus of this thesis**

1. Impact assessment of a South-African university campus
2. Linkages between a university and sectors
3. The real estate impact

**Economic base approach with multipliers**

- Friedman & Silberman (2003)

**Measuring the economic impact based on spin-off developments (mainly research related).**

- Parrillo and De Socio (2014)
- Cortes (2004)
- Hoover (2008)
- Isaacs (1971)
- Hendrick, Henson and Mack (1996)

**Identify the typical land use change that exist adjacent university campus.**

- Elliott, Levin & Meisel (1988)
- Snowball and Antrobus (2006)

**Knowledge-Production functions. The effects of university research on production.**

- Arrow (1962)
- Griliches (1979)
- Jaffe (1989)
- Riddel and Schwer (2003)

**Surveys: Spending analysis from surveys coupled with multiplier analysis.**

Source: Author’s design
An overview of the literature indicated that economic impact studies on universities rely mostly on the input–output (I–O) tables and social accounting matrices (SAM) with multiplier analysis. These methods arrive at a quantified economic value of university expenditure, which involves estimating the direct and indirect impact of university spending, investing and employment on the economy (Drucker & Goldstein, 2007:24). They constitute tools to evaluate and compare the impact of universities on the economy, the results of which help to motivate why spending on tertiary institutions is good for the economy. Drucker and Goldstein (2007:26) highlight that this approach should not be regarded as the only viable option for quantifying the economic impact but should rather be supported by other approaches.

The literature on economic growth at a city level suggest that cities represent nodes of knowledge which are essential to generate growth and that population changes may have a role in this (Coetzee & Kleynhans, 2018:1). The basic model of regional economics highlights the role of households (consumers) in the economy. Consumers obtain and sell resources and products in order to maximise their utility. The decisive voter in the market system is the consumer, who decides what products it prefers through their spending (Myers, 2011:16). A university campus, represent an economic entity that attract consumers to a specific region. Once the consumer take part in the activity associated with the university, the consumers (i.e. staff and students) interact with the economic activities in the surrounding area, resulting in local development.

1.4 Problem statement

Each of the 26 public university campuses in South Africa represents an important economic entity in its host city and acts as a stimulus to local economic development. It is expected that the economy benefits from a university’s operational expenditure, while the real estate market is certain to benefit from the living expenses incurred by staff and students. Identifying the university–economic sector linkages and quantifying the impact of staff and student spending on the real estate market will result in improved forecasting capabilities on the part of the university and public and private sector decision-makers.

1.5 Research question and objectives

The following research question flows from the problem statement:

Are there certain sectors that benefit more than others from university expenditure and if so, what is the implication for the local and regional economies?

Understanding the economic significance of a university for the local economy will assist the university management, local authorities, government and the private sector to recognise the
importance of such an institution, so that they can plan accordingly. The main objective of this study is:

To determine the economic impact of a university campus.

In order to achieve this objective and answer the research question this study will use a case study of an existing university within a small city in South Africa. A number of specific objectives have in turn been formulated to address the main objective. Each of the specific objectives will be addressed in a separate chapter in this thesis.

The specific objectives of this study are:

1. Using a multi-pronged approach and innovative methods to investigate the economic value of a university campus.
2. Identify the university–sector linkages that exist resulting from university operational and capital expenditure (Chapter 3).
3. Quantify the economic impact of a university campus on the economy through social accounting matrix (SAM) analysis (Chapter 4).
4. Quantify the real estate markets that benefit from staff and student spending in the host city and quantify the required real estate space (in square metres) (Chapter 5).

The results of the study will not only be beneficial in the initial stages of a university’s development, but also throughout the university’s operational lifetime as the results of this study will provide a means to evaluate and identify the long-term development implications for the local economy.

1.6 Research method

This study makes use of a mixed methods research approach, using a case study and internal data to examine the economic impact of a university campus. The city of Potchefstroom in the North West Province, the setting for the study, had an estimated population of 160 000 in 2011 (Stats SA, 2011) and is home to the Potchefstroom Campus of the North-West University (NWU). The campus experienced a significant increase in student enrolments from 2004 (14 600 students) to 2017 (22 792 students), amounting to a 56% increase (NWU 2018). The campus is situated outside any metropolitan area, in a rural setting, which implies that it attracts students from outside the host city.

The ability to attract students from outside the local area and the spending associated with additional (non-local) students are of benefit to the economy. This financial injection is supplemented by spending by staff employed by the university as well as spending linked to social, cultural and sporting events at or near the university. These activities constitute an
important stimulus to local economic development in the city and provided the rationale for the study.

The thesis is written in article format with each article addressing one of the research objectives. Each article is written according to the target journal’s specifications, which means that the format and style are different in each case. Article 1 in Chapter 3 has been published while Articles 2 and 3 in Chapters 4 and 5 have been submitted to a national and an international journal respectively and are awaiting feedback.

A number of methods were used to meet the objectives of the thesis. A survey was used to collect primary data from staff and students associated with the Potchefstroom Campus of the NWU. The results from the survey were incorporated into, and support the methods applied in, each article. A further three methods were used, namely the bill-of-goods approach in Article 1, a social accounting matrix (SAM) analysis in Article 2 and real estate demand modelling in Article 3.

Each article follows a similar structure and includes an introduction, a review of the theory and literature, a description of the methodology and discussion on the empirical results, and a conclusion.

The research context is basic and applied with a formative research purpose with a positivist but pragmatic paradigm.

1.7 Structure of the thesis

1.7.1 Chapter 2: Methodology

Chapter 2 provides an overarching summary of the methodologies used in the thesis, which helps to bind the chapters together. This provides a useful backdrop for each article to then describe its own methodology in more detail.

1.7.2 Chapter 3: A university in a small city: Discovering which sectors benefit (Article 1)

The aim of this article is to identify the university–economic sector links that exist as a result of the capital and operational expenditure incurred by the campus. A bill-of-goods method was used to identify goods and services purchased while the Standard Industrial Classification (SIC) was used to group these goods and services into sectors. The analysis covered each year in the period 2009 to 2015 and provided an illustration of the sectors that benefited.

The article was submitted to Acta Commercii and published in November 2017 (see Bibliography).
1.7.3 Chapter 4: Economic impact assessment of a South African university campus: A case for promoting on-campus contact learning (Article 2)

The aim of this article is to quantify the economy-wide impact of university and student spending. A SAM method was used to quantify the direct, indirect and induced impacts, thereby providing an economy-wide view of the effect on employment, production and labour income. The findings indicated that benefits would accrue to individual sectors in the economy as a result of expenditure by universities, their staff and students.

The article was submitted to the South African Journal of Economics during May 2018 and is awaiting feedback.

1.7.4 Chapter 5: University population expenditure and its impact on real estate demand: Evidence from South Africa (Article 3)

The aim of this article is to quantify the impact of university staff and student spending on the real estate market in the host city. Surveys and real estate modelling were used to estimate the demand in square metres for various real estate markets in Potchefstroom. This article introduced the spatial demand concept into the study, with the specific focus on the benefit to the host city.

The article was submitted to Environment and Planning A: Economy and Space in May 2018 and is awaiting feedback.

1.7.5 Chapter 6: Conclusion and recommendations

The last chapter concludes the thesis by reiterating key findings and providing a number of recommendations based on these findings.

1.8 Summary and conclusion

This thesis investigates the economic impact of a South African university campus. The current chapter has set out the research agenda for the study, describing the research question and objectives, the research methods used and the focus of three different (but related) articles which examined the university–sector linkages, quantified the economy-wide impact, and identified and quantified the real estate markets that benefit in the host city.
CHAPTER 2: METHODOLOGY

2.1 Introduction

This chapter provides a basic explanation of the methodological processes that were followed in the thesis. The chapter does not duplicate the methodology presented in each of the articles; rather it sets out to provide a broad or summary description of the different processes followed, thereby helping the reader to better navigate the thesis and grasp its core arguments and conclusions. The philosophical orientation of the thesis is positivist but pragmatic and the use of one case study is appropriate in the context of the methodology.

A mixed methods approach was used to ensure that the study aligned with existing literature. However, the study also incorporated new methods in the estimation of the economic impact of a university campus on its community. The main methods used in this study were the bill-of-goods method, a social accounting matrix (SAM) analysis, real estate modelling and surveys.

Article 1 (Chapter 3) used the bill-of-goods approach to identify the linkages between the university and various economic sectors, as a result of university expenditure. The bill-of-goods approach makes it possible to quantify in monetary terms (Rand) the value of expenditure incurred by the university per economic sector.

Article 2 (Chapter 4) quantified the economy-wide impact of the North-West University’s Potchefstroom Campus, using a SAM analysis. The analysis included operational and capital data for the campus and incorporated survey findings to quantify the economic impact of the campus.

Article 3 (Chapter 5) incorporated survey findings into a real estate demand model to determine the real estate impact for the host city, as a result of the spending that takes place in the local economy. The model estimated the demand, in square metres, for each of the real estate sub-markets that benefit.

The rest of Chapter 2 is structured as follows. Section 2.2 explains the survey and its application in the thesis to estimate the economic impact of a university campus. Section 2.3 explains the bill-of-goods approach used in Article 1. Section 2.4 explains the SAM and economic impact assessment method used in Article 2, while Section 2.5 explains the real estate demand modelling method used in Article 3. Section 2.6 concludes this chapter.

2.2 Primary data collection

A survey was developed to assist the economic impact analysis by providing quantitative values of individual spending patterns and preferences regarding various consumer-related activities.
Surveys have been used extensively in university impact assessments to quantify individual spending (see Armstrong, Darrall & Grove-White, 1997; Sen, 2011; Tavoletti, 2007).

One of the main features of the survey is its ability to source expenditure values from the target population, which in this case was the staff and students associated with the Potchefstroom Campus. The expenditure values sourced from the survey were used as inputs in two of the research projects in this thesis involving the conducting of economic impact analysis and estimations. The first was the SAM analysis in Chapter 4 where spending values were used to illustrate the impact on the economy, with forward and backward linkages. The second was in Chapter 5 where spending values were used as inputs to determine the impact on the real estate market.

Sourcing the spending values of staff and students improves the accuracy of the estimates and eliminates unnecessary assumptions. For example, it assists in identifying the money value that is spent within the host city compared with the money spent outside the host city (in other cities) (Tavoletti, 2007:9). This differentiation measures the actual spending that takes place within the host city and eliminates assumptions about the economic injection or leakage within the local economy. The spending values also form an integral part of the real estate modelling. The model incorporates the values of expenditure by the market population in order to determine the requirements of various real estate activities. In this case, the amount of money spent on, for example, accommodation, food and entertainment would have a direct impact on the development potential of properties within the market area. Sourcing data such as the type of accommodation reveals residential preferences and is also necessary for estimating the type of accommodation demanded.

The interpretation of the results is equally important. Pastor, Pérez and De Guevara (2013:540) caution that using average expenditure values could lead to inaccurate results, especially since there is dispersion in expenditure as all consumers do not all make the same expenditure. Instead of using average values, this study applied a more realistic approach using weighted averages. Such an approach incorporates the socio-economic differences between consumers (e.g. male and female) when determining the amount of spending by staff and students. Annexure A (at the end of this thesis) provides an overview of the survey that formed part of the study. This data could only be sourced through primary data collection.

### 2.2.1 Staff and student survey

The survey data was collected from staff and students during September and October 2016. Data was collected on monthly spending on goods and services, preferences in accommodation and general socio-economic characteristics. The survey questions were formulated to quantify the
economic value generated by staff and students who are associated with the Potchefstroom campus.

The survey comprised questions that would enable unique integration with the SAM analysis and real estate modelling. The literature review of these methods indicated the types of inputs required and the questions were formulated accordingly. The survey was submitted for ethical approval to the Ethics Committee of the Faculty of Economic and Management Sciences at the North-West University (NWU) and approval was granted on 30 August 2016. A draft survey was initially launched to selected staff and students who were part of the NWU’s School of Economics for initial analysis and feedback. The feedback was used to improve and finalise the survey. The survey, which was available in English and Afrikaans, was conducted online and access was provided via a link.

An email (see Annexure B) with the link to the survey was sent to 2 200 staff members and approximately 8 000 students on the Potchefstroom Campus during September and October 2016. Only those staff members and students who had gave permission to be contacted for research purposes, as required by the Protection of Personal Information Act 4 of 2013, were sent an email.

SurveyGizmo, an Internet-based survey website, was used as the platform for completing the survey. Once a participant opened the website, they were provided with the aim of the study and an option to give their consent for the results to be used for research purposes. The survey took approximately 10 to 15 minutes to complete.

The results of the survey are discussed in Chapter 4 in the ‘Methodology’ section, and provide an overview of student expenditure patterns. The monthly expenditure values pertaining to students were an important input for the analysis of real estate demand. The major contributor to the development of the host city is the injection of consumer spending into the local economy and the survey questions was structured in such a way to identify if there is an injection of spending into the city.

The impact on the real estate market is discussed in Chapter 5, also with reference to the survey results. The survey results are explained and incorporated into the text in the ‘Research approach and key results’ section.

2.3 Bill-of-goods methodology

The bill-of goods, the main method used in Chapter 3, is a detailed representation of income and expenditure relating to each good and service in a particular year. It provides a more detailed breakdown of goods and services procured than is usually reflected in an income statement used
for accounting purposes. The information was sourced from the campus’s finance department and included all income and expenses for the Potchefstroom Campus from 2009 to 2015. A condensed example of the data is illustrated in Figure 2-1. The first column represents the activity undertaken while the second column provides a summary of the annual value spent on that activity from 2009 to 2015. The year with the highest value is highlighted in black. The last column shows the median expenditure value of the specific activity for the period 2009 to 2015.

**Figure 2-1: Example of data in the bill-of-goods for the Potchefstroom Campus, 2009-2015**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSULTATION FEES</td>
<td></td>
<td>R 377 024</td>
</tr>
<tr>
<td>PROFESSIONAL FEES</td>
<td></td>
<td>R 68 906 261</td>
</tr>
<tr>
<td>ADVERTISEMENT - STAFF VACANCIES</td>
<td></td>
<td>R 68 834</td>
</tr>
<tr>
<td>INSURANCE</td>
<td></td>
<td>R 2 478 017</td>
</tr>
<tr>
<td>STATIONERY</td>
<td></td>
<td>R 5 214 782</td>
</tr>
<tr>
<td>AUDIO-VISUAL MATERIALS</td>
<td></td>
<td>R 77 823</td>
</tr>
<tr>
<td>TELEPHONE COST</td>
<td></td>
<td>R 5 369 944</td>
</tr>
<tr>
<td>SOFTWARE PURCHASES</td>
<td></td>
<td>R 3 313 068</td>
</tr>
<tr>
<td>TRAVEL</td>
<td></td>
<td>R 21 162 360</td>
</tr>
<tr>
<td>PLUMBER WORK</td>
<td></td>
<td>R 372 298</td>
</tr>
<tr>
<td>GARDENING SERVICES</td>
<td></td>
<td>R 2 742 024</td>
</tr>
</tbody>
</table>

*Source: NWU, 2016*

Once the data was collected and sorted into the various expenditures, the activities were distributed and classified according to the economic sectors for the particular activity. To this end, the Standard Industrial Classification (SIC) for South Africa was used to classify the various expenditures into sectors. The SIC refers to an activity as a category which is divided into major groups and SIC divisions (see Table 2-1). The finance department at the university provided a descriptive sheet assisting in the categorisation of expenditures into sectors. Table 2-1 shows the wholesale and retail trade sector of the SIC and the activities that form part of this sector as an example of how the various activities are categorised into SIC divisions.
Table 2-1: Example of the SIC for South Africa – Wholesale and retail trade (SIC 6)

<table>
<thead>
<tr>
<th>SIC division</th>
<th>Major group</th>
<th>Title of category</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td></td>
<td>Wholesale and commission trade, except of motor vehicles &amp; motor cycles</td>
</tr>
<tr>
<td>611</td>
<td></td>
<td>Wholesale trade on a fee or contract basis</td>
</tr>
<tr>
<td>612</td>
<td></td>
<td>Wholesale trade in agricultural raw materials, livestock, food, beverages &amp; tobacco</td>
</tr>
<tr>
<td>613</td>
<td></td>
<td>Wholesale trade in household goods</td>
</tr>
<tr>
<td>614</td>
<td></td>
<td>Wholesale trade in non-agricultural intermediate products, waste &amp; scrap</td>
</tr>
<tr>
<td>615</td>
<td></td>
<td>Wholesale trade in machinery, equipment &amp; supplies</td>
</tr>
<tr>
<td>619</td>
<td></td>
<td>Other wholesale trade</td>
</tr>
<tr>
<td>62</td>
<td></td>
<td>Retail trade, except of motor vehicles &amp; motor cycles; repair of personal household goods</td>
</tr>
<tr>
<td>621</td>
<td></td>
<td>Non-specialised retail trade in stores</td>
</tr>
<tr>
<td>622</td>
<td></td>
<td>Retail trade in food, beverages &amp; tobacco in specialised stores</td>
</tr>
<tr>
<td>623</td>
<td></td>
<td>Other retail trade in new goods in specialised stores</td>
</tr>
<tr>
<td>624</td>
<td></td>
<td>Retail trade in second-hand goods in stores</td>
</tr>
<tr>
<td>625</td>
<td></td>
<td>Retail trade not in stores</td>
</tr>
<tr>
<td>626</td>
<td></td>
<td>Repair of personal &amp; household goods</td>
</tr>
<tr>
<td>63</td>
<td></td>
<td>Sale, maintenance and repair of motor vehicles &amp; motor cycles; retail trade in automotive fuel</td>
</tr>
<tr>
<td>631</td>
<td></td>
<td>Sale of motor vehicles</td>
</tr>
<tr>
<td>632</td>
<td></td>
<td>Maintenance &amp; repair of motor vehicles</td>
</tr>
<tr>
<td>633</td>
<td></td>
<td>Sale of motor vehicle parts &amp; accessories</td>
</tr>
<tr>
<td>634</td>
<td></td>
<td>Sale, maintenance &amp; repair of motor cycles and related parts &amp; accessories</td>
</tr>
<tr>
<td>635</td>
<td></td>
<td>Retail sale of automotive fuel</td>
</tr>
<tr>
<td>64</td>
<td></td>
<td>Hotels &amp; restaurants</td>
</tr>
<tr>
<td>641</td>
<td></td>
<td>Hotels, camping sites &amp; other provision of short-stay accommodation</td>
</tr>
<tr>
<td>642</td>
<td></td>
<td>Restaurants, bars and canteens</td>
</tr>
</tbody>
</table>

Source: StatsSA, 1993

A representation of the distribution of expenses into sectors is provided in Chapter 3 (Figure 4) in the ‘Methodology’ section.

The spending values in the bill-of-goods represent nominal market prices which were adjusted and reworked to real values, thus enabling comparison and trend analysis. Statistics South Africa inflation data (StatsSA, 2016), Quantec industry-structure data (Quantec, 2017) and suggestions obtained through discussions with macro-economists were used to adjust these values to real values.
This process of categorising expenditure values into the appropriate SIC division was done for all goods and services purchased or obtained during the period 2009 to 2015.

2.4 Social accounting matrix

The social accounting matrix (SAM) is a statistical illustration of the various role players in the economy, represented in a square matrix (Round, 2003). 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). When this thesis refers to ‘impact’ it means an activity, either existing or new, that takes place in the economy.

When using the SAM for impact analysis, the end result, i.e. the total impact on the economy, is attained by applying multipliers. A multiplier is a coefficient, a ratio, which illustrates the value of economic activity in the form of gross domestic product, employment, the level of production and labour remuneration that are created for every Rand spent. The result can also be illustrated in various stages as the impact is realised in the economy. This impact can be a direct impact, indirect impact or induced impact. The direct impact refers to the first-round beneficiaries of the impact, i.e. the people employed at the university or the goods and services purchased. The indirect impact refers to the benefits resulting from second-round activity, i.e. the goods and services purchased by the staff of the university or the purchases made by the suppliers of the university which enable them to carry out their business activities. The induced impact refers to the income spent in the economy as a third-round activity, i.e. the purchases made by the workers of the suppliers to the university. The cumulative impact of these three rounds refers to the economy-wide impact, which is an indication of the change within the entire economy.

2.4.1 SAM of the North West Province

In an effort to illustrate the impact of a university campus on the economy, the most recent and lowest level of aggregation SAM was used – i.e. the 2006 North West provincial SAM. Even though the SAM was already a few years old, it was still relevant as its values indicated the relative relationships between the demand emanating from the various sectors of the regional economy. Furthermore, the SAM was adopted to suit the particular research needs of this thesis. Table 2-2
shows the North West 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).

**Table 2-2: North West SAM framework**

<table>
<thead>
<tr>
<th>Receipts</th>
<th>Activities</th>
<th>Commodities</th>
<th>Factor payments</th>
<th>Enterprises</th>
<th>Households</th>
<th>Government</th>
<th>Capital account</th>
<th>Rest of the world</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Activities</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commodities</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor payments - Labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor payments - Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enterprises</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital account</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest of the world</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: NW SAM, 2006*

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.

**2.4.2 Reconstructing the SAM**

In order to quantify the economic impact of the campus, the economic contribution of the campus was extracted from the existing SAM and included as a separate entity. This means that the interaction between the campus as an economic entity and the rest of the provincial economy was visible in the SAM. The following 2006 data was obtained from the NWU in order to extract the economic contribution of the Potchefstroom Campus from the SAM:
• Detailed financial statements of the campus
• Employment data for employees
• Remuneration data for employees
• Occupation level, gender and race of employees.

This data was used to determine the relative contribution of the appropriate accounts illustrated in Table 2-2 and given as:

1. Activity (production) accounts;
2. Commodity accounts;
3. Factor accounts (labour and capital [gross operating surplus]);
4. Institutional accounts (enterprises, households and government);
5. Capital accounts;
6. Trade accounts (rest of the world).

Once the estimation of this distribution was complete the SAM was assumed to be in equilibrium, while the campus was included in the SAM as an entity with its associated economic values and interactions with the various accounts. The model is further described in Chapter 4 in the ‘Methodology’ and ‘Results’ sections.

2.5 Real estate demand modelling

Real estate demand modelling, also referred to as space demand modelling, is a research method associated with real estate market analysis. Real estate refers to the land and the buildings or infrastructure on the land (OED, 2018). Real estate market analysis is a process of minimising risk and maximising opportunity for developers and investors in the real estate market (Brett & Schmitz, 2009:3). Real estate market analysis includes both demand and supply in its application, where demand represents the users of real estate (households, retailers, businesses and industry) and supply constitutes the existing stock of real estate (Brett & Schmitz, 2009:4). When both demand and supply are considered, they provide an indication of the relative saturation of the market and whether there is a gap or surplus within a particular real estate market.

This thesis assumes the supply to be the existing stock in the market of a particular real estate type, which is fixed during the period of analysis. The demand for various real estate types is derived from the demand for the product or service that the real estate provides (Fanning, 2005:129). The demand for real estate includes:

• Retail property, derived from consumer spend on retail services;
• Office property, derived from the demand for services provided by businesses;
The demand for real estate is quantified as physical space and often only referred to as space, which is an indication of total square metres (m²). For this reason the demand for real estate space refers to the total square metres demanded for a specific real estate type. This space demand is associated with a specific market area, such as the demand for retail space within a city, town or country. The quantitative method to determine this demand is the space demand model. The specifications of the model depend on the particular real estate type being analysed and vary for retail, residential, office and industrial.

The data used as an input in the model was a combination of statistical data on a regional level, industry economic data and building statistics from Statistics South Africa, data obtained from staff and students through surveys, and data pertaining to property trends in Potchefstroom from the company, Property 24.

The purpose of the model was to quantify the demand for real estate space in Potchefstroom as a result of staff and student spending in the local economy. The values of staff and student spending were quantified through survey analysis. The survey quantified the value of monthly spending by staff and students associated with the Potchefstroom Campus on various goods and services, such as inter alia; groceries, non-groceries, entertainment, accommodation, transport, fast foods and medical expenses. These are all associated with a real estate type.

Estimating the real estate demand involves analysing the factors that influence demand. These factors tend to be unique to the type of real estate being analysed; however, some factors do overlap and include:

- The share of expenditure associated with the real estate product;
- The size of the market, i.e. the number of households or people;
- Personal or household income;
- Leakage in spending, i.e. the value of money spent outside the delineated market area.

Chapter 5 provides a detailed analysis of the various models and the applicable model specification for this thesis.

2.6 Conclusion

This chapter provided an overview of the approach and methods followed in this thesis. The article format of this thesis made it possible to incorporate a number of methods in order to achieve the study objectives. The overall objective of the thesis is to assess the economic impact of a
university campus, and so by applying a number of methods the results of the assessment are enhanced.

The Potchefstroom Campus of the NWU was used as a case study to quantify the impact. A survey was conducted to determine the spending patterns and preferences among staff and students associated with the campus. The results from the survey were then combined with the formal data figures obtained from the university’s finance department and used in the various approaches to determine the impact.

The bill-of-goods approach, together with the reclassification of expenditure into sectors in Chapter 3, ensured that the sectors that benefit from university expenditure could be identified. The sector results in Chapter 3 were used with the SAM to reconstruct the existing provincial SAM in Chapter 4 and to quantify the economy-wide impact of university expenditure. With a SAM having the flexibility to conduct impact assessments, various student growth scenarios were modelled and the economic impact was quantified. Chapter 5 considers the impact on the host city – specifically the impact on the real estate market. Space demand modelling was applied to quantify the demand for physical space in square metres in various real estate markets.

The applied methodology discussed in this thesis has made it possible to arrive at significant and clearly quantifiable results that reveal the economic benefit of a university campus for the host city, the province and the economy as a whole.
CHAPTER 3: A UNIVERSITY CAMPUS IN A SMALL CITY: DISCOVERING WHICH SECTORS BENEFIT (ARTICLE 1)

3.1 Title page and abstract

Journal section:
Original Research

Article title:
A university in a small city: Discovering which sectors benefit

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Authors’ 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, a lecturer and a doctoral fellow at the North-West University (South Africa). E.P.J.K. assisted in the development of the concept, the interpretation of some of the empirical findings and the development of the manuscript. He assisted in the writing and the finalisation of the article for publication.

Abstract

Orientation: A university, and equally so a university campus, has the ability to influence the economy through its sectoral links. This raises the question as to what sectors benefit as a result of expenditure made by a university campus that is situated within a small city in South Africa.

Research purpose: This article identified the university-sector links by applying a bill-of-goods approach to identify which sectors benefit as a result of an operational university campus.

Motivation for the study: The findings of this study will be used in refining provincial or local social accounting matrix (SAM) models to improve the measurement of an economic impact assessment for the university campus, especially as SAM models are not readily available on such a micro level within South Africa.

Research design, approach and method: The bill-of-goods is a detailed representation of the purchases of goods and services for the campus. The goods and services are grouped into the corresponding sector according to the Standard Industrial Classification (SIC) to identify and quantify university-sector linkages.

Main findings: The results indicated a significant benefit for tertiary sectors of the economy, which receive approximately 85% of university expenditure. On a sectoral level, there is an increased benefit to the utility, retail and personal services sectors, whereas manufacturing and construction turn out to be less significant. Growth prospects for sectors within the tertiary sectors are higher compared to sectors in the primary and secondary sectors.

Practical and managerial implications: Understanding this link enables strategic spatial planning on the part of local government and will enable proactive land-use planning, based on
the strength and growth prospects of each individual sector that benefits from university expenditure.

**Contribution or value-add:** This approach provided exceptional value in identifying the sectors that benefit and provided important trend analyses that will be combined with input–output models to improve the accuracy of measuring university impact assessment on a local level.

### 3.2 Introduction

The benefits of universities are regularly valued on a national level by placing an emphasis on their role in improving the level of education for the national economy. Universities are institutions of higher education in which human capital improvement takes place, typically through the process of teaching, learning and innovation. This consequently benefits the economy. The improvement in human capital, through tertiary education, is an instrument that supports economic growth (Neeliah & Seetanah 2016), which encourages governments to invest in tertiary education (Stevens & Weale 2004:176). As an example, the South African government has as recently as 2013/2014 developed two new public universities with the aim of improving availability and accessibility to these institutions.

Universities represent institutions that are not only important for national economic growth, but also to the benefit of the local economy, especially when considering that universities are considered relatively resilient to business cycle fluctuations (Steinacker 2005:1161). Furthermore, a university has the ability to create employment and generate economic activity within the local economy by utilising local resources (Duke 2014). The benefit for the economy is often apparent through a changing physical landscape, where sectors benefit as a result of linkages with the university. A case in point is Potchefstroom, a small city approximately 120 km from Johannesburg in South Africa, with a population of 162 763 (StatsSA 2011), which hosts a campus of the North-West University (NWU). The location of Potchefstroom is illustrated in Figure 1.
Source: QGIS 2017

**FIGURE 1:** The study area, Potchefstroom.

Potchefstroom Campus is the largest campus of the NWU and had 21,501 full-time contact and 34,050 distance students enrolled in 2015 (NWU 2015). Potchefstroom falls within the Tlokwe municipal area in North West Province. The economic growth of the local economy is largely driven by an ever-increasing tertiary sector. The sectoral gross value-added (GVA) contribution and the contribution of the sectors that form part of the tertiary sector, such as trade, transport, finance, community and government, are highlighted and illustrated in Figure 2.
Source: Quantec data 2017


Figure 2 illustrates the change in GVA contribution from each of the sectors for the local economy. The contribution from the tertiary sectors, illustrated by the red box, was significantly higher in 2015 compared with 1997. These sectors were also the drivers of growth for the economy as annual economic growth between 1997 and 2015 averaged 2.5%. The implication of the continued growth is that the Tlokwe economy is constantly increasing its contribution to the district and provincial economy as shown in Figure 3.
Figure 3 shows the GVA contribution for 1993 and 2015 of Tlokwe to the district and provincial economy. The contribution of the Tlokwe economy to the North West provincial economy has increased from 1993 (5.2%) to 2015 (6.1%). Similarly, the contribution to the Dr Kenneth Kaunda District economy is also higher, rising from 15.7% in 1993 to 31.5% in 2015.

From the trend analysis, it can be inferred that Tlokwe is a local economy that is strengthening within the district and province. The influence of the university on the local economy should not be taken for granted, considering the possible links that exist between university expenditure and the local sectors that have experienced the growth. Understanding the effect of such an institution on the local economy and the linkages it shares with the local sectors would assist in identifying the long-term development potential of the local economy. Not only will this be beneficial to economies in which universities are already present but it will also assist economic planning in regions intended for the development of new tertiary education institutions.

These economic impacts are frequently assessed with an input–output model and its extension, the social accounting matrix model (Polo & Valle 2012:337). Within the South African context, however, the lowest levels of aggregation of these models are at the provincial level. Measuring the economic impact on a local, university-campus level would require either a large number of assumptions or an alternative approach altogether. Understanding the university–sectoral link...
that results from university expenditure provides a starting point in measuring the impact of a campus on the economy. For this reason, the aim of this study is to identify the sectors that benefit from expenditure incurred by a university campus, by means of a bill-of-goods approach. This approach utilises the expenditure value per activity as recorded in the accounting statements from the campus for analysis. The analysis enables the identification of sectors that benefit, coupled with a determination of growth prospects in the long run.

The following section provides an overview of the literature, and in particular discusses the change in method for universities' economic impact assessment studies. The ‘Methodology’ section describes the applied method for this study and is followed by the ‘Empirical analysis’ to identify the sectors that benefit from university expenditure. The final section provides an interpretation of the results, and in particular describes the growth prospects of the beneficial sectors, and the conclusion.

3.3 Literature

A university is an institution where production, diffusion and transmission of knowledge occur (Özsoy 2008). For these activities to take place, investment in technology, physical infrastructure, human capital and land is required. These investments render the institution operational and lead to additional capital and operational expenditure, resulting in economic benefits. Assessing the economic impact of these expenditures is done through economic impact assessment methods, which are well documented in the literature (Armstrong, Darrall & Grove-White 1997; Bonner 1968; Booth & Jarrett 1976; Caffrey & Isaacs 1972; Smith & Bissonnette 1989; Stewart et al. 1989).

There has been significant growth in the number of economic impact studies for universities from the 1960s onwards (Brown & Heaney 1997:229). This increase in economic impact assessments led to a study by Caffrey and Isaacs (1972) who published findings on how to assist researchers in standardising the assessment method for university impact studies. The majority of the studies that were conducted made use of an input–output model to illustrate economy-wide impacts. Findings generally illustrate an economic impact value in local currency, often reaching millions, while simultaneously indicating the number of jobs created as a result of an operational university in the local economy (Siegfried, Sanderson & McHenry 2007:547).

The impact of universities on the economy changed as economies evolved, driven by globalisation in commerce and a shift towards increasing knowledge-intensive production and services (Drucker & Goldstein 2007:20). As a result, recent studies (since the 1990s) have measured the economic impact of a university by considering specific university functions and
have consequently applied different approaches in measuring the economic impact (Drucker & Goldstein 2007:24). This change in approach was to overcome the relatively inflexible nature of the input–output model (Ambargis, McComb & Robbins 2011) in understanding the economic impact of a university.

Drucker and Goldstein (2007) illustrate various alternative approaches that are utilised in measuring the economic impact of a university. These include the use of surveys, designed to obtain information on direct expenditure by staff and students, as an assessment tool (see Elliott, Levin & Meisel 1988); production functions to measure the importance of knowledge and innovation (see Bano & Taylor 2015; Martin 1998); individual data sets that measure the economic effect of a university through, for example, the number of spin-off firms generated as a result of a university’s research and development activities (see Acs, Audretsch & Feldman 1994; Goldstein & Drucker 2006); and patents and licensing agreements that have resulted (see Friedman & Silberman 2003) from innovation and knowledge obtained by universities. As the impact assessment approach for universities has evolved and expanded, the significant linkages that exist between the institution and the economy have been highlighted, albeit often in isolation.

One such example is the development of innovation hubs. Parrillo and De Socio (2014) comment that for innovation hubs to develop, the university will most likely have a strong focus on research and innovation. Innovation hubs are, however, not a feature of every university, as Siemiatycki (2013) points out – it differs from university to university. The implication is that a university, through its linkages with the economy, is in a position to affect the spatial characteristics of the surrounding area where the university is located.

The interaction between a university and its surrounding environment has already been highlighted by Caffrey and Isaacs (1972) who assert that the economy distinguishes between primary activities and secondary services. The primary activities of a university include research, innovation and development, teaching and learning of students and community development through social programmes. These primary activities result in the establishment of secondary services. For example, research and innovation lead to new product development and patent rights which can be used in improving production, a secondary service. Another example is the process of teaching and learning, which entails students attending the university and this, in turn, gives rise to secondary services through demand for residential and retail products. This interaction between the university and the economy creates opportunities where the personnel and the students take part in social and economic activities in the surrounding area, resulting in local development. The scale of the development would depend on the social structure and development state of the environment where the university is located (Antikainen 1981).
The existing university impact literature indicates that these institutions represent a benefit to the economy, both on a national level and a local level. Identifying and quantifying these benefits occur in the form of university–sector linkages which are often measured individually, but in most cases the existing studies identify one of these linkages and report on the specific impact. In regions where local input–output models are available, these linkages form part of the model that estimates the economic impact, but mostly they are not reported on. As a result, the university–sector linkages that are formed as a result of university expenditure on capital and operational activities are rarely discussed as an impact aspect alone. The importance of quantifying the university–sector linkages is key to quantifying the economic impact of a university. Furthermore, understanding this link would enable local government to engage in strategic spatial planning. Gathering information about the sectors that will benefit as a result of an operational university would enable proactive land-use planning, based on the strength and growth prospects of each individual sector that benefits from university expenditure.

The bill-of-goods approach is used to identify the sectors that benefit as a result of university expenditure. This approach highlights the university–sectoral linkages, enabling long-term trend analysis in expenditure and, when combined with input–output models, the accuracy of the impact assessment can be improved (Ambargis et al. 2011:1). Identifying the university–sectoral linkages as a result of university expenditure is an important first step in quantifying the economic significance of a university campus.

3.4 Methodology

To identify and measure the sectoral linkages of Potchefstroom Campus, the expenditure value of each activity, referred to as the bill-of-goods, is grouped into the corresponding sector according to the Standard Industrial Classification (SIC) system of South Africa. The SIC is a classification system where activities within the economy are divided into sectors.

Identifying the sectoral linkages resulting from university expenditure through the bill-of-goods approach could improve economic impact assessment results when later combined with the input–output and social accounting matrix (SAM) approaches. It considers the specific investment or expenditure value made by a university, which is a more detailed analysis than the off-the-shelf input–output analysis (Ambargis et al. 2011). This approach captures the economic impact of a university in more detail than, for example, the input–output and SAM approaches, when assessing sectoral linkages.
The bill-of-goods is a detailed representation of the university’s purchases of goods and services from the campus accounting statements. The value of purchases is expressed in nominal values for a specific year of operation for the campus and grouped into purchases of specific activities or consumables. To analyse the expenditure trends, the values are converted to real values to remove the effect of inflation.

Figure 4 illustrates the process involved in classifying the expenditure incurred by Potchefstroom Campus into sectors according to the SIC system.

Figure 4 shows the process that is required to identify the sectors that benefit from the expenditure by the university campus. Expenditure data for the period 2009–2015 was sourced for Potchefstroom Campus. The expenditure type was linked to the relevant activity type as provided in the SIC version 5, which enabled the expenditure to be divided into sectors. The value of expenditure for each sector was added for any given year to illustrate the annual total expenditure per sector.

The value of total expenditure for Potchefstroom Campus from 2009 to 2015 is illustrated in Figure 5.

The value of expenditure has increased over the past seven years in nominal and real values. The increase in expenditure is indicative of a period of expansion for the university. During the period under consideration, the campus experienced growth in the number of enrolments, staff employment and research outputs. It is illustrated in Figure 5 that the value of expenditure by the campus is significantly large and certainly a positive stimulus for the economy, both locally and nationwide.
Source: Authors’ own analysis using data from 2009 to 2015 from the NWU and StatsSA 2016

FIGURE 4: Campus expenditure to sector value.
3.5 **Empirical analysis**

3.5.1 **Identifying the sectors that benefit**

The process to identify the sectors that benefit involves linking the activities for which there are campus expenses with the relevant sector. Table 1 illustrates the selected activities and the corresponding sectors.

**TABLE 1: Activity with corresponding sector**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Sector or sub-sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publishing, course material, printing</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Water, electricity</td>
<td>Utilities</td>
</tr>
<tr>
<td>Building work, carpeting, electrical</td>
<td>Construction</td>
</tr>
<tr>
<td>Food, books, refreshments</td>
<td>Retail trade</td>
</tr>
<tr>
<td>Entertainment, accommodation</td>
<td>Catering and accommodation</td>
</tr>
<tr>
<td>Travel</td>
<td>Transport and storage</td>
</tr>
<tr>
<td>Postage, telephone, courier</td>
<td>Communication</td>
</tr>
<tr>
<td>Legal, consultation, software</td>
<td>Business services</td>
</tr>
<tr>
<td>Insurance, bank cost</td>
<td>Finance and insurance</td>
</tr>
<tr>
<td>Gardening, laundry</td>
<td>Community and personal services</td>
</tr>
<tr>
<td>Property tax, staff development (excluding personnel remuneration)</td>
<td>General government</td>
</tr>
</tbody>
</table>

*Source: NWU 2016*
Personnel remuneration is the single largest expense of the campus. In 2015, this expense alone constituted 61% of total expenditure and was similarly large during the preceding years. Salaries represent an income source that is on its part used by households for spending on a variety of goods and services in different economic sectors. The salary component is excluded from the analysis as it represents an injection from households into the economy. The value of expenditure for each sector is illustrated in Figure 6.

**Source:** NWU 2016 and authors’ own calculations

**FIGURE 6:** Sectors that benefit, percentage share, 2015. Salaries are excluded.

Figure 6 shows the expenditure incurred by the university campus according to different sectors and that most of the sectors within the economy benefit, with the exception of agriculture and mining. Retail represents the largest expenditure type at 31.7%, followed by business services at 29.3%. Expenditure on activities in the utilities sector represents 8.8% of all expenditure, catering and accommodation at 7.3%, and transport and storage at 6%. Expenditure on the government services sector, which includes property tax, represents the smallest expense for the campus at 0.7%. A total of 84.3% of expenditure is in the tertiary sector, which highlights the benefit that this sector derives from university expenditure.

Longer-term expenditure trends over the period 2009–2015 show the sectors that strengthen their link with a university or alternatively have a diminishing role based on expenditure. Figure 7 graphically illustrates the expenditure level for each sector from 2009 to 2015, and the following can be concluded.
Manufacturing

\[ R^2 = 0.6547 \]

Utilities

\[ R^2 = 0.9489 \]

Construction

\[ R^2 = 0.2767 \]

Retail

\[ R^2 = 0.8529 \]

Catering & Accommodation

\[ R^2 = 0.2768 \]

Transport & Storage

\[ R^2 = 0.7229 \]

Communication

\[ R^2 = 0.5402 \]

Finance & Insurance

\[ R^2 = 0.0497 \]
The manufacturing sector consists mainly of spending on activities in the paper, publishing and printing sub-sector as far as the university is concerned. Since 2009, the value of university expenditure on manufacturing activity has decreased steadily, this during a period of expansion for the campus. The major reason for this decrease is probably the reduced reliance on printing and paper products and a move towards the electronic delivery of similar reading material.

The expenditure on utilities, which include water and electricity, has increased significantly and has more than doubled over the past seven years. Investment in and use of electricity-generating-capable infrastructure, to limit the negative operational impact on the university of power shortages, is a possible reason for the increase. At the same time, the price of electricity has increased with rates above inflation values. Furthermore, the university has invested significantly over this period in a number of new buildings on the campus which would contribute to an increase in demand for water and electricity.

The construction sector includes expenditure on general maintenance and investments in new buildings on the campus. The campus has construction-related expenditure on an annual basis and, apart from 2014, this value has been mostly stable.
Expenditure on retail and related activities increases annually. The value in 2015 was double the 2009 value, with significant expenses being incurred in this sector. Retail expenditure includes activities such as purchases of stationery, food and computer equipment.

Expenditure on catering and accommodation activities represents one of the smaller sectors. Expenditure in this sector was initially high in 2009 and decreased significantly the following year. From 2010 to 2015, expenditure increased annually, with the 2015 value being significantly higher than the 2009 value. Expenditure on conferencing is part of this sector and also falls within the retail and transport sectors.

The transport and storage sector reached a peak in 2013 and has since decreased to the same level as in 2011, with overseas and local travel expenditure being the largest contributors.

Expenditure on communication activity has increased only slightly over the past seven years, with telephone and courier services being responsible for the largest share of expenditure.

Similarly, expenditure in the finance and insurance sector has stayed more or less constant during the period under consideration.

Business services is the third largest sector, with 11.5% of expenditure incurred on such activities, including legal and consulting services. The expenditure value increased annually from 2010 and reached a peak in 2014 before declining in 2015.

The expenditure on community and personal services has risen slightly every year and includes expenditure on conference fees, gardening and laundry services.

The government services sector is responsible for 0.7% of all expenditures. The expenditure on government services increased from 2009 to 2015 and consists of the payment of property tax, staff development and staff training.

### 3.5.2 Sectoral trends

When sectoral expenditure is expressed as a percentage of total university campus expenditure, the change in contribution, for the period 2009 to 2015, can be compared to identity changes in expenditure trends. Figure 8 shows the sectoral percentage shares of university expenditures for 2009, 2012 and 2015.

Figure 8 shows that, over the long term, the retail and business services are the sectors that benefit the most from university expenditure and their share as a percentage of expenditure has remained near 30% over the period. The manufacturing and construction sectors had lower
shares in 2015 compared to 2009, while utilities had a significantly higher share in 2015. The share of the other sectors stayed more or less the same over this period.

Source: NWU 2016 and authors’ own calculations

**FIGURE 8**: Sectoral trends, 2009–2015 (percentage share).

The following section investigates the change in shares of expenditure in the context of the local economy.

### 3.5.3 Strengthening sectoral linkages

This section investigates whether sectoral changes, resulting from university expenditure, have the ability to influence economic activity in the local economy through the use of competitive advantage analysis (CAA). CAA is the ideal analytical tool to measure the structure and performance of economic entities (DBSA 2001). The findings from this kind of analysis are
descriptive and add another dimension to the explanation of the relationship between university expenditure and local economic activity.

The leading–lagging analysis is a CAA tool that describes the growth dynamic of the university's sectoral growth in comparison with the local economy. There are two key values, the district sector relative growth (DSRG), which in this instance reflects the Tlokwe economy, and the local sector relative growth (LSRG), represented by the Potchefstroom Campus expenditure. The campus expenditure values are adjusted to reflect the GVA value of each sector.

3.5.3.1 District sector relative growth

The district sector relative growth (DSRG) shows the sector growth compared to the total growth of the district economy, in this case Tlokwe. If the sector growth is higher than the total growth rate, then the sector is leading, meaning that it has increased at a higher rate than the total economy and signifies a sector that is rising relative to the district economy. When the sector growth rate is lower than the total growth rate of the district economy, the sector is lagging:

\[
\text{DSRG} = \text{District GVA growth in a sector} - \text{District GVA growth overall.}
\]

3.5.3.2 Local sector relative growth

The local sector relative growth (LSRG) measures the growth of a sector in the local economy relative to the growth of the same sector in the district economy. A sector is leading when the local sector has a higher growth rate than the corresponding sector in the district economy and it is lagging when it has a lower growth rate.

\[
\text{LSRG} = \text{Local GVA growth in a sector} - \text{District GVA growth in the sector.}
\]

The findings of the leading–lagging analysis of the current study are provided in Figure 9, while the location quotient (LQ) is incorporated into the findings where its value is indicated by the size of the circle. The LQ indicates the level of concentration of a sector between the local and district economies (Leigh 1970). The LQ is a ratio that measures the relative size of the local sector with the relative size of the same sector in the district economy.

The LQ has been added to this analysis to illustrate sectoral spending concentration from the Potchefstroom Campus within the Tlokwe economy. A higher LQ value indicates that the sector is more specialised or concentrated in the local economy (university) compared to the district economy (Tlokwe), and vice versa.
LQ = Percentage of local sector GVA/percentage of district sector GVA.

Figure 9 provides a descriptive analysis of the growth trends for the period indicated. The LSRG, which represents the university, is indicated on the vertical axis and ranges between −5% and 3%, while the DSRG, which represents the Tlokwe economy, is indicated on the horizontal axis and ranges between −7% and 20%. The graph is divided into four segments. The upper right segment shows the sectors that are leading in both LSRG and DSRG, while the bottom right segment shows the sectors that are leading in the local sector but lagging in the district sector. The bottom left segment shows the sectors that are lagging in both the local and district sector analysis, while the upper left segment reflects a leading district sector and lagging local sector.

The analysis does not unambiguously explain causality between economic activity generated as a result of university expenditure and the local economy; however, it does provide unique insight into the sectoral expenditure growth of the university compared with sectoral growth in the local economy. At this point, it is important to repeat that the LSRG and DSRG analyses compare sector and overall growth with each other, in an effort to explain the economic structure and performance of the university within the Tlokwe local economy.

The sectors where the LSRG and DSRG are leading show an increase in competitive advantage resulting from strong economic growth in the local and district economies. These sectors include catering and accommodation, transport and communication, business services and community and personal services. Sectors where LSRG and DSRG are lagging have, by comparison, experienced lower economic growth. These sectors include manufacturing and construction.
The CAA is not without controversy, as highlighted by Buss (1999) who makes a case against targeted industry strategies that are mostly based on the findings of such analyses. The CAA is often wrongly used as a measuring tool instead of a descriptive tool used for the purpose of strategic planning. This article utilised the CAA only as a descriptive tool in understanding the role of sectoral expenditure patterns within the local economy context.

This section evaluated the sectoral structure of spending by Potchefstroom Campus, as an economic entity within the Tlokwe municipal economy. The analysis revealed the intricate changes that have taken place on a sectoral level for university campus expenditure within the Tlokwe economy during the period 2009–2015. The following section combines the findings of the CAA and the general expenditure trends for each of the sectors and discusses the growth prospects of sectors that benefit from university expenditure.
3.6 Interpretation of the results

Identifying the growth prospects of each of the sectors that benefit from university expenditure requires an integrated approach to data assimilation and interpretation. The growth prospects per sector are determined by combining the expenditure trends from 2009 to 2015, as well as the comparative advantage analysis findings. The limited data periods available have unfortunately restricted the use of forecasting techniques to conduct a detailed growth analysis. For this reason, the growth prospects are based on combining the historical performance of each sector and the CAA findings, and are categorised as low, medium or high.

Growth prospects = f(Ss, Sg, LQ)

where Ss is the sector’s share of total campus expenditure, Sg is the sector growth over the past seven years and LQ is the location quotient, an indication of the concentration of the sector compared to the local economy.

Low-growth sectors have a small sector share of university expenditure, i.e. below 5%, coupled with low growth of below 2% per annum and a low LQ. Medium-growth sectors have a small share of university expenditure, i.e. above 5%, coupled with positive growth over the past seven years of above 2% per annum and a medium-to-high LQ. The high-growth sectors have a share of more than 5%, coupled with positive growth and a high LQ.

Table 2 illustrates the growth prospects on a sectoral level resulting from university expenditure.

**TABLE 2: Growth prospects of sectors that benefit.**

<table>
<thead>
<tr>
<th>Sector or sub-sector</th>
<th>Historical economic performance</th>
<th>Growth prospects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sector percentage share (%)</td>
<td>Sector growth (%)</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>2.7</td>
<td>-4.1</td>
</tr>
<tr>
<td>Utilities</td>
<td>9.0</td>
<td>17.5</td>
</tr>
<tr>
<td>Construction</td>
<td>3.2</td>
<td>-0.7</td>
</tr>
<tr>
<td>Retail</td>
<td>32.6</td>
<td>10.7</td>
</tr>
<tr>
<td>Catering and accommodation</td>
<td>7.5</td>
<td>5.8</td>
</tr>
<tr>
<td>Transport</td>
<td>5.3</td>
<td>6.5</td>
</tr>
<tr>
<td>Communication</td>
<td>2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Finance</td>
<td>2.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Business</td>
<td>29.4</td>
<td>4.7</td>
</tr>
<tr>
<td>Community and personal services</td>
<td>4.7</td>
<td>9.9</td>
</tr>
</tbody>
</table>

*Source: NWU 2016 and authors’ own calculations*
The growth prospects per sector, as provided in Table 2, are also shown in Figure 10. The figure is a graphical representation of the table.

The sector percentage share (indicated in column 2 of Table 2) reflects the significance of a sector in terms of the benefits gained from university expenditure. A higher value represents a more significant link between the university and the sector. In other words, the sector gains significantly from an operational campus. In this case, activities that fall within the retail and finance and business services sectors are the major beneficiaries of a university's presence.

The sector growth is indicative of the strength of the link between the sector and the university. A sector that continues to have positive growth strengthens the university–sector link; negative growth in a sector weakens the link.

The interpretation of LQ is not complex and merely indicates the level of concentration of the sector resulting from expenditure compared to the local economy. Sectors that dominate will have higher LQ values and sectors that are relatively scarce will have lower values.

Source: NWU 2016 and authors' own calculations

**FIGURE 10:** Growth prospects per sector.
The past seven years have been a period of expansion for the campus, which includes increased enrolments of contact students, increases in personnel on the campus and the development of physical infrastructure (including new lecture halls and hostels) on the campus. The interpretation of university–sector linkages was conducted with this expansion period in mind. During this period of expansion, expenditure on activities in the manufacturing sector was slowly decreasing. Potchefstroom Campus shows limited and decreasing benefits to manufacturing activity and signifies low-growth prospects.

The utility sector is growing significantly, as university expenditure on these activities has increased annually. The expansion of the university’s physical infrastructure, coupled with uncertainty in the national electricity supply, has undoubtedly driven expenditure in this sector. Expenditure in this sector is still relatively small compared to all sectors receiving university expenditure. While the expenditure has increased, investment in this sector should stabilise as the national electricity supply stabilises. With continued investment in infrastructure on the campus and the need to continue operations even with interruptions in water and electricity services, this sector represents a medium-to-high growth prospect in the short run.

The expenditure on construction increased slightly until 2014, while 2015 was significantly lower. The sector trend illustrates that construction has been relatively constant over a seven-year period, although it is clear that there were years with above-average expenditure followed by years with below-average expenditure. The level of expenditure is expected to remain at current expenditure levels over the longer term and represents low-growth prospects.

The university–retail sector link is significant and has solidified over the period of analysis. The retail sector benefits significantly from the presence of Potchefstroom Campus and growth prospects remain high for this sector.

The annual increase in catering and accommodation expenditure, and above-average total expenditure, has strengthened the link between the university and the sector. The sector represents a high-growth prospect during the current period of expansion for the campus.

The transport sector reached a peak in expenditure levels in 2013 and declined thereafter. The 2015 expenditure is comparable to the level of expenditure in 2011 but is still higher than in 2009. Over the long term, the sector shows positive economic performance but is decreasing over the short term. Given the short-run decrease in expenditure during a time of expansion for the campus, this sector represents medium-to-high growth prospects.
The communication sector receives the smallest share of university expenditure, with low levels of growth. The expenditure value has mostly been constant each year and represents low-to-medium growth prospects.

The finance sector is similar to the communication sector in that expenditure has been consistently of the same value year on year. The long-term trend indicates positive economic performance, but the sector share has remained low; as a result, growth prospects are low to medium.

The university–business services sector link is significant. The expenditure value has increased annually, with the exception of 2015. The sector represents high-growth potential.

The community and personal services sector has grown continuously over the past seven years and represents medium-to-high growth prospects.

3.7 Summary and conclusion

The aim of this study was to identify the sectors that benefit from expenditure incurred by a university campus. Instead of using a generalised input–output model, an alternative approach, the bill-of-goods method, was used. The advantage of this approach is that it considers all the expenses made per activity by the university, as indicated by the accounting statements, which are then allocated to the relevant sectors through the use of the SIC of South Africa.

The bill-of-goods approach provides exceptional value in identifying the beneficial sectors, particularly considering the process involved in allocating the expenditure activities to sectors. Identifying the annual economic value of a particular sector, coupled with expenditure changes over time, provides important insights for trend analyses.

The expenditure by the Potchefstroom Campus of the North-West University mainly benefits the tertiary sectors, which are less likely to be influenced by drastic business cycle fluctuations compared to the primary and secondary sectors. Although not completely unaffected by business cycle changes, the beneficial sectors are more resilient to these changes. Three sectors – the government services, business services and trade sectors – gain the most from university expenditure, while expenditure in smaller sectors such as catering and accommodation and utilities shows some growth prospects. Potchefstroom Campus is experiencing a period of growth and expansion, which has affected the value of expenditure by the campus.
The findings from this study will be used in refining provincial or local SAM models to improve the measurement approach used in an economic impact assessment of the university campus, especially as SAM models are not readily available on such a micro level in South Africa. The university–sector linkages provide insight into development and growth trends in the economy, especially the local economy in which the campus is situated. This insight should assist in the planning of the town where these institutions are located, since the local impact on demand for activities related to university expenditure would have an effect on long-term land use developments. This link between sector and land use demand is the topic of a follow-up study.
References


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CHAPTER 4: ECONOMIC IMPACT OF A SOUTH AFRICAN UNIVERSITY CAMPUS: A CASE FOR PROMOTING ON-CAMPUS CONTACT LEARNING (ARTICLE 2)

4.1 Title page and abstract

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

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Authors’ 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, a lecturer and a doctoral fellow at the North-West University (South Africa). E.P.J.K. assisted in the development of the concept, the interpretation of some of the empirical findings and the development of the manuscript.
Abstract
Public universities in South Africa play an extremely important role in preparing students for productive and fulfilling careers. Yet 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. In this article, the economic benefits of one of South Africa’s largest universities, the North-West University (specifically its Potchefstroom Campus), was quantified using a social accounting matrix (SAM) approach and survey data. The article examines the impact, on the provincial economy, of spending by the university and full-time contact students, respectively. 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.

4.2 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 cities of universities could theoretically benefit.

In the 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) attempt to highlight the potential benefits of universities for host cities but their study lacks 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 two-fold: first, to illustrate the economy-wide impact of the Potchefstroom Campus of the NWU on the provincial economy using a social accounting matrix (SAM); 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 4.3 describes the Potchefstroom study area, while Section 4.4 provides an overview of the literature and identifies best practice modelling techniques from existing theoretical and empirical work on the topic. Section 4.5 explains the methodology used to quantify the economic impact, with the research results being presented in Section 4.6. Section 4.7 concludes the article.

4.3 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. 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](source: Authors' own construction using NWU data, 2018)
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 Potchefstroom Campus of the NWU has most likely played a role in this result, with the impact assessment indicating if this was indeed the case.

4.4 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 Stewart et al., 1989, Brown & Heaney, 1997). 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 measures the economic impact to include the entire economy. Their findings revealed that a university has a much wider influence than simply 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 social accounting matrices (SAMs) are mostly used. The I–O model is a linear model that illustrates the sale and purchase relationship between producers and consumers in an economy, in matrix form (OEDC, 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 I–O 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 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 I–O matrix can only extract the direct and indirect multipliers. In this respect, the SAM was the preferred economic impact assessment method 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 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 special 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, respectively. Beck, Elliott, Meisel and Wagner (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.

4.5 Methodology

4.5.1 The model

A SAM was used to measure the economic impact of the Potchefstroom Campus of the NWU on the economy. The SAM provided a detailed framework of the economy in a matrix form, showing the interdependencies with the regional economy in a given year (Round, 2003:14–2). The regional economy in this paper refers to all economic activity within a provincial setting. The benefits of using a SAM in this context were two-fold: first, it allowed the economic significance of the campus within the provincial context to be quantified; 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: SAM as an impact-quantifying tool](image)

**Figure 2: SAM as an impact-quantifying tool**

*Source: Authors' own design*

Figure 2 illustrates the impact of a shock on the economy, resulting in a benefit or a cost, or no substantial change within the economy.
For the current assessment, the 2006 North West provincial SAM, developed by the Development Bank of South Africa (DBSA), was used. This was the most recent and lowest level of aggregation available for 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 extracted were based on the operational and capital expenditure by the campus. Once this was done, the adjusted SAM was complete and the economic analysis could be conducted.

4.5.2 The data

University operational and expenditure data as well as survey data was used to quantify the economic impact. The survey data considered the spending patterns of first year students. The analysis considered only first year students so as 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 was 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 North West provincial economy. The Standard Industrial Classification (SIC) system and the North West 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 was 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 in order 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 university, which in this case was 2015. The 2015 campus expenditure is illustrated in Table 1.
Table 1: Campus expenditure (R millions), 2015

<table>
<thead>
<tr>
<th>Activity</th>
<th>Expenditure value (R/millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational expenditure</strong></td>
<td></td>
</tr>
<tr>
<td>Paper and paper products</td>
<td>1.3</td>
</tr>
<tr>
<td>Publishing and printing</td>
<td>17.6</td>
</tr>
<tr>
<td>Electricity</td>
<td>48.1</td>
</tr>
<tr>
<td>Water</td>
<td>11.9</td>
</tr>
<tr>
<td>Building and other construction</td>
<td>28.7</td>
</tr>
<tr>
<td>Trade</td>
<td>153.1</td>
</tr>
<tr>
<td>Accommodation</td>
<td>49.5</td>
</tr>
<tr>
<td>Transport</td>
<td>40.7</td>
</tr>
<tr>
<td>Communication</td>
<td>13.9</td>
</tr>
<tr>
<td>Insurance</td>
<td>3.1</td>
</tr>
<tr>
<td>Business services</td>
<td>239.1</td>
</tr>
<tr>
<td><strong>Capital expenditure</strong></td>
<td>87</td>
</tr>
<tr>
<td><strong>Labour cost</strong></td>
<td>1 058</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td>1 752</td>
</tr>
</tbody>
</table>

*Source: NWU campus finances, 2015*

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 was used to measure the impact of a stimulus (shock) on the economy. Student spending represents an exogenous demand stimulus. In order to determine the value of this stimulus, student surveys were conducted during the month of September in 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 in order to determine how student spending stimulates the provincial economy.

### 4.6 Simulation results

The economic contribution of the campus extends beyond the expenditure values emanating from the campus. The economic value or impact is three-fold, comprising 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 employers within the economy as part of their living expenses – also referred to as the income effect (Econex, 2017:2).

Two analyses were conducted. First, 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.

4.6.1 The impact of university expenditure

The economic benefits of a university are much more significant than might initially be assumed. In order to understand the impact, it is appropriate to quantify it in terms of monetary value. In a provincial context, such value is illustrated by means of the contribution to 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.

4.6.1.1 Impact on production and gross domestic product (GDP)

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 R1 753 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 extreme right-hand bar.

![Figure 3: Economy-wide impact on production (R/millions), 2015 values](source: Authors' calculations based on NW SAM, 2006)
The economy-wide impact totalled R3 167 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 provincial GDP is illustrated in Figure 4.

The total economy-wide impact of the campus’s operations on GDP was R1 791 million in 2015. This represented a 0.37% contribution to provincial GDP that year.

**Figure 4: Economy-wide impact on GDP (R/millions), 2015 values**

*Source*: Authors' calculations based on NW SAM, 2006

4.6.1.2 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 important impacts that an institution can make in South Africa. The university represents an economic entity that relies on human capital to function properly and plays an important 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 3 452 jobs. Every R1 million of spending by the campus created an additional 4 jobs throughout the economy. This equated to 1.1% of total formal employment within the North West 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.
4.6.1.3 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 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).

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

Source: Authors’ calculations based on NW SAM, 2006

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

4.6.2 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 students 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, i.e. 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, i.e. 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 locally, i.e. 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.

4.6.2.1 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 from 2010 to 2017 was 195 students. This has resulted in an increase in first year admissions from 3 480 in 2010 to 4 842 in 2017. The same rate of growth up to 2022 will result in approximately 5 815 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 5 815 first year students in 2022 is illustrated in Table 2. The table shows the GDP and employment benefits per sector.

Table 2: Scenario 1: Economic impact of first year student spending, 2022

<table>
<thead>
<tr>
<th>Sector</th>
<th>Initial injection</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact</th>
<th>Percentage (Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross domestic product (R/millions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>-</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>1.1%</td>
<td></td>
</tr>
<tr>
<td>Mining</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
<td>0.2</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.1</td>
<td>0.7</td>
<td>0.5</td>
<td>1.3</td>
<td>4.7%</td>
<td></td>
</tr>
<tr>
<td>Electricity &amp; water</td>
<td>0.0</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.6%</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>0.0</td>
<td>0.3</td>
<td>0.1</td>
<td>0.4</td>
<td>1.4%</td>
<td></td>
</tr>
<tr>
<td>Trade &amp; accommodation</td>
<td>19.2</td>
<td>7.1</td>
<td>0.6</td>
<td>2.4</td>
<td>10.1%</td>
<td>35.5%</td>
</tr>
<tr>
<td>Transport &amp; communication</td>
<td>4.5</td>
<td>1.3</td>
<td>1.4</td>
<td>0.7</td>
<td>3.4%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Financial &amp; business services</td>
<td>19.4</td>
<td>6.1</td>
<td>3.0</td>
<td>1.8</td>
<td>10.9%</td>
<td>38.3%</td>
</tr>
<tr>
<td>Community services</td>
<td>3.7</td>
<td>0.6</td>
<td>0.5</td>
<td>0.6</td>
<td>1.7%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Total</td>
<td>46.9</td>
<td>15.2</td>
<td>7.0</td>
<td>6.2</td>
<td>28.5%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

| Employment (number)          |                   |               |                 |               |              |                    |
| Agriculture                  | -                 | 4             | 9               | 13            | 4.7%         |                    |
| Mining                       | 0                 | 1             | 0               | 1             | 0.5%         |                    |
| Manufacturing                | 1                 | 9             | 6               | 16            | 5.5%         |                    |
| Electricity & water          | 0                 | 0             | 0               | 0             | 0.1%         |                    |
| Construction                 | 0                 | 8             | 2               | 10            | 3.4%         |                    |
| Trade & accommodation        | 107               | 10            | 35              | 152           | 53.3%        |                    |
| Transport & communication    | 4                 | 4             | 2               | 11            | 3.8%         |                    |
| Financial & business services| 40                | 15            | 10              | 66            | 23.1%        |                    |
| Community services           | 6                 | 5             | 5               | 16            | 5.6%         |                    |
| Total                        | 159               | 56            | 69              | 284           | 100.0%       |                    |

Source: Authors’ calculations based on NW SAM, 2006
By 2022 the value of spending by students is expected to result in GDP of R28.5 million, of which the main beneficiaries will be the financial and business services, trade and accommodation sectors. A total of 284 jobs will be created throughout the economy, of which the trade and accommodation sector will be the major beneficiary.

**4.6.2.2 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 4 726 that year. Table 3 illustrates the average monthly spending by students who fell within the 25th, 50th and 75th percentiles.

**Table 3: First year student spending patterns, 2016**

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Number of 1st year students</th>
<th>Average spending per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>25th</td>
<td>1 182</td>
<td>R 2 348</td>
</tr>
<tr>
<td>50th</td>
<td>2 363</td>
<td>R 3 574</td>
</tr>
<tr>
<td>75th</td>
<td>3 545</td>
<td>R 4 782</td>
</tr>
<tr>
<td>Total</td>
<td>4 726</td>
<td>R 6 641</td>
</tr>
</tbody>
</table>

*Source: Authors’ calculations based on survey findings, 2018*

The average spend value per month for students within the 50th percentile amounted to R3 574. 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 5,037 in 2018 to 5,815 in 2022, which represents the same increase as in Scenario 1 (195 per year), with 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 4 illustrates the economic impact of this scenario.

Table 4: Scenario 2: Economic impact of first year student spending, 2022

<table>
<thead>
<tr>
<th>Sector</th>
<th>Initial injection (Gross domestic product: R/millions)</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact (Gross domestic product: R/millions)</th>
<th>Percentage (Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>-</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>1.1</td>
<td>1.1%</td>
</tr>
<tr>
<td>Mining</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
<td>0.2</td>
<td>0.8</td>
<td>0.8%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.1</td>
<td>0.7</td>
<td>0.5</td>
<td>1.3</td>
<td>4.7</td>
<td>4.7%</td>
</tr>
<tr>
<td>Electricity &amp; water</td>
<td>0.0</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.6</td>
<td>0.6%</td>
</tr>
<tr>
<td>Construction</td>
<td>0.0</td>
<td>0.3</td>
<td>0.1</td>
<td>0.4</td>
<td>1.4</td>
<td>1.4%</td>
</tr>
<tr>
<td>Trade &amp; accommodation</td>
<td>18.2</td>
<td>6.7</td>
<td>0.6</td>
<td>2.3</td>
<td>9.6</td>
<td>35.7%</td>
</tr>
<tr>
<td>Transport &amp; communication</td>
<td>4.2</td>
<td>1.2</td>
<td>1.4</td>
<td>0.6</td>
<td>3.2</td>
<td>11.8%</td>
</tr>
<tr>
<td>Financial &amp; business services</td>
<td>18.3</td>
<td>5.7</td>
<td>2.9</td>
<td>1.7</td>
<td>10.3</td>
<td>38.1%</td>
</tr>
<tr>
<td>Community services</td>
<td>3.5</td>
<td>0.6</td>
<td>0.5</td>
<td>0.5</td>
<td>1.6</td>
<td>5.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>44.2</strong></td>
<td><strong>14.4</strong></td>
<td><strong>6.7</strong></td>
<td><strong>5.9</strong></td>
<td><strong>26.9</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment (number)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>-</td>
<td>4</td>
<td>8</td>
<td>13</td>
<td>4.7</td>
<td>4.7%</td>
</tr>
<tr>
<td>Mining</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.5</td>
<td>0.5%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1</td>
<td>8</td>
<td>5</td>
<td>15</td>
<td>5.5</td>
<td>5.5%</td>
</tr>
<tr>
<td>Electricity &amp; water</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.1</td>
<td>0.1%</td>
</tr>
<tr>
<td>Construction</td>
<td>0</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>3.4</td>
<td>3.4%</td>
</tr>
</tbody>
</table>
By 2022 the value of spending by students is expected to result in GDP of R26.9 million, while 270 jobs will be created throughout the economy.

4.6.2.3 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 are illustrated in Table 5.

Table 5: Scenario 3: Economic impact of first year student spending, 2022

<table>
<thead>
<tr>
<th>Gross domestic product (R/millions)</th>
<th>Initial injection</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact</th>
<th>Percentage (Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.1%</td>
</tr>
<tr>
<td>Mining</td>
<td>0.0</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>0.6</td>
<td>0.8%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.1</td>
<td>0.6</td>
<td>0.4</td>
<td>1.1</td>
<td></td>
<td>4.7%</td>
</tr>
<tr>
<td>Electricity &amp; water</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
<td>0.1</td>
<td></td>
<td>0.6%</td>
</tr>
<tr>
<td>Construction</td>
<td>0.0</td>
<td>0.3</td>
<td>0.1</td>
<td>0.3</td>
<td></td>
<td>1.4%</td>
</tr>
<tr>
<td>Trade &amp; accommodation</td>
<td>16.3</td>
<td>6.0</td>
<td>0.5</td>
<td>2.0</td>
<td>8.6</td>
<td>35.5%</td>
</tr>
<tr>
<td>Transport &amp; communication</td>
<td>3.8</td>
<td>1.1</td>
<td>1.2</td>
<td>0.6</td>
<td>2.9</td>
<td>11.8%</td>
</tr>
<tr>
<td>Financial &amp; business services</td>
<td>16.5</td>
<td>5.2</td>
<td>2.6</td>
<td>1.5</td>
<td>9.3</td>
<td>38.3%</td>
</tr>
<tr>
<td>Community services</td>
<td>3.2</td>
<td>0.5</td>
<td>0.4</td>
<td>0.5</td>
<td>1.4</td>
<td>5.9%</td>
</tr>
<tr>
<td>Total</td>
<td>39.8</td>
<td>13.0</td>
<td>6.0</td>
<td>5.3</td>
<td>24.2</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment (number)</th>
<th>Initial injection</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact</th>
<th>Percentage (Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td></td>
<td>4</td>
<td>8</td>
<td>11</td>
<td></td>
<td>4.7%</td>
</tr>
<tr>
<td>Mining</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
<td>0.5%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>13</td>
<td></td>
<td>5.5%</td>
</tr>
<tr>
<td>Electricity &amp; water</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0.1%</td>
</tr>
<tr>
<td>Construction</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>8</td>
<td></td>
<td>3.4%</td>
</tr>
<tr>
<td>Trade &amp; accommodation</td>
<td>91</td>
<td>9</td>
<td>30</td>
<td>129</td>
<td></td>
<td>53.3%</td>
</tr>
<tr>
<td>Transport &amp; communication</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>9</td>
<td></td>
<td>3.8%</td>
</tr>
<tr>
<td>Financial &amp; business services</td>
<td>34</td>
<td>13</td>
<td>9</td>
<td>56</td>
<td></td>
<td>23.1%</td>
</tr>
<tr>
<td>Community services</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>14</td>
<td></td>
<td>5.6%</td>
</tr>
<tr>
<td>Total</td>
<td>135</td>
<td>48</td>
<td>59</td>
<td>242</td>
<td></td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations based on NW SAM, 2006
By 2022, the value of GDP from student spending is estimated to be R24.2 million and 242 additional jobs will have been created.

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 greatest economic benefit to the local and provincial economy. The NWU attracts a large number of students who reside outside 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.

4.7 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 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 in order to quantify the direct, indirect and induced impacts. The Potchefstroom Campus of the North-West University 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 large 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 important 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 important driver of the Northern Cape and Mpumalanga Provinces. As time goes by and 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/regional governments.
References


National Treasury, see South Africa.


CHAPTER 5: UNIVERSITY POPULATION EXPENDITURE AND ITS IMPACT ON REAL ESTATE DEMAND: EVIDENCE FROM SOUTH AFRICA (ARTICLE 3)

5.1 Title page and abstract

Title:
University population expenditure and its impact on real estate demand: Evidence from South Africa

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Dates:
Submission: May 2018

Journal:
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SOUTH AFRICA
Abstract
A university campus is an economic anchor for a city, with an ability to attract consumers from outside the region who spend locally to the benefit of the local economy. The real estate sector is an obvious beneficiary of this process. The staff and students affiliated to a university campus are – because of their spending patterns – major drivers behind real estate developments. This article identifies the real estate sub-markets that benefit from staff and student spending, quantifies the total spending value and estimates the real estate space demand benefit to the host city. The Potchefstroom Campus of the North-West University in South Africa was used as an example to illustrate these demand forces and dynamics, and space demand modelling was applied to estimate the impact of expenditure on the city. In 2016, the combined expenditure by staff and students on a variety of goods and services (from accommodation to entertainment) was R2.2 billion – not an insignificant amount – which spilled over into a healthy demand for floor space in the city. A key conclusion that can be drawn is that a strong and steady increase in full-time students on the campus and a corresponding increase in staff numbers has had and will continue to have a very positive impact on the economy of Potchefstroom, with the real estate market benefiting in particular. However, the risk in this close relationship between university enrolments and activity in the real estate market is that if one is under pressure, the other will be similarly constrained.

Keywords: University, Real estate, Space demand modelling, Office property, Retail property, Residential property, South Africa

5.2 Introduction
A university campus often comprises vast tracts of real estate, incorporating residential, office and retail space, lecture and conference facilities, recreational areas and cultural facilities. A university is therefore an economic anchor that acts as an employer, a buyer of goods and services, and a real estate developer (Hahn, Coonerty and Peaslee 2003). It offers benefits that extend well beyond its day-to-day operations. Staff and students as well as visitors to sporting and cultural events, workshops and conferences also support the surrounding local economy through the purchases that they make.

The aim of this study was to illustrate the economic impact of staff and student spending on the demand for real estate in a city that has a university campus. More specifically, the study focused on the personal expenditure in the local economy by staff and students affiliated to the university campus. Both these groups are well vested in the local economy – staff members tend to stay in close proximity to their workplace while students, who attend the university as full-time contact students, reside in the city for the duration of their studies. The staff and students represent sub-
markets within the broader market and their spending on goods and services spills over into demand for square metre (m²) floor space which can be measured through space demand modelling.

Consumer spending is a major contributor to a country’s economy. In South Africa, for example, consumer spending accounted for 60% of gross domestic product (GDP) in 2015 (World Bank 2017), which demonstrates what an important economic driver it is at the national, provincial and local level. A university campus, in particular, attracts a critical mass of consumers to a particular area and encourages high levels of spending. This benefits both the real estate market and economic growth as a whole.

Dyason and Kleynhans (2017) illustrate how economic linkages are formed as a result of the expenditure that takes place from a university campus. Expenditure on goods and services, in turn, has an impact on the real estate market. When goods and services are purchased by economic entities such as general consumers, government officials and foreigners, demand is stimulated for geographical locations where commercial transactions take place. This usually takes the form of real estate, which represents certain types of land use. For these activities to take place, physical infrastructure is often required, which then translates into areas of specific land use. It is for this reason that there is a causal relationship between sector spending and real estate, as illustrated in Figure 1. Figure 1 illustrates the principle that expenditure related to a specific sector contributes to the demand for real estate space within a delineated market area. Quantifying this demand is done through space demand modelling.

![Causal Relationship between Sector Spending & Real Estate](image)

**Fig. 1** Causal relationship between sector spending and real estate

*Source: Author, 2018*
The Potchefstroom Campus of the North-West University in South Africa was used as an example for the purpose of the analysis. Staff expenditure amounted to R500 million and student expenditure to R1.76 billion in 2016. This value was derived from surveys conducted during that year. The combined expenditure by these two groups was valued at R2.2 billion, representing a significant financial injection into the economy. Through the use of surveys, the spending patterns and preferences were identified and used to measure the demand for real estate space in the city.

The rest of this article is structured as follows: Section 5.3 gives a literature overview of how real estate demand is quantified; Section 5.4 describes the study area and why measuring the real estate component is so important; Section 5.5 explains the method used to quantify the real estate demand and the empirical results, which together permitted a quantitative analysis of real estate demand in Potchefstroom; and Section 5.6 brings the article to a close with a final conclusion.

5.3 Literature review

5.3.1 Input–output analysis and real estate integration

The input–output modelling and Keynesian multiplier approaches are widely used to quantify the direct and indirect economic impact of a university (Drucker and Goldstein 2007:24). To improve the results, these models can be refined by incorporating surveys into the analysis (Carroll and Smith 2006; Steinacker 2005; Parsons and Griffiths 2003). The impact findings are typically presented as the value of additional economic activity and employment that are attributed to every one Rand invested by or spent at a university. In some instances, the authors reported on the individual sectors that benefitted. Steinacker (2005) used the results from the surveys and estimated the total impact of the university from patterns of expenditure by students and staff on food, accommodation and other services. Using various methods, including the input–output method, Garrido-Ysere and Gallo-Rivera (2010) revealed the impact on various economic sectors’ production and employment and also that the services sectors benefit the most.

The real estate benefits associated with universities, as highlighted in the literature, include the residential market (Hahn et al. 2003; Cortes 2004; Hoover 2008), the retail market (Caffrey and Isaacs 1971; Hendrick, Henson and Mack, 1990; Garrido-Ysere and Gallo-Rivera, 2010:53) and the finance, business and personal services market (Hendrick et al. 1990). However, these studies tend to consider only one aspect of this relationship, such as the impact on the retail or residential market. One such example was reported in Kleinsmith and Horn (2015) and epitomised how real estate tends to be integrated with the economic impact of a university. The latter study showed that there are links with the real estate market, but these were mainly referred to in a qualitative manner and only one segment of the real estate market was considered. This article
aims to bridge this gap by showing how the economic benefit for a host city can be quantified using a single, all-inclusive approach.

5.3.2 Real estate demand

Dipasquale and Wheaton (1992:186) state that the real estate market arises out of demand from the occupiers of space, namely firms (tenants) and households. Because of the relationship that exists between sectors and the real estate market, changes in the real economic value of sectors are bound to influence property and the real estate market.

Determining the desired stock in the real estate market and forecasting its growth potential depend fundamentally on what is considered to be the driving force behind real estate development. Two groups of studies flowed from this question. One group focused on understanding the demand for and supply of real estate space or leasable space (Rosen 1984; Hekman 1985; Wheaton 1987) while the second group studied the role of capital or assets in the supply of and demand for real estate (Viezer 1999; Fisher 1992; DiPasquale and Wheaton 1992). In the latter case, the change in the market for real estate was conceptualised as the value of rent or the price at which the asset is sold or exchanged between investors (DiPasquale and Wheaton, 1992). Two models in particular are used to explain this dynamic within the property market. The Fischer–DiPasquale/Wheaton (FDW) real estate model, developed by DiPasquale and Wheaton (1992), uses a four-quadrant diagram that illustrates how current stock levels in the market determine the rent value and how this is translated into the prices of the assets. This, in turn, triggers new construction, which changes the stock within the market. The FDW model explains equilibrium as a state in which all variables are determined simultaneously (Viezer 1999:505) and as a result provides limited forecasts for an investor. Viezer (1999) later introduced the Real Estate Econometric Forecast Model (REEMF) which uses statistics to explain this relationship and is regarded as an investment tool as it has the ability to forecast returns. Although the capital market is an important factor in the development of real estate, it is not the primary focus of this article.

The first group of studies by Rosen (1984), Hekman (1985), Wheaton (1987) and others have shown that the need for real estate space is driven by demand and supply which, at its core, is driven by changes in the economy. In other words, changes in the economy drive the demand for real estate development. An economy is characterised by cyclical behaviour, with periods of growth and periods of contraction. As economic growth changes, it directly affects demand and supply in the market. This influences the real estate market (Mueller 2002:115) in the same way that changes in the broad economy affect the demand for and supply of any good or service.
The role of government in stimulating real estate development is also of importance. Hong Y (2016) explains that the particular focus of government policies and strategies influences the drivers of growth. Hong Y (2016:185) states that the most prominent forms of growth for countries are export-oriented growth, investment-driven growth and consumer-driven growth. In South Africa, growth is largely driven by consumer spending. This demand-driven growth transforms the physical landscape through an increase in supply where new developments are implemented in, for example, the retail and industrial sectors as consumers demand more goods and services. For a consumer-driven economy to deliver a strong performance, consumers need to have access to businesses that can easily supply goods and services. Accessibility is made possible through real estate developments in cities and towns, which have a direct impact on the spatial environment of surrounding regions.

The literature, however, gives this topic very light treatment. This article aims to develop the topic further by quantifying such demand for real estate space.

5.3.3 Estimating the demand for real estate space

Real estate estimates and forecasting are fundamental components of the property sector as investment decisions are based on what can possibly be done to increase profits. Jadevicius and Huston (2015) provide an overview of how forecasting techniques have become more complex over time as property researchers have sought to improve investment decision-making. In their study they compared various statistical models, some complex and some simple, to determine which are better for forecasting. The findings showed that simple models are just as good as, and sometimes even better than, the more complex models (Jadevicius and Huston 2015:354). They concluded that property market forecasting should be user-friendly and easy to understand, and should have a strong element of human judgement.

The approach in this particular study was to estimate the demand for real estate for a given year. There is a difference between the terms estimating and forecasting. Fanning (2005:131) explains that although these two terms are often used simultaneously, they have different meanings. Forecasting is an attempt to measure change over time into the future, while estimating refers to a current value or the stock of particular land in use. Economic forecasting on a sectoral level provides concrete insights into economic growth and development prospects in a specific geographical area (Carnot, Koen and Tissot 2005).

The survey results indicated that three property markets in particular benefit the most from staff and student spending in Potchefstroom, South Africa. These are the retail, office and residential markets, and they are discussed below.
5.3.3.1 Retail market

Retail space demand models aim to quantify the demand for retail activity in terms of physical size (in square metres) of a particular market area. Retail space demand is a function of household disposable income, population size and the proportion of income spent on retail goods (Fanning 2005:134; Pirounakis 2013:183). Fanning (2005:133) provides two approaches or models that are often used in calculating retail space demand. The first model forecasts retail space demand for a given period:

New retail space demand per year in sq. ft. = \( \frac{(cH \times AH\times CR)}{SR \text{ per sq. ft.}} \)  

\[ \text{eq. 1} \]

Where:
- \( cH \) = change in the number of households in the market area per annum
- \( AH\) = average household income per annum
- \( CR\) = capture rate of household income per retail facility
- \( SR \text{ per sq. ft.} \) = number of sales needed for a retailer to develop one square foot of retail space

This model estimates new retail space as the household number changes within a market area.

A second estimation technique is simply to calculate the ratio of retail space to the population in a particular geographical area (Fanning 2005:133). Equation 2 shows this ratio as the total retail space in the city in square feet (\( Rc \)) divided by the total population (\( Pc \)), which gives a ratio of square feet retail space per person (\( rc \)).

\[ \frac{Rc}{Pc} = rc \]  

\[ \text{eq. 2} \]

Estimating future retail demand is based on population growth in the region. An increase in the number of people will result in an increase in demand for retail space over time. This method assumes that the ratio of retail space per person depends on the year in which this ratio is calculated. For this reason it does not indicate if there is an over- or undersupply of retail space in the market. This could alter the potential demand for retail space significantly. It was beyond the scope of this study to measure over- or undersupply of retail space in Potchefstroom, but it is still important to note this shortcoming in the forecasting technique of Fanning (2005).
5.3.3.2 Office market

The office market, as with any real estate market, can be analysed from the perspective of supply or demand. In order to determine the equilibrium in the market for a specific time, studies consider both demand and supply-side factors.

Supply tends to be driven by investors in the capital market who are intent on ultimately maximising profits through sales and rentals. These models tend to include factors such as the existing vacancy level, current rents, construction costs, interest rates and office-related employment (Rosen 1984; Hekman 1985; Wheaton 1987). The supply of office space is driven not only by a gap in the market or excess demand. There is also an element of profitability — investors attempt to maximise profits (Rosen 1984:263).

Office demand is driven by the users of the office market for personal and professional services such as medical, business, insurance and financing. McDonald (2002) and Rabianski and Gibler (2007) describe how office space demand forecasting models have adapted and expanded in order to quantify the additional demand created by the users of office space.

Rabianski and Gibler (2007) explain how Jennings (1965) was the first author to estimate office space demand using a population ratio model. The ratio of existing office stock to population is used to forecast future office demand by multiplying the ratio by future population estimates. Various subsequent improvements have led to a variety of models that can be applied today in estimating office space demand. Rabianski and Gibler (2007:54) explain that the forecasting models are being constantly refined in an effort to improve accuracy in market analysis. However, they also state that empirical tests are required to determine if these improvements lead to improved estimated results (Rabianski and Gibler 2007:54). In the absence of these tests, there may be no significant improvement in the results. This could point to the fact that simple, non-technical models are just as good (Jadevicius and Huston 2015:354).

A generalised model for office space demand is provided by Fanning (2005:135) as follows:

$$\text{Total office space demand (sq. ft.)} = cOE \times \frac{SF_{os}}{E} \times CRm$$

Where:

- $cOE = \text{change in the number of office workers}$
- $\frac{SF_{os}}{E} = \text{square foot per office worker}$
- $CRm = \text{capture rate in the market}$
Wheaton, Torto and Evans (1997) include variables in this model, such as rent \((R_t - 1)\) and coefficients \((\alpha 2)\), which show how the use of space varies when rent changes. Their model includes a variable \((\varphi 2)\) of price elasticity of demand to show how demand for space changes as rent changes – which is similar to the approach used by Wheaton et al. (1997). Fuerst (2006) also includes a coefficient \((\varphi 1)\) to show how the effect of dynamic growth in office employment translates into additional space consumption.

### 5.3.3.3 Residential market

Households are the main drivers behind the demand for housing in a market. The residential market can be divided into sub-sectors that are predominantly influenced by the socio-economic characteristics of households. Myers (2011:39) refers to these sub-sectors as: (1) owner-occupied, (2) rental, and (3) social housing.

Each of these residential sub-sectors can be disaggregated even further in terms of size and functionally, but this is beyond the scope of this article. What should be considered, though, is that estimating or forecasting would require an understanding of the demand drivers of each of them. There are general themes applicable to all of the sub-sectors and for this reason a generalised demand model is provided (Myers 2011:41).

\[
\text{Quantity houses demanded} = f(N, P_n, P_n - 1, Y, G, Z) \tag{4}
\]

Where:

- \(N\) = Population
- \(P_n\) = Property price or rental amount
- \(P_n - 1\) = Price of other forms of tenure
- \(Y\) = Income
- \(G\) = Government policy
- \(Z\) = Other things

This is a very basic residential demand model, but it includes factors that can be analysed in more detail in order to quantify the demand for housing in a particular market area. The household, as the user of residential property, considers a number of factors when making a decision about a particular residential property. These factors, which relate to economic, financial and personal circumstances, could complicate the residential space demand modelling to a significant degree. For this reason, and to keep the space demand analysis as focused as possible, the residential model will incorporate the findings from the staff and student surveys conducted on the North-West University’s Potchefstroom Campus.
The retail, office and residential models applied in this study use the generalised models as the basic model. These are taken further by incorporating the findings from the survey for the particular land use to develop and improve existing space demand models.

5.4 Study area: Potchefstroom

The overwhelming majority of economic impact studies confirm that a university affords economic benefits to the local economy. One of the reasons for this positive impact, as mentioned by Smith and Bissonnette (1989), is that students who attend the university and come from areas outside the state/province where the university is situated make a significant, positive impact on the local economy through their expenditure patterns.

The analysis of the local economy illustrates that the Potchefstroom Campus of the North-West University is one of the larger local role players. The institution has a sizable workforce and frequent construction activity is evident in the vicinity of the campus. The question that arises from this observation is: what is the impact of the university on the economy and to what extent is the university’s drive to increase the number of contact students responsible for this development?

Universities have an influence on the built environment in the surrounding area; therefore, developing an understanding of the full extent of the local impact of the university should go hand in hand with the formulation of plans to ensure that local communities are able to take full advantage of these benefits (Armstrong, Darrall and Grove-White 1997).

5.4.1 Expanding university population

The high numbers of students who attend the university, especially those who originate outside the local economy, positively impact the economy because of their spending. The Potchefstroom Campus has experienced a significant increase in the number of registered students, with the total student complement in 2016 being 21 689 students – an increase from 14 652 in 2004. Since 2004 the number of contact students has clearly risen sharply, reflected in an average annual increase of approximately 586 students. Figure 2 illustrates the number of contact students enrolled on the campus from 2004 to 2016.
The ongoing increase in contact students enrolled on the Potchefstroom Campus has influenced the local economy, which is evident in the continued construction of new residential units in close proximity to the campus. Figure 3 illustrates the change in densification of residential buildings in the area surrounding the campus from 2006 to 2016.

The densification of residential land use, illustrated by the yellow polygons on the map, is evident in the suburbs close to the university. According to building data provided by the local municipality, the majority of residential developments in the city are for flats and townhouses. Figure 4
illustrates the significant investment that was made in the residential and non-residential real estate market in the local economy from 1999 to 2015.

**Fig. 4** Buildings completed in Potchefstroom, 1999–2015

*Source: Stats SA, 2017*

Since 2002, there has been a significant increase in the building of flats and townhouses, reaching a peak in 2008 but still growing each year thereafter. Comparing the growth in student numbers with the growth in new residential buildings shows that much of the demand for housing in the local economy is most likely driven by students’ demand for accommodation. Figure 5 compares the growth in student numbers with the completion of new residential projects in Potchefstroom.

**Fig. 5** Comparison of growth in student numbers and new residential units per annum, 2005–2015

*Source: Stats SA, North-West University and author’s calculations, 2017*
Figure 5 indicates that in most years the additional number of students was higher than the number of new residential developments. This is to be expected as vacancy levels, lags in the construction sector and varying sizes of new flats and townhouses are not considered for the purposes of this comparison. It is, however, evident that the continued growth in student numbers on the campus is a contributing factor to the ongoing increase in investment in residential units in the local economy.

Property investors tend to target the residential market in university towns in anticipation of growth in student numbers and an increase in demand for residential land use in close proximity to the institution. Often these developments do not take into account national economic conditions but rather take place continuously to absorb the supposed or anticipated residential demand in the market. This seemingly unregulated development of residential land use either pays off economically and the units are sold to meet demand, or it creates an over-supply of residential property in the market. These building developments are often custom-built to cater for the student market. This is a very specific market and while market prices may be favourably affected, the target market remains limited.

Rising student numbers also contribute to a growing staff component at the university. Figure 6 shows the number of permanent and fixed-term staff on the campus from 2006 to 2016 and the steady increase in their numbers.

![Fig. 6 Staff employed on the Potchefstroom Campus](image)

*Source: North-West University People & Culture, 2017*

There have also been new developments in retail, office and industrial land use. Table 1 shows the size, in square metres, of other (non-residential) real estate developments in Potchefstroom.
from 1999 to 2015. The retail space development is by far the largest in the area, followed by
industrial and then office space.

Table 1 Non-residential property completions, Potchefstroom, 1999–2015

<table>
<thead>
<tr>
<th></th>
<th>Office and banking space (m²)</th>
<th>Shopping space (m²)</th>
<th>Industrial and warehouse space (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>28 625</td>
<td>166 293</td>
<td>32 250</td>
</tr>
</tbody>
</table>

Source: StatsSA, 2017

The next section assesses the methodology used in quantifying the real estate space demand.

5.5 Research approach and key results

The real estate market is a collective term for various property types, including retail, residential,
office/business and industrial. Estimating the market size involves a unique process for each of
these property types. Determining the causal relationship between sector spending and real
estate is fundamental to being able to identify and analyse the demand-side drivers behind real
estate development (Demacon 2007).

Primary data collection through surveys provides a detailed understanding of the preferences of
students and staff associated with the Potchefstroom Campus of the NWU. It makes possible
improved input data for estimating and forecasting space demand modelling for a specific sub-
market. The students and staff represent a sub-market within the local economy which shows
unique characteristics and demand trends. Utilising the survey data enables space demand
estimates to be sub-market-specific and improves on the generalised models outlined in the
literature review.

An online survey was made available to permanent staff and full-time, contact students during
September 2016. A total of 291 completed staff survey forms and 497 student survey forms were
collected. Table 2 presents a summary of the survey results.
Table 2 Summary of survey results

<table>
<thead>
<tr>
<th></th>
<th>Staff results</th>
<th>Student results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment type (staff)</td>
<td>• 61% support staff</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 39% academic staff</td>
<td></td>
</tr>
<tr>
<td>Total monthly spending</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighted average</td>
<td>R18 957</td>
<td>R6 773</td>
</tr>
<tr>
<td>Academic staff</td>
<td>R24 085</td>
<td></td>
</tr>
<tr>
<td>Support staff</td>
<td>R15 702</td>
<td></td>
</tr>
<tr>
<td>Residential type</td>
<td>• Home on stand (68%)</td>
<td>• Flat in block of flats (45%)</td>
</tr>
<tr>
<td></td>
<td>• Townhouse (12%)</td>
<td>• Hostel on campus (28%)</td>
</tr>
<tr>
<td></td>
<td>• Flat in block of flats (10%)</td>
<td>• Room in house (9%)</td>
</tr>
<tr>
<td>Residential tenure</td>
<td>• Owned but not yet paid off</td>
<td>• Renting (69%)</td>
</tr>
<tr>
<td></td>
<td>(43%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Renting (33%)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>• 29% male</td>
<td>• 41% male</td>
</tr>
<tr>
<td></td>
<td>• 71% female</td>
<td>• 59% female</td>
</tr>
</tbody>
</table>

Source: Author’s calculations and survey results, 2016

The employment-type results for academic and administrative staff were in line with the staff distribution on the campus where support staff make up 60% and academic staff make up 40% of the full staff complement. More female staff members provided feedback than their male counterparts, at 71% and 29%, respectively. This is somewhat different from the gender distribution on the campus where women represent 58% and men represent 42% of the workforce. To minimise this difference, a weighted approach in calculating average monthly spending was used. The weighted monthly average spending amounted to R18 957.

The student survey results showed that the weighted average monthly spending amounted to R6 773. The 2016 profile of the Potchefstroom Campus did not show the racial profile of contact students; it only reported the racial profile of the entire university, including distance learners. For this reason, a comparison could not be made between survey responses and the racial profile of the campus. The results from the survey were therefore regarded as the best available information for the analysis and a weighted average approach was applied to mitigate possible discrepancies.

The survey respondents were able to indicate their expenditure in detail, as shown in Figure 7. Figure 7 illustrates the percentage of expenditure allocated to different categories of goods and services. These values were then disaggregated and linked with sectors and the associated land use, thus ensuring that the space demand analysis was associated with actual expenditure values from staff and students in the city of Potchefstroom. The expenditure data obtained from the
survey indicated that the major land uses that benefited from expenditure were retail, office and residential.

For staff members the largest expense was accommodation (20.5%) followed by food (16.1%) and transport (15.9%). For students, a similar picture emerged, i.e. accommodation (30.7%), food (20.6%) and transport (15.5%). The survey results illustrate individual and not household expenditure values. The main reason for this approach was to quantify the expenditure by each individual associated with the campus. This made it possible to quantify the value of each sub-market. The assumption was therefore that each of the 2 197 employment opportunities represented a job opportunity to which spending was attached, irrespective of a household’s ability to spend more.

Fig. 7 Values of individual monthly expenditure by staff and students
Source: Author’s calculations and survey results, 2016
The value of these two sub-markets’ total spending on goods and services amounted to R2.2 billion in 2016, as illustrated in Figure 7. Spending on goods and services can be divided into spending in specific sectors, which in turn influences the real estate market. The significance of consumer expenditure on the following real estate markets was provided: (1) retail market, (2) office market, and (3) residential market.

The space demand models discussed below are unique in that they consider staff and student spending (sub-markets within the economy) in estimating the demand. In other words, the models quantify the contribution of these sub-markets in the market. This is significantly different from the generalised models that simply quantify the space demand across the entire market.

5.5.1 Retail market

Retail space is a derived demand for trading activity (Pirounakis 2013:183). This means that increasing consumer spending on retail goods and services will result in expanded retail floor space to absorb the additional demand. An important concept in retail demand estimation is the trade area which, in this case, is represented by the host city, Potchefstroom, and includes only the expenditure that takes place locally.

Retail space in South Africa is categorised into various merchandise sub-categories which enables space demand analysis to be performed for each individual sub-category. Instead of modelling the retail space demand for the retail sector, each sub-category is modelled separately to indicate the tenant mix and demand for retail based on the retail spending patterns of staff and students. Trading density values for each sub-category are used to ensure that space measurement is correctly applied. Trading density refers to the income received per square metre in the retail sector during a specified period. Trading density figures for South Africa, which are released quarterly, illustrate the sales per square metre for various merchandise categories (MSCI 2016). These values represent formal retail centre trading densities and exclude individual shops and, in most cases, Central Business District (CBD) nodes.

Furthermore, the retail space demand modelling distinguishes between a stock model and a forecasting model. The stock model indicates the retail space demand for a specific year, while the forecasting model is used to forecast growth in retail space demand. The main difference between these two models is that the forecast model includes both changes in the population from the base year (n) to a future date (n+1) and an increase in disposable income (DI+cpi) which is expected to be in line with inflation. The change in population, ceteris paribus, will result in additional space demand for retail in the city.
5.5.1.1 Retail demand results

The model is an adjustment of the generalised model which was outlined in the literature review. The main difference is the inclusion of sub-market (staff and students) spending that takes place locally – in the city – and spending per merchandise sub-category. Equations 5 and 6 show the stock retail space demand model for a specific year (n).

\[ TRS_{i,j} = (DI \times P \times Rs \times Ls) \]  
\[ \text{Retail space demand}_n = \frac{TRS_{i,j \text{ for } x,y,z}}{Td} \]

Where:

- \( TRS_{i,j} \) = total retail spend in the city by staff (\( TRS_i \)) and students (\( TRS_j \))
- \( DI \) = weighted disposable personal income
- \( P \) = population size
- \( Rs \) = retail spend - amount of money spent on retail
- \( Ls \) = retail spending in the city
- \( TRS_{i,j \text{ for } x,y,z} \) = retail spending on each merchandise sub-category
- \( Td \) = income per square metre of retail

Both sub-markets have similar demand equations. Simply combining the total space demand for both sub-markets illustrates the total retail space demand. The stock retail space demand model is illustrated in Table 3, with 2016 given as the base year. The table shows the results of the retail model and illustrates the total retail space demand. Financial services such as banks often form part of retail centres; this category is excluded from the retail analysis and will be modelled separately.

**Table 3** Results from the stock retail space demand model for Potchefstroom, 2016

<table>
<thead>
<tr>
<th></th>
<th>Staff</th>
<th>Students</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population size</td>
<td>2 197</td>
<td>21 689</td>
<td>23 886</td>
</tr>
<tr>
<td>Individual weighted disposable income</td>
<td>R227 492</td>
<td>R81 279</td>
<td>R308 771</td>
</tr>
<tr>
<td>Market size (annual)</td>
<td>R499 million</td>
<td>R1 762 million</td>
<td>R2 262 million</td>
</tr>
<tr>
<td>Retail spend as percentage of income</td>
<td>35.5%</td>
<td>43.7%</td>
<td></td>
</tr>
<tr>
<td>Total retail market size (annual)</td>
<td>R177 429 102</td>
<td>R771 043 678</td>
<td>R948 472 780</td>
</tr>
<tr>
<td>Retail spend in city (annual)</td>
<td>R155 664 977</td>
<td>R626 880 130</td>
<td>R782 545 107</td>
</tr>
</tbody>
</table>
### Retail spend per category (Rand)

<table>
<thead>
<tr>
<th>Category</th>
<th>Staff</th>
<th>Students</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing and footwear</td>
<td>R11 827 302</td>
<td>R47 866 763</td>
<td>R59 752 893</td>
</tr>
<tr>
<td>Department store</td>
<td>R21 820 146</td>
<td>R86 688 769</td>
<td>R108 215 061</td>
</tr>
<tr>
<td>Food (bulk and top-up groceries)</td>
<td>R68 321 505</td>
<td>R275 211 325</td>
<td>R343 550 969</td>
</tr>
<tr>
<td>Restaurants and entertainment</td>
<td>R23 385 055</td>
<td>R94 843 107</td>
<td>R118 394 261</td>
</tr>
<tr>
<td>Personal care</td>
<td>R4 217 216</td>
<td>R16 282 061</td>
<td>R20 325 173</td>
</tr>
<tr>
<td>Other personal goods and services</td>
<td>R26 093 752</td>
<td>R105 988 105</td>
<td>R132 306 751</td>
</tr>
<tr>
<td><strong>Total retail spend</strong></td>
<td><strong>R155 664 977</strong></td>
<td><strong>R626 880 130</strong></td>
<td><strong>R782 545 107</strong></td>
</tr>
</tbody>
</table>

### Retail space demand (m²)

<table>
<thead>
<tr>
<th>Category</th>
<th>Staff</th>
<th>Students</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing and footwear</td>
<td>471</td>
<td>1 906</td>
<td>2 379</td>
</tr>
<tr>
<td>Department store</td>
<td>698</td>
<td>2 771</td>
<td>3 459</td>
</tr>
<tr>
<td>Food (bulk and top-up groceries)</td>
<td>1 557</td>
<td>6 274</td>
<td>7 832</td>
</tr>
<tr>
<td>Restaurants and entertainment</td>
<td>672</td>
<td>2 726</td>
<td>3 403</td>
</tr>
<tr>
<td>Personal care</td>
<td>135</td>
<td>520</td>
<td>650</td>
</tr>
<tr>
<td>Other personal goods and services</td>
<td>1 520</td>
<td>6 173</td>
<td>7 706</td>
</tr>
<tr>
<td><strong>Total retail space demand (m²)</strong></td>
<td><strong>5 053</strong></td>
<td><strong>20 370</strong></td>
<td><strong>25 429</strong></td>
</tr>
</tbody>
</table>

**Source:** Author's calculations, 2017

The formal retail space demand arising from student and staff expenditure amounted to 25 429 m² gross leasable area (GLA) in 2016. This would have had a direct impact on retail activity and illustrates the significant economic benefit of having a university campus located within a city. The space demand was highest for food (bulk and top-up groceries). This was followed by department stores (Game/Walmart stores), and restaurants and entertainment.

The total investment value associated with this retail space amounted to R152 million (2016 values) and an estimated employment figure of 848 people\(^1\). Figure 8 shows the total formal retail GLA in Potchefstroom, as sourced from the South African Council of Shopping Centres (SACSC) (2015), and compares the retail space demand generated by the university's presence with the total amount of retail space in the city.

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\(^1\) A benchmark of 30 square metres per worker was used.
Fig. 8 Total formal retail supply in Potchefstroom

*Note:* The formal retail supply includes financial services. Financial services are often part of retail centres but are modelled separately under office space demand.

*Source:* SACSC (2015) and author’s calculations, 2017

In 2016, the expenditure by staff and students affiliated to the Potchefstroom Campus accounted for approximately 26% of formal retail space in the local economy. The impact of their retail expenditure in the economy is significant and constitutes a large financial injection for the retail sector, the real estate market and the economy as a whole.

5.5.2 Office market

Expenditure by students and staff contributes to office and related business activities, including those relating to medical and health services, financial and banking services, insurance and personal services. Instead of using an office demand forecast model in which demand is a function of employment in financial services, insurance and real estate activities, as well as the price (i.e. rent) of office space in the region (Rosen 1984:262), the demand estimate considers the demand driven by consumer spending.

5.5.2.1 Office demand results

The survey revealed the monthly expenditure on medical services, personal services and financial activities related to the office market. Table 4 shows the weighted monthly expenditure on these services.
Table 4 Weighted average expenditure on medical and personal services, and financial activities, 2016

<table>
<thead>
<tr>
<th></th>
<th>Staff</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical services</td>
<td>R1 041</td>
<td>R151</td>
</tr>
<tr>
<td>Personal services</td>
<td>R1 081</td>
<td>R298</td>
</tr>
<tr>
<td>Financial services and insurance</td>
<td>R1 747</td>
<td>R338</td>
</tr>
<tr>
<td>Total</td>
<td>R3 869</td>
<td>R787</td>
</tr>
</tbody>
</table>

Value of total monthly expenses

<table>
<thead>
<tr>
<th></th>
<th>Staff: 20%</th>
<th>Students: 12%</th>
</tr>
</thead>
</table>

Source: Author’s calculations and survey results, 2016

The expenses shown in Table 4 represent a 20% and 12% share of total monthly expenses for staff and students, respectively. The expenses create demand within the city for the services in question and consequently also demand for office-related land use. The stock model below illustrates office space demand in the city as a result of staff and student expenditure. The office forecast model includes changes to the population from the base year (n) to a future date (n+1) as well as an increase in disposable income (DI+cpi) which is expected to be in line with inflation. Equation 9 shows the value of total spending on office-related services in the city by a particular sub-market. Equation 10 estimates the office space demand.

\[
TOS_{i,j} = (P \times DI \times Os)
\]

eq. 9

Where:
- \(TOS_{i,j}\) = total spending on office-related services by staff \(TOS_i\) and students \(TOS_j\)
- \(P\) = population size
- \(DI\) = weighted disposable personal income
- \(Os\) = office-related spend

Office space demand = \(\frac{TOS_{i,j}}{ELr} \times Sqm.w\)

eq. 10

Where:
- \(\frac{TOS_{i,j}}{ELr}\) = office-related employment
- \(ELr\) = consumption-to-labour ratio within the office sector
- \(Sqm.w\) = square metre per office worker

Rabianski and Gibler (2007:53) and Mesthrige (2014) state that the office space per worker ratios vary according to industry sector, occupation, location and market conditions, and these should be considered when estimating office space demand. Miller (2014:173) empirically analysed
these differences and found that although there were differences, the average office space per worker came to 20 square metres per worker – which was used in the model. The results of the stock model for office space demand for Potchefstroom during 2016 are presented in Table 5.

Table 5 Results from the stock office space demand model, 2016

<table>
<thead>
<tr>
<th>Annual, 2016 values</th>
<th>Staff</th>
<th>Students</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population size</td>
<td>2 197</td>
<td>21 689</td>
<td>23 886</td>
</tr>
<tr>
<td>Weighted disposable income</td>
<td>R227 492</td>
<td>R81 279</td>
<td>R308 771</td>
</tr>
<tr>
<td>Market size</td>
<td>R499 million</td>
<td>R1 762 million</td>
<td>R2 262 million</td>
</tr>
<tr>
<td>Office-related spending as a percentage of income</td>
<td>20.41%</td>
<td>11.61%</td>
<td></td>
</tr>
<tr>
<td>Total spending on office-related services</td>
<td>R102 million</td>
<td>R204 million</td>
<td>R306 million</td>
</tr>
<tr>
<td>Final consumption expenditure on office and related activity to office employment ratio</td>
<td>R239 080 per office worker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total office employment</td>
<td>427</td>
<td>856</td>
<td>1 283</td>
</tr>
<tr>
<td><strong>Total office space demand (m²)</strong></td>
<td><strong>8 535</strong></td>
<td><strong>17 125</strong></td>
<td><strong>25 660</strong></td>
</tr>
</tbody>
</table>

*Source: Author’s calculations, 2017*

The results illustrate that the value of expenditure on office-related services in 2016 in Potchefstroom amounted to an office space demand of 25 660 m². A simplified office model indicated that the total office space demand in Potchefstroom in 2016 was 154 080 m² based on the size of employment in the sector for the given year. The implication is that the demand created by staff and student spending on office-related activity in 2016 contributed approximately 17% of office space in the city that year (see Figure 9).

**Fig. 9** Total office space generated by staff and student expenditure compared with total estimated office space in Potchefstroom

*Source: Author’s calculations, 2017*
5.5.3 Residential market

The demand for residential space is primarily driven by consumers’ need for a place to stay. The residential market comprises a number of sub-markets (Myers 2011:39), which are largely determined by the affordability level of the consumer. The sub-sectors considered in this study were the owner-occupied market where consumers own their own property (including consumers with mortgages) and the rental market where consumers rent the property in question (which is the main form of tenure for students). Figure 10 shows the tenure types among staff and students on the Potchefstroom Campus during 2016.

![Pie chart showing tenure types among staff and students, 2016](image)

**Fig. 10** Tenure types among staff and students, 2016

*Source: Author’s calculations and survey results, 2016*

The rental market accounted for a significant proportion of student demand for housing (69%) in 2016. For staff, the owner-occupied market constituted the largest segment (57.6%), followed by the rental market (32.8%) in second place. Demand for housing is calculated on the basis of, *inter alia*, population and household trends, employment, lifestyle choices and location preferences (Brett and Schmitz 2009:51). Consequently, these aspects are incorporated into a residential demand model. Estimating the space demand for housing in a given year is based on the number of people and the average size of a unit which would include all amenities (such as bathroom, bedroom and kitchen). The survey revealed that the residential demand from staff and students can be divided into two distinctly separate sub-markets.

Students prefer to rent and pay lower accommodation costs, with the result that they are more prone to sharing living space with others. Communes and large flats rented out are often shared by students. To confirm this, the current market prices for accommodation were compared with actual student expenditure on accommodation. Table 6 shows the average monthly rental cost in Potchefstroom for various sizes of dwelling.
Table 6 Accommodation costs in Potchefstroom, (early) 2017

<table>
<thead>
<tr>
<th>House price/cost</th>
<th>House typology</th>
</tr>
</thead>
<tbody>
<tr>
<td>R3 097</td>
<td>Bachelor flat</td>
</tr>
<tr>
<td>R4 123</td>
<td>1 bed</td>
</tr>
<tr>
<td>R5 558</td>
<td>2 bed</td>
</tr>
<tr>
<td>R6 520</td>
<td>3 bed</td>
</tr>
</tbody>
</table>

Source: Property24 & Pukkiverblyf, 2017

Considering that the average expenditure by students on accommodation at the end of 2016 was R2 098 per month, there was a difference between market prices and the value of expenditure by students. A meaningful conclusion to be drawn from this comparison is that students shared rental costs and accommodation in order to save money.

5.5.3.1 Residential demand results

Two residential models were provided, one for each sub-market. The stock residential model for students considered the population size (P), the cost of accommodation (AC) and the average unit size (aUs). The stock residential space demand model for students (j) is illustrated in Equation 11.

\[ R_{\text{residential space demand}}(j) = f(P, AC, aUs) \]  

eq. 11

Where:

\( P \) = Population size  
\( AC \) = Accommodation cost  
\( aUs \) = Average unit size

Student income was not included as a variable, as most students study full-time and are not income earners. The cost of accommodation was largely covered by family, loans and bursaries (see Figure 11). For this reason, the current cost of accommodation rather than an income variable was used in determining the demand for residential units.
Fig. 11 Main provider of finance while studying

Source: Author’s calculations and survey results, 2016

The rent payable by a student is a dynamic variable that changes annually as new agreements are concluded between property owners and tenants. There is a relationship between the rent paid and the size of a unit, with larger units often being rented out at higher prices. Table 7 shows the results from the stock residential space demand model for students in 2016.

Table 7 Results from the stock residential space demand model for students, 2016

<table>
<thead>
<tr>
<th>Student market size</th>
<th>Market share</th>
<th>Average accommodation spend</th>
<th>Average unit size (m²)</th>
<th>Total space demand (m²)</th>
<th>Typology</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 226</td>
<td>14.9%</td>
<td>R1 266</td>
<td>18</td>
<td>58 076</td>
<td>Bachelor/room</td>
</tr>
<tr>
<td>14 161</td>
<td>65.3%</td>
<td>R2 518</td>
<td>25</td>
<td>349 969</td>
<td>Bachelor</td>
</tr>
<tr>
<td>2 987</td>
<td>13.8%</td>
<td>R4 208</td>
<td>43</td>
<td>129 125</td>
<td>1 bedroom</td>
</tr>
<tr>
<td>777</td>
<td>3.6%</td>
<td>R5 585</td>
<td>58</td>
<td>45 200</td>
<td>2 bedroom</td>
</tr>
<tr>
<td>538</td>
<td>2.5%</td>
<td>R7 133</td>
<td>68</td>
<td>36 432</td>
<td>3 bedroom</td>
</tr>
<tr>
<td>Total: 21 689</td>
<td>100.0%</td>
<td></td>
<td></td>
<td>618 803</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s calculations, 2018
The total space demand for student accommodation in the city amounted to 618,803 square metres in 2016.

The residential space demand function for staff incorporates income as a factor in the decision about accommodation type. The residential space demand model for staff members \( (j) \) for 2016 is provided in equation 12 which states that the demand from staff for residential space is a function of population size \( (P) \), household income \( (Y) \), building cost \( (Bc) \), interest rates \( (i) \) and financing \( (Cr) \). The Protection of Personal Information Act (4 of 2013) (POPI) hinders the identification of members of the same household that work at the university. The assumption is therefore that each of the 2,197 employment opportunities represents a job opportunity in which housing is demanded, irrespective of whether members of the same household are employed by the university.

\[
R_{\text{esidential space demand}} = f(P, Y, Bc, i, Cr)
\]

\text{eq. 12}

Where:

\[
\begin{align*}
P & = \text{Population size} \\
Y & = \text{Household income} \\
Bc & = \text{Building cost} \\
i & = \text{Interest rates} \\
Cr & = \text{Financing}
\end{align*}
\]

The space demand model estimated the total space demand for residential use based on 2016 income and affordability. The model illustrates the total sub-market demand in the city in 2016. This eliminates the complex issue of accommodation costs associated with each individual’s actual year of purchase as market prices and inflation are excluded from the model. The model only considers the total space requirements for residential use based on the income received per staff member. The value of the residential unit that can be obtained is dependent on the individual’s income or possible financing options. The model assumes that all individuals will be able to access finance and will pay off the bond within 20 years at current interest rates. This value represents the value of the residential property demanded by the household. Table 8 shows the results from the stock residential space demand model for staff in 2016.
### Table 8: Results from the stock residential space demand model for staff, 2016

<table>
<thead>
<tr>
<th>Average median annual income</th>
<th>Total employed</th>
<th>Distribution</th>
<th>Bond price / Property price</th>
<th>Average unit size (m²)</th>
<th>Total m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>R70 000</td>
<td>374</td>
<td>17.0%</td>
<td>R172 849</td>
<td>53</td>
<td>19 860</td>
</tr>
<tr>
<td>R150 001</td>
<td>621</td>
<td>28.3%</td>
<td>R370 392</td>
<td>80</td>
<td>49 370</td>
</tr>
<tr>
<td>R300 001</td>
<td>784</td>
<td>35.7%</td>
<td>R740 783</td>
<td>99</td>
<td>77 618</td>
</tr>
<tr>
<td>R500 001</td>
<td>297</td>
<td>13.5%</td>
<td>R1 234 638</td>
<td>165</td>
<td>49 006</td>
</tr>
<tr>
<td>R700 001</td>
<td>105</td>
<td>4.8%</td>
<td>R1 728 492</td>
<td>231</td>
<td>24 255</td>
</tr>
<tr>
<td>R900 001</td>
<td>8</td>
<td>0.4%</td>
<td>R2 222 347</td>
<td>297</td>
<td>2 376</td>
</tr>
<tr>
<td>R1 450 001</td>
<td>8</td>
<td>0.4%</td>
<td>R3 580 447</td>
<td>479</td>
<td>3 828</td>
</tr>
<tr>
<td>Total:</td>
<td>2 197</td>
<td>100.0%</td>
<td></td>
<td></td>
<td>226 313</td>
</tr>
</tbody>
</table>

Source: Author's calculations, 2016

Given the number of staff employed and the number of students attending the university, the total residential demand equated to 226 313 m² for staff in 2016. This value was only for the building structure and excluded the erven size and servitude for services that often form part of residential unit developments.

#### 5.5.4 Future growth

Forecasting the growth outlook for the real estate market and potential new development opportunities shows the economic value of real estate developments in the host city. The additional space demand for the city can be quantified by applying the average annual increase in student enrolments of 586 and average annual increase in staff of 76 over the next five years (2017–2021). The additional real estate demand for Potchefstroom is illustrated in Table 9.

### Table 9: Results from the forecast space demand model for Potchefstroom, 2017–2021

<table>
<thead>
<tr>
<th>Real estate type</th>
<th>Additional space</th>
<th>New employment</th>
<th>New investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>5 197 m²</td>
<td>173 jobs</td>
<td>R31 million</td>
</tr>
<tr>
<td>Office</td>
<td>12 845 m²</td>
<td>642 jobs</td>
<td>R90 million</td>
</tr>
<tr>
<td>Residential</td>
<td>123 048 m²</td>
<td></td>
<td>R736 million</td>
</tr>
</tbody>
</table>

Source: Author's calculations, 2017

This additional demand will benefit the local economy considering that the enrolment figure at the university between 2012 and 2019 is estimated to increase at a projected annual rate of 2.9% (NWU 2016:15).
5.6 Conclusion

The aim of this article was to quantify the demand for real estate associated with university staff and student spending in the host city of Potchefstroom in South Africa. While the benefit of having a university campus in a city has been evaluated in the literature, the benefit for the real estate market in particular has until now not been quantified.

Staff and students spend locally within the city where a university campus is situated and the local real estate market is a direct beneficiary of this spending. Each student spends approximately R6 773 and each staff member spends approximately R18 957 per month, of which the residential, retail and office markets derive the greatest benefit. Both these sub-markets make a substantial contribution to the Potchefstroom economy and as a result, the absence of a campus would drastically change the structure of the economy.

During 2016, the retail space demand amounted to 25 429 m² gross leasable area (GLA), with an estimated employment benefit of 848 direct jobs and an investment value of R152 million (2016 values). The benefit to the office market was similar that year, with an estimated space demand of 25 660 m² and a total employment benefit of 1 283 jobs and an investment value of R179 million (2016 values). The residential market gained the most, with a total area demand of 845 116 m².

Since the turn of the 21st century the Potchefstroom Campus has been experiencing a strong and steady increase in numbers of students and staff members. The projected continued increase will definitely benefit the economy, as the market size of student and staff spending is bound to create additional demand, resulting in a new supply of real estate. This will continue to have a positive economic impact on the city and as new opportunities are created in the retail, office and residential markets, additional investment and employment opportunities will be brought to the city.
References


CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The aim of this thesis was to quantify the economic impact of a South African university campus. To this end the Potchefstroom Campus of the North-West University (NWU) was used as a case study. The city of Potchefstroom, which is located within the North West Province, South Africa, has experienced consistent economic growth over the past decade and in the process has been increasing its economic contribution to the local and provincial economy. The influence of the university campus in stimulating economic activity and supporting this trend is important for the community and the country as a whole.

The existing literature shows that university impact assessment analysis has not yet been given sufficient attention in a South African context; nor have the university–sector linkages or the impact on real estate been identified in the structured manner set out in this thesis. Given the current (2018) focus on higher education institutions in South Africa, the importance of understanding the economy-wide impact of a university campus seems to be a strong motivating factor for conducting assessments of this nature. In addition, the benefit to the host city from real estate development is a novel way to measure the economic impact of a campus and in this regard the thesis makes a unique contribution. The impact on various real estate markets and the existence of university–sector linkages ensure that this thesis takes another important step towards explaining the economic impact of a university campus. The findings also reveal why the continued increase in full-time contact students is beneficial for the local and provincial economy.

This continued increase in enrolments for a campus located in a rural setting makes this case study unique. The injection from consumer spending in the host city is driven by the continued increase in the number of students that attend the university and the expansion in the staff component of the campus which has a significant impact on the real estate market and associated development of various property types within the city. The SAM analysis shows that the benefit of spending by both staff and student is also an economic injection for the provincial economy highlighting that the institution is an important driver of economic activity far beyond the borders of the host city.

This chapter represents the conclusion to the thesis. Section 6.2 discusses the main findings while Section 6.3 offers a number of recommendations. Section 6.4 provides concluding remarks and presents a number of possible options for further research.
6.2 Findings

The problem statement, as stated in Chapter 1 of this thesis, inferred that a university campus is a stimulus to economic development due to the various forms of spending by the university and the living expenses incurred by staff and students. In pursuing the main objective of the thesis, which was to determine the economic impact of a university campus, three specific objectives were formulated.

The first specific objective was to identify the university–economic sector linkages that exist as a result of the university’s operational and capital spending. Chapter 3 examined the university–sector links. The results from the analysis were presented at national and international conferences (Dyason, 2017a; 2017b) and published in an accredited, (blind) peer-reviewed journal (see Dyason & Kleynhans, 2017). The appropriate method to determine these links was the bill-of-goods approach. This approach illustrates all of the campus’s purchases and expenses over a year, and when combined with the Standard Industrial Classification (SIC) system the spending can be reclassified into sectors. This allows for the identification of specific university–sector linkages for the year in question. The analysis was expanded to include the period 2009 to 2015 to detect any emerging trends. Results showed that all sectors, except agriculture and mining, benefit from direct university expenditure and that the tertiary sectors (notably, wholesale and retail trade, transport and communication, financial and business services, community and personal services and government services) benefit the most. In each year from 2009 to 2015, the tertiary sectors received in the region of 85% of all expenditure incurred by the university.

The growth assessments in Chapter 3 revealed the growth potential of each of the sectors and sub-sectors. Three sub-sectors in particular are expected to continue on a high-growth trajectory resulting from university expenditure: retail, catering and accommodation (which constitute the wholesale and retail sector) and business services. On the other hand, expenditure related to the manufacturing sector is decreasing and therefore the sector has low-growth prospects. The results from this analysis were incorporated into Article 2 (Chapter 4) as the university–sector links and the associated sector expenditure values were used to reconstruct the social accounting matrix (SAM). The university–sector linkages highlight the strong connection between university expenditure and the various economic sectors. With the continued increase in expenditure in these sectors, the benefit to GDP and employment came to R50.68 million and 456 employment opportunities, respectively, in a single year (2016).

The second specific objective of the thesis was to quantify the economic impact of a university campus through a SAM analysis. The impact analysis was conducted in Chapter 4, which also considered various scenarios related to student spending. The SAM analysis represents a
The statistical overview of the circular flow of income and production relating to the economy, which makes it possible to analyse shocks within the economy. The results from the impact analysis showed that the campus, through its spending, has direct, indirect and induced impacts on the economy which, when combined, give rise to an economy-wide impact. The impact is quantified for production, employment and labour income through a multiplier analysis for 2015 spending values. When considering production, the NWU’s economy-wide production multiplier amounts to 1.8. This implies that, for each Rand spent by the university, a total of R1.81 of production is generated throughout the economy. The impact on labour income as a result of university spending is similar, where for every Rand spent a total of R1.6 of labour income is generated throughout the economy. Regarding the impact on total employment (i.e. formal and informal), the NWU’s economy-wide employment multiplier of 4 results in additional formal and informal sector employment creation (jobs) remaining collectively sustained, both upstream and downstream across the provincial economy.

The main benefit of a SAM is that it is used to examine changes within an economy and allows for flexibility in its application. This makes it possible to conduct scenario modelling of student spending. Three scenarios of student spending were evaluated to determine the best possible economic scenario for the provincial economy. The first scenario was a continuation of the status quo, the second scenario was an increase in the number of students with lower spending power, and the third scenario was an increase in online learning with a decline in contact student enrolments. The scenario with the highest economic benefit for the provincial economy is the one in which the number of on-campus full-time students enrolled at the Potchefstroom Campus increases continually. The economic benefits of these scenarios are at least 12% to 17% higher than scenario involving an increase in online learning. This might also serve as an indication that free national higher education may benefit both universities and the entire national economy.

The third and last specific objective of the thesis was to identify and quantify, in square metres (m²), the real estate markets that benefit from staff and student spending in the host city. One of the best ways to determine the impact of such spending on the economy is to observe the expansion of real estate developments. Chapter 5 used the results from the staff and student surveys and incorporated these into the space demand models in order to quantify the demand for real estate space. The results indicated that the demand growth for three real estate markets is significant, i.e. residential, retail and office.

The 2016 demand for the three real estate markets was estimated. The demand models used in the literature were adjusted and refined to quantify the space demand, resulting from two consumer sub-markets that are associated with a university campus, i.e. staff and students. The
spending values of the two sub-groups illustrated that significant demand has been created in the host city, due to their spending.

The total demand from students for residential property in 2016 amounted to 618,803m² with an investment value of R3.7 billion (2016 value), while bachelor flats (57%) and single bedroom apartments (21%) were the main typology type. That year the total demand from staff for residential property amounted to 226,313m² with an investment value of R1.3 billion. The retail space demand amounted to 25,429m² gross leasable area (GLA) with an investment value of R152 million, while office space demand amounted to 25,660m² with an investment value of R180 million. In total the demand for real estate within the host city equated to an investment value of R5.33 billion. This represents a significant financial injection into the local economy.

The increase in student enrolments is a major contributing factor to the growth of the local real estate market. The market forecast analysis is a testament to this. Continued enrolment growth, along with student spending power, would determine the growth potential of the host city. However, the spending patterns of students with lower spending capacity would differ from those with higher spending capacity, which would result in different retail sub-categories. For example, a person with a lower disposable income would spend a larger portion of that income on basic goods and groceries compared with someone with a higher income. The type of goods and services would also differ according to affordability. The implication here is that a change in the spending power of students that attend classes on campus would certainly have an impact on the demand for different types of local retail sub-categories.

6.3 Recommendations

This thesis was able to illustrate the economic value of a university campus in South Africa. It also highlighted the fact that a campus that has full-time contact students is beneficial for the host city and the province in which it is located. The spending by the university and by its staff and students has an economy-wide impact, resulting in other sectors benefiting as well. The university‒sector links show the benefits to the economy of particular sectors, which are predominantly in the services category.

The thesis has further indicated that the impact for the host city is visible within the local real estate market. Importantly, too, it has shown that the economic impact could indeed be quantified, using the spending values from staff and students in the host city. The existing literature has until now not quantified the impact on the real estate market – especially not the demand that is created from spending locally. Yet it is now possible to forecast the growth in real estate demand for a city that is influenced by student and staff changes. As real estate developments increase, pressure is placed on the basic services infrastructure, namely water, electricity and sanitation, all of which
are typically provided by the local municipality. With local government having to invest adequately in basic services in order to cater for new demand, a forecast of new real estate developments is required. This thesis has provided such a growth forecast, which in turn constitutes a valuable input for infrastructure planning.

The results also imply that the other universities in South Africa will generate similar demand for real estate in their host cities. It is recommended that similar studies be conducted on Kimberley and Mbombela, the host cities of recently established university campuses. In this regard, the impact of the university on the real estate market in these cities should be quantified. Not only will the results show the positive economic gain to be made, but they will also provide the local government with key findings that could aid infrastructure planning. This link between sector and land use demand is the topic of a follow-up study. Forecasting real estate demand would further assist in long-run strategic planning for the host city, whereby financial and public service allocation could be managed.

In order to stimulate local economic growth and development it is recommended that the university consider using local suppliers where possible. This will not only boost local employment and investment creation, it will also protect local businesses from serious fluctuations in the business cycle and make them more resilient in the face of cyclical changes because of their working relationships with the university.

The North-West University has two campuses in the North West Province: one in Potchefstroom and one in Mahikeng. The growth of these campuses directly benefits the economy through their economic links with other sectors. The results of the SAM analysis showed the economy-wide benefit for the province of university, staff and student spending and that the economic benefit increases as the total number of full-time contact students. It is therefore recommended that these two campuses continue to press for higher enrolment figures as this will be beneficial for the North West provincial economy.

Finally, the SAM analysis illustrated how every R1 million spent by students on retail-related goods directly contributes an additional R0.51 million to GDP, as well as an additional 7 direct jobs and 3 indirect and induced jobs. In a scenario where fewer students were to attend classes on campus and rather study online or through some other distance education medium, the provincial economy would be worse off – especially considering the high numbers of students from other provinces on the Potchefstroom Campus.

With free education and its impact on the economy currently being at the centre of many policy debates, this thesis is valuable in that it supports the idea of universities opening their doors to
more students, who in turn will contribute to the local economy through their day-to-day consumption and who will also be catered for in new real estate developments.

6.4 Conclusion and further study options

The literature on university economic impact assessments shows the positive effect that a university has on the economy. Various approaches can be used to conduct impact assessments, ranging from those based on spending values, to those showing how research and innovation lead to improvements in production and the formation of spin-off companies.

A university campus therefore offers significant benefits to the economy and especially the real estate market of the host city. Real estate growth in the city is largely dictated by staff and student consumption, which reflects a derived demand for goods and services. The real estate modelling in this thesis provided a new approach to quantifying the impact of a university and could be applied to all universities in South Africa. Additionally, the setting where the campus is located is likely also influence the findings. Further research would highlight if the approach of this thesis would provide similar results for a campus in a metropolitan setting, or whether other factors such as land-cost and transportation cost should also be considered in estimating real estate demand.

Further improvements to and refinement of the economic impact analysis could be done on the inflow and outflow of the university. In addition, it is recommended that more research be conducted into the location of the beneficiaries of university expenditure (i.e. suppliers) which would reveal whether the direct expenditure benefit stayed within the host city or whether there was leakage to outside the area. Such leakage would represent a loss to the local economy but at the same time a potential market gap that could be addressed at the local level.

Studying the spending patterns and values at the other two campuses of the NWU, one in Mahikeng and the other in Vanderbijlpark, would be a logical next step in analysing the total university impact. The findings could then also be compared to those of other universities in South Africa.

The methodology used in this thesis could also be applied in measuring the economic impact of the various social projects that a university undertakes. The NWU’s social responsibility mandate is not to invest its income directly in the community but rather to create shared value for communities by encouraging and mobilising community-based expertise (NWU Annual Report, 2014). This is achieved through community engagement projects, in which funding is obtained via collaboration with stakeholders from corporate social investment funds and other sources.
The challenges of local real estate development in terms of pressure on public services and its effect on local municipal funding coupled by possible crowding-out of other industries is related to the continued expansion of the campus and further research on this topic is proposed.

Finally, this thesis serves to illustrate that a number of approaches described in the literature can be successfully applied to highlight the benefits of a South Africa university campus for the economy (i.e. the SAM approach) while also showing that spending patterns among full-time students could strengthen the argument supporting free education. The bill-of-goods approach, in turn, reveals those sectors that benefit from university expenditure while also providing inputs for the purposes of reconstructing the provincial SAM and conducting an economy-wide impact analysis. This analysis can be refined even further by developing a local (i.e. Potchefstroom) social accounting matrix which could be the foundation of a range of future studies.
BIBLIOGRAPHY


ANNEXURE A

Staff survey

NWU Potch - Personeel vraelys / Staff survey

Agtergrond / Background

Die doel van hierdie vraeys is om die ekonomiese impak van die Potchefstroom kampus van die NWU te bepaal. Die tyd wat nodig is om die vraeys in te vul is +/− 13 min.

Aan die einde van die vraeys kan jy jou epos invul om in aanmerking te kom vir een van drie (3) R500 Takealot koopbewyse (slegs vir volledig ingevulde vraeyste).

The aim of this questionnaire is to determine the economic impact of the Potchefstroom campus of the NWU. The time needed to complete this survey is +/− 13 min.

At the end of the survey you can provide your email address to be in the draw to win one of three (3) R500 Takealot vouchers (only if the survey is completed in full).

1. Jou deelname sal bydra tot ‘n beter begrip van die ekonomiese belangrikheid van ‘n universiteit in die plaaslike ekonomie. Die opname is vertoulik en die verslagdoening van die resultate sal anoniem wees. Deur op ‘stem in’ te klik gee jy toestemming dat die navorsing die inligting wat u verskaf vir navorsingsdoeleindes kan gebruik.

Your participation would contribute to a better understanding of the economic significance of a university in the local economy. The survey data will be confidential and the reporting of the results will be anonymous. By clicking ‘agree’ you give consent that the researcher can use the information that you provide in the survey for research purposes.

☐ Stem in / Agree
☐ Stem nie in nie / Do not agree

2. In watter jaar het jy by die Potchefstroom kampus begin werk?
In which year did you start working at the Potchefstroom campus?

3. Dui asb. aan wat is jou paseaanstelling op die oomblik?
Please indicate your job appointment at this time?

-- Please Select --
### Spending patterns

Given the salary that you receive from the NWU, please indicate your average monthly spend for the following goods (only fill in the expenses applicable to your salary):

<table>
<thead>
<tr>
<th>Item</th>
<th>Rand per maand / Rand per month</th>
<th>Dui asb die persentasie (%) van spandering binne Potch / Please indicate the percentage of spent in Potch</th>
<th>Dui asb die persentasie (%) van spandering buite Potch / Please indicate the percentage of spent outside Potch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kos, drank en sigarette inkopies / Food, beverages and tobacco purchases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nie-kos aanelope b.v skoonmaak produkte, persoonlike produkte, elektronike, aanelope by die apsiek / Non-food purchases e.g. cleaning products, personal products, electrical appliance, purchases at the pharmacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kiere &amp; skoene / Clothing &amp; footwear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vermaak (rekreasie, kultuur en sport aktiwiteit uitgawes) / Entertainment (recreation, culture and sport activity expenditure)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurant / Take-away / Coffee House, etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mediese dienste (Dokter, Fisio, Tandarts) / Medical services (Doctor, Pharmacy, Physio, Dentist)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gym geide / Gym fees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Privat vervoer (Brandstof) / Private transport (Petrol)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Privat vervoer (Motor lening / terugbetaling) / Private transport (motor repayment)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publieke Vervoer (Bus, trein, taxi) / Public Transport (Bus, taxi)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verblyf (lening / huur betaling) / Accommodation (Rent / loan repayment)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selfoon &amp; internet uitgawes / Cell phone &amp; internet expense</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Versekering (Motor, Huis, Selfoon, Mediese) / Insurance (Motor, Home, Cell phone, Medical aid)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maandelike Munsipalie dienste (water &amp; elektriesiteit, eendomsbelasting, ens.) / Monthly Municipal services (water &amp; electricity, property tax, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opvoedkundige uitgawes (skoolgeid, ens.) / Educational expenses (School fees, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skoonheidsdienste / Beauty services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Studie uitgawes (stuit ook studie lening in) / Study expenditure (also including loan repayment)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ander uitgawes wat nie hierbo gospesifiseer is nie (bv ander lenings) / Other expenses not specified above (e.g. other loans)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Waar vind aankope buite Potch meestal plaas / Where do purchases outside of Potchefstroom mostly take place?
   -- Please Select --

6. Dui asb. jou gunsteling handelaar aan vir kruideniers aankope in Potch (kan meer as 1 aandui)
   Please indicate your preferred retailer for grocery purchases in Potch (can indicate more than one)

   Gunsteling handelaar (Rangskik volgens voorkeur) / Preferred retailer (Rank according to preference)

<table>
<thead>
<tr>
<th>1st</th>
<th>-- Please Select --</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>3rd</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>4th</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>5th</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>6th</td>
<td>-- Please Select --</td>
</tr>
</tbody>
</table>

Residensiële voorkeure / Residential preferences

7. Is jy 'n permanente inwoner van Potchefstroom?
   Are you a permanent resident of Potchefstroom?
   - Ja / Yes
   - Nee / No

8. As jou antwoord nee is, gee 'n rede asb.
   Please give a reason if your answer is no
   
9. Dui asb. jou verblyf tipe aan
   Please indicate your residential type
   - Huis op erf / Home on stand
   - Woonstel in woonstelblok / Flat in block of flats
   - Meenhuis / Townhouse
   - Woonstel in agterplaas / Flat in backyard
   - Kamer in huis / Room in house
   - Informele struktuur / Informal structure
   - Ander / Other
10. Where in Potchefstroom do you live?

- Bult en Dam area
- Kanonierspark en Dassierand
- Van der Hoffpark, Mooivallei & Tuscany Ridge area
- Baillie Park & Grimbeekpark area
- Potchefstroom sentraal / central
- Potchefstroom suid / south & Miederpark
- Plotte / Small holding
- Elders / Other

11. What is the value of your property?

- Not Applicable

12. Please indicate your residential tenure:

- Volbetaalde eiendom wat ek besit / Owned and fully paid off
- Besit maar nog nie volbetaal nie / Owned but not yet paid off
- Huur / Rented
- Woon sonder om te huur / Occupied rent-free
- Ander / Other

13. What factor(s) determined the place of residence?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Meer belangrikste</th>
<th>Baie belangrik</th>
<th>Nogal belangrik</th>
<th>Leewat belangrik</th>
<th>Onbelangrik</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naby aan kampus / Close to the campus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verblyf koste (bekostigbaarheid) / Accommodation cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kwaliteit van die verblyf / Quality of accommodation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naby winkels / Near retail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naby aan skole / Close to schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verwagte beleggings opbrengs / Expected return on</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veel veilig in die woonbuurt (sekerheid) / Feeling of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>safety in the Neighbourhood (security)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rustige omgewing / Peaceful environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
14. Belê u ook in die plaaslike eiendomsmark (Potch) deur die aankoop van woonstelle/huise, ens.? (los die vraag as dit nie van toepassing is nie)

Do you also invest in the local property market (Potch) by purchasing apartments/houses, etc.? (leave this question if not applicable)

<table>
<thead>
<tr>
<th>Woonstel / Apartment</th>
<th>Meenhuys / Townhouse</th>
<th>Studentehuis / Studenthouse</th>
<th>Huis / Homes</th>
</tr>
</thead>
<tbody>
<tr>
<td>R300 000 - R500 000</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>R500 001 - R800 000</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>R800 001 - R1 200 000</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>R1 200 000+</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Algemeen / General

15. Hoeveel lede van jou huisgesin (persone wat saam met u ’n huis deel) werk op die NWU, Puk kampus (tel jouself ook by)

How many of your household (persons that live in your home) are working on the Potch Campus of the NWU (include yourself)

16. Het hulle ook hierdie vraelys voltooi?

Did they also fill in this survey?

- Ja / Yes
- Nee / No
- Onseker / Unsure

17. Dui asb. jou ras aan

Please indicate your race

- Please Select --

18. Dui asb jou geslag aan / Please indicate your gender

- Manlik / Male
- Vroulik / Female

19. Dui asb jou ouderdom aan / Please indicate your age

- Please Select --
Student survey

NWU Potch - Studente vraelys / Student survey (Final)

Achtergrond / Background

Die doel van hierdie vraelys is om die ekonomiese impak van die Potchefstroom kampus van die NWU te bepaal. Die tyd wat nodig is om die vraelys in te vul is ±15 min.

Aan die einde van die vraelys kan jy jou epos invul om in aanmerking te kom vir een van drie (3) R500 Takealot koopbewyse (leks vir volledig ingevulde vraelyste).

The aim of this questionnaire is to determine the economic impact of the Potchefstroom campus of the NWU. The time needed to complete the survey is ±15 min.

At the end of the survey you can provide your email address to be in the draw to win one of three (3) R500 Takealot vouchers (only if the survey is completed in full).

1. Jou deelname sal bydra tot 'n beter begrip van die ekonomiese belangrikheid van 'n universiteit in die plaaslike ekonomie. Die opname is vertouwlik en die verslagdoening van die resultate sal anoniem wees. Deur op 'stem in' te klik gee jy toestemming dat die navorsing wat u verskaf vir navorsingsdoeleindes kan gebruik.

Your participation would contribute to a better understanding of the economic significance of a university in the local economy. The survey data will be confidential and the reporting of the results will be anonymous. By clicking ‘agree’ you give consent that the researcher can use the information that you provide in the survey for research purposes.

- Stem in / Agree
- Stem nie in nie / Disagree

2. In watter jaar het jy by die Potchefstroom kampus begin studeer?
   In which year did you start studying at the Potchefstroom campus?

3. Studie metode / Study method
   - Voltyds / Full-time
   - Deeltyds / Part time

4. Wie voorsien die finansies vir die volgende terwyl jy studeer (meer as een opsie kan gekies word)?
   Who is providing the finances for the following while you are studying (more than one option can be chosen)?

<table>
<thead>
<tr>
<th>Studies / Studies</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>-- Please Select --</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Verblyf / Accommodation</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>-- Please Select --</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lewenskoste (kos, petrol, ens.) / Living costs (food, petrol, etc.)</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>-- Please Select --</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
</tbody>
</table>
5.

1. Koop jy jou eie kruideniersware of koop iemand anders dit (bv. Ouers, kamermaat)?
2. Are you responsible to buy our own groceries or is it bought by someone else in general (e.g. parents, room mate)?

- Ek koop / I buy
- Iemand anders (bv. ouers) koop / Someone else (e.g. parents) buy
- Kombinasie van beide / Combination of both

6. Dui asb. aan watter van die volgende stellings jou die beste beskryf (uitgesluit vakansies)
Please indicate which of the following statements describe you best (excluding holidays)

- Ek is meeste naweke in Potch / I am in Potch during most weekends
- Ek is meeste naweke nie in Potch nie / I am mostly not in Potch during the weekend
- Kombinasie van die 2 opsies / Combination of the two options

7. Wanneer spandeer jy meeste van jou geld oor die algemeen?
When do you spend the majority of your money in general?

- Gedurende die week / During the week
- Gedurende die naweek / During the weekend
- Gelyk tussen week en naweek / Equally between week and weekend

8. Vind die meeste van jou kos of eie aankope op kampus of in die dorp plaas in die algemeen?
Are most of your food or meal purchases on campus or in town on average?

- Op kampus by die SS en eetkroon / On campus at the cafeteria and dining halls
- In die dorp / In the town
- Kombinasie tussen die twee / Combination between the two
- Other - Write in

9. Dui asb. jou gemiddelde maandelike uitgawes aan vir die volgende goedere (sluit ook die betaling hier in wat ouers/familie/beurs aangaan namens jou)
Please indicate your average monthly expenditure for the following goods (also include the payment made by your parents/family/bursary in your behalf):

<table>
<thead>
<tr>
<th>Rand per maand (Rand per month)</th>
<th>Dui asb die persentasie (%) van spanderings binne Potch / Please indicate the percentage of spent in Potch</th>
<th>Dui asb die persentasie (%) van spanderings buite Potch / Please indicate the percentage of spent outside Potch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kos, drank en sigaretten inkopies (Insluitend die bedrag wat jou ouers/familie betaal vir kos aankope op jou studentekarta) / Food, beverages and tobacco purchases (also include the amount that your parents/family pay for food purchases on your student card)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nie-kos aankope b.v. skoonmaak produkte, persoonlike produkte, elektronika, aankope by die aptek/ Non-food purchases e.g. cleaning products, personal products, electrical appliance, purchases at the pharmacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kleding &amp; skoonheidsartikels / Clothing &amp; footwear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vermaak en spettering (kulturele en sport aktiwiteite uitgawes) / Entertainment (recreation, culture and sport activity expenditure)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurant / Take-away / Coffee House, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mediese diens (Dokter, Fisié, Tandarts, ens.) / Medical (Doctor, Pharmacy, Dentist, etc.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10. Did you spend the same amount of money every month that you spend on campus at the SS and in the town (Potch)?
   - On campus / On campus
   - In the town / In town (Potch)

11. Why do you buy at the cafeteria and/or dining halls?

12. Illustrate which of the following payment methods you make use of the most for purchases in Potchefstroom (where 1 is the most and 4 is the least)
<table>
<thead>
<tr>
<th></th>
<th>Daaglikse / Daily</th>
<th>Gereeld, maar nie daaglikse nie / Often, but not daily</th>
<th>Soms / Seldom</th>
<th>Glad nie / Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studentekaart / Student card</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Debitkaart / Debit card</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Kredietkaart / Credit card</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Kontant / Cash</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Bestedingspatrone / Spending patterns**

13. Dui asb. aan hoeveel keer jy die volgende sentrums besoek per week
*Please indicate the number of time you visit the following centres per week*

<table>
<thead>
<tr>
<th>Sentrum</th>
<th>-- Please Select --</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull Area (Spar, OK Grocer, Friendly, Insleep, etc.)</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>River Walk</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>Mool River Mall</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>Canal Crossing</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>West Acres</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>Van Der Hoffpark Pick'n Pay</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>Miederpark Spar</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>Baillie Park Spar</td>
<td>-- Please Select --</td>
</tr>
</tbody>
</table>

14. Dui asb. jou gunsteling handelaar aan vir kruideniers aankope in Potch (kan meer as 1 aandui)
*Please indicate your preferred retailer for grocery purchases in Potch (can indicate more than one)*

<table>
<thead>
<tr>
<th>Gunsteling handelaar (Rangskik volgens voorkeur) / Preferred retailer (Rank according to preference)</th>
<th>-- Please Select --</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>2nd</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>3rd</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>4th</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>5th</td>
<td>-- Please Select --</td>
</tr>
<tr>
<td>6th</td>
<td>-- Please Select --</td>
</tr>
</tbody>
</table>
Residensiële voorkeure / Residential preferences

15. Dui asb jou verblyf tipe aan
*Please indicate your residential type*

- Keshuis op kampus / Hostel on campus
- Woonstel in woonstelblok / Flat in block of flats
- Woonstel in agterplaas / Flat in backyard
- Meenthuis / Townhouse
- Kamer in huis / Room in house
- Huis op erf / Home on stand
- Informele struktuur / Informal structure
- Ander / Other

16. Dui asb u verblyfreg aan
*Please indicate your residential tenure:*

- Afbetaalde eiendom wat ek besit / Owned and fully paid off
- Besit maar nog nie afbetaal nie / Owned but not yet paid off
- Huur / Rented
- Woon sonder om te huur / Occupied rent-free
- Ander / Other

17. Waar in Potchefstroom bly jy?
*Where in Potchefstroom do you live?*

- Bult en Dam area
- Kanonierspark en Dassierand
- Van der Hoffpark, Mooivallei & Tuscany ride area
- Bailie Park & Grimbeekpark area
- Potchefstroom sentraal / central
- Potchefstroom suid / south & Miederpark
- Plotte / Small holding
- Op kampus / On campus
- Elders / Other

18. Wat is jou maandelikse verblyfkoste (huur)?
*What is your monthly cost for accommodation (rent)?*
19. What factor(s) determined the place of residence (rank from most important to least important)?

Drag items from the left-hand list into the right-hand list to order them:

- Afstand na die kampus / Distance to campus
- Verblyf koste (bekostigbaarheid) / Accommodation cost (affordability)
- Kwaliteit van die verblyf / Quality of accommodation
- Naby winkels / Near retail
- Nie van toepassing / Not applicable
- Ander / Other

Algemeen / General

20. As die Potch kampus nie bestaan het nie, waar sou jy studeer? Kies een
If the Potch campus did not exist where would you have studied? Choose one

- NWU Mahikeng
- NWU Vaal Triangle
- University of Johannesburg (UJ)
- University of Pretoria (UP - Tuks)
- University of the Free State (UFS - Kovsies)
- Stellenbosch University (SU - Maties)
- University of Witwatersrand (Wits)
- University of Cape Town (UCT)
- Other - Write In (Required)
21. Hoe gereeld kom jou familie (ouers) kuiers in Potch (per jaar)?
*How often does your family (parents) come to Potch (per year) to visit?*

- Please Select -- *

22. Tydens hulle kuiers, bly hulle oor?
*When they visit, do they stay over?*

- Ja / Yes
- Nee / No

23. As hulle oorslaap waar bly hulle?
*If they stay the night, where do they sleep?*

- Please Select -- *

24. Dui asb jou ras aan
*Please indicate your race*

- Please Select -- *

25. Dui asb jou geslag aan / Please indicate your gender

- Manlik / Male
- Vroulik / Female

26. Dui asb jou ouderdom aan / Please indicate your age

- Please Select -- *
Email to students

David Dyason - Ekonomiese impak van die: Potchefstroomkampus / Economic impact of the Potchefstroom campus

From: David Dyason
Date: 2016/09/21 08:43 PM
Subject: Ekonomiese impak van die: Potchefstroomkampus / Economic impact of the Potchefstroom campus
BC: 0732404937@mymtmail.co.za; 10069038@nwu.ac.za; 10074031@nwu.ac.za; 1...

Beste Potch kampus Student,

Hier is 'n geleentheid om deel te neem aan 'n studie om die ekonomiese impak van die NWU, Potch kampus te bepaal. Vir die studie word daar 'n vraelys gebruik om studente besteding en voorkeure te bepaal. Met die voltooiing van die vraelys is daar ook 'n kans om een (1) van drie (3) R500, TAKEALOT geskenkbewyse te kan wen.

Gaan na hierdie skakel om die vraelys te voltooi:

Groete,
David Dyason
~~~~~~~~~~~~~~~~~~~~

Dear Potch campus Student,

Here is an opportunity to participate in a study to determine the economic impact of the NWU Potchefstroom campus. The study make use of a questionnaire to determine student spending and preferences. With the completion of the questionnaire there is also a chance for you to win one (1) of three (3) R500, TAKEALOT vouchers.

Go to this link to complete the survey:

Kind Regards,
David Dyason

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Hierdie studie het etiese goedkeuring: NWU-00224-16-A4

Die inligting vir hierdie navorsingsversoek (u e-posadres) is aan die navorser verskaf as deel van 'n goedgekeurde versoek vir toegang tot inligting in terme van die Wet op die Bevordering van Toegang tot Inligting 2 van 2000 en is aan die navorser verskaf na die ondertekenning van 'n vertroulikeheidsverklaring. Die verwysingsnommer van die goedgekeurde versoek is 10468/1.1.4.2 Dyason research. Die persoonlike inligting (u kontakbesonderhede) is verskaf vir navorsingsdoelendes en word hanteer in terme van die Wet op Beskerming van Persoonlike Inligting 4 van 2013, ten einde die integriteit en privaatheid van u persoonlike inligting te beskerm.

This study has ethical clearance: NWU-00224-16-A4

The information provided for this research request (your e-mail address) was provided to the researcher as part of an approved request for access to information in terms of the Promotion of Access to Information
Email to staff

David Dyason - NWU Potch Kampus - Ekonomiese Impak Studie / NWU Potch Campus - Economic Impact Study

From: David Dyason
Date: 2016/09/26 08:08 PM
Subject: NWU Potch Kampus - Ekonomiese Impak Studie / NWU Potch Campus - Economic Impact Study
BC: 10058834@nwu.ac.za; 10059016@nwu.ac.za; 10059172@nwu.ac.za; 10059199@...

Beste Potch Kampus Personeellid,

Hier is ‘n geleentheid om deel te neem aan ‘n studie om die ekonomiese impak van die NWU, Potch Kampus te bepaal. Vir die studie word daar ‘n vraelys gebruik om personeel besteding en voorkeure te bepaal. Met die voltooiing van die vraelys is daar ook ‘n kans om een (1) van drie (3) R500, TAKEALOT geskenkbewysse te kan wen.

Gaan na hierdie skakel om die vraelys te voltooi:
http://www.surveygizmo.com/s3/3044317/NWU-Potch-Personeel-vraelys-Staff-survey

Groete,
David Dyason
~~~~~~~~~~~~~~~~~~~~~~~~~

Dear Potch Campus Staff Member,

Here is an opportunity to participate in a study to determine the economic impact of the NWU Potchefstroom Campus. The study make use of a questionnaire to determine staff spending and preferences. With the completion of the questionnaire there is also a chance for you to win one (1) of three (3) R500, TAKEALOT vouchers.

Go to this link to complete the survey:
http://www.surveygizmo.com/s3/3044317/NWU-Potch-Personeel-vraelys-Staff-survey

Kind Regards,
David Dyason

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Hierdie studie het etiese goedgekeuring: NWU-00224-16-A4

Die inligting vir hierdie navorsingsversoek (u e-posadres) is aan die navorser verskaf as deel van ‘n goedgekeurde versoek vir toegang tot inligting in terme van die Wet op die Bevordering van Toegang tot Inligting 2 van 2000 en is aan die navorser verskaf na die ondertekening van ‘n vertroulikheidsverklaring. Die verwysingsnommer van die goedgekeurde versoek is 10468/1.1.4.2 Dyason research. Die persoonlike inligting (u kontakbesonderhede) is verskaf vir navorsingsdoeleindes en word hanteer in terme van die Wet op Beskerming van Persoonlike Inligting 4 van 2013, ten einde die integriteit en privaatheid van u persoonlike inligting te beskerm.

This study has ethical clearance: NWU-00224-16-A4

The information provided for this research request (your e-mail address) was provided to the researcher as part of an approved request for access to information in terms of the Promotion of Access to Information Act, 2 of 2000, and hence the information was provided to the researcher subject to the signing of a
Confidentiality Clause. The reference number of the approved request is 10468/1.1.4.2_Dyason_research. The personal information (your contact details) was provided for research purposes and is dealt with in terms of the Protection of Personal Information Act 4 of 2013, in order to safeguard the integrity and privacy of your personal information.