

EVALUATING VALUE CHAINS IN TERTIARY EDUCATION: SETTING THE DEVELOPMENTAL AGENDA FOR AFRICA

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ABSTRACT

In comparison to the World average (15.25%), a relatively large (17.4%) share of the national budget in Sub-Saharan Africa is devoted to education. However, upon closer scrutiny of the value chain, it would become evident that education is not really addressing the broader development agenda of Africa. Porter's generic 'value chain' model requires activities of an organization to be separated into discrete components for value chain analysis to be performed, and recent trends in higher education make such segregation possible, since Higher Education Institutions (HEISs) are seemingly under intense pressure to create value and focus their efforts and scarce resources on activities that drive up value for their respective customers and stakeholders.

The purpose of this paper is to assess the impact of value chains on Tertiary Education (TE) in Zimbabwe through information gathered by conducting in-depth interviews with 12 representative authorities from the 17 registered universities (13 public and 4 private), and a sample of graduates and captains of industry. From a qualitative study using a structured questionnaire, it became evident that while both primary and secondary activities need to be well supported, it is critical that universities develop industry-driven value adding programmes in order to make the degrees awarded more relevant and addressing the broader development agenda. It is therefore proposed that by unbundling the academic process into its discrete components with well developed performance measures, a balance between university output and industry demand can be created and, thus help drive Africa's developmental agenda.

Key Words: Value chains, tertiary education, impact, knowledge creation, development.

INTRODUCTION

Several researchers concur that the world is fast moving from a production-based to a knowledge-based economy (Powell and Snellman, 2004). Drucker (1999b) states that the most important contribution management needs to make in the 21st century, is to increase the productivity of knowledge work and the knowledge worker. The knowledge-based view of the firm identifies the primary rationale for the firm as the creation and application of knowledge (Demsetz, 1991; Nonaka, 1994; Grant, 1996; Spender, 1996). Therefore, the ability of firms to generate and exploit new forms of knowledge is vitally important (Anand *et al.*, 2007). The economic challenges of the post-capitalist society will therefore be the productivity of knowledge work and the knowledge worker (Drucker, 1993).

A more skill-intensive route to development could provide both resource-rich and resource-poor African countries with avenues for raising domestic value-added – and for multiplying opportunities for innovation and diversification, away from traditional commodities that are subject to wide price swings. The mitigation of, and adjustments necessitated by climate change also calls for the innovative application of existing technologies and the development of new technologies that are suitable for the African context.

Tertiary education institutions that are equipped to impart quality education and conduct relevant applied research are also more likely to cultivate multiple linkages with industry and to stimulate knowledge-based development through a variety of proven channels. To achieve these results, it calls for the unbundling of academic processes into discrete components which have well developed measures.

Given the above, the purpose of this paper is to identify value creators within the tertiary education value chain and, assess their impact. While the literature has hitherto focused on conceptualizing Porter's value chain concept, the paper takes a discrete analysis of the value chain in order to identify areas of weaknesses for policy to address.

BRIEF LITERATURE REVIEW

The value chain concept was described and popularized by Porter (1985), who defined it as a representation of a firm's value-adding activities, based on its pricing strategy and cost structure. Other scholars for example, Kaplinsky (2000) defined the value chain as "the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use." Furthermore, Stonehouse and Snowdon (2007) defined value chain as "Porter's technique for understanding an organization's ability to add value through its activities, and their internal and external linkages, and allows managers to identify where value is currently added in the system and where there is potential to create further value in the future by reconfiguration and improved coordination of activities."

Higher Education has undergone significant changes in the recent past (Paul, 2005), which includes the tightening of research funds, the concentration of these funds on research-accomplished institutions only, and creation of additional funds for innovative research and education. From a theoretical standpoint, resource-based theory focuses on the identification of value-adding rare resources in a firm in order to be more successful than competing organizations (Grant, 1991). The resource-based theory or resource-based view argues that resources and capabilities of an organization need to be identified before the appropriate strategy can be determined and implemented. Competitive advantage arises when resources are not only rare but also inimitable, thus making the organization very valuable to customers (Kraaijenbrink *et al.*, 2010).

Over several years, Porter (1980, 1985, 1990, and 1991) published widely in the context of strategic management and identification of competitive advantage, including the value chain. The aforementioned researcher developed the value chain in order to identify core competences and explain cost behaviour patterns, according to the chosen generic strategy. Furthermore, the value chain could be used to identify the interrelationships between value-creating activities, based on what customers rank most highly (Porter, 1985). The scope of the value chain is to extend beyond organizational borders, and take linkages between suppliers and customers into account (Shank and Govindarajan, 1992a). Furthermore, sustainable competitive advantages that a firm has created are identified through a value chain analysis. A competitive advantage usually utilizes scarce resources and is not easily imitable and, is greatly valued by customers (Shank and Govindarajan, 1992a). Porter (1985) identified the following as the key value chain activities:

- *Input logistics*: they receive and store inputs. Distribution to production (i.e. goods and services) is according to need (research, investment, teaching, recruitment, admission, registration, research purposes, grants, etc).
- *Operations*: they are processes to transform inputs into finished goods and services. (Teaching, research, counseling, tutoring, etc.)
- *Output logistics*: storage and distribution of finished goods and services. (Graduation, publications, placement, performance, etc.)
- *Marketing and sales*: identification of needs of demanders and delivery generation. (Recruitment, technology and knowledge transfer, and research, development and innovation (RD&I).
- *Service*: post-delivery support to users of goods and services as service value. (Academic support, society services, alumni support, RD&I support).

Unpacking value chains in tertiary education, is best accomplished by critiquing the various educational value chain models available.

EDUCATIONAL VALUE CHAIN MODELS

Sison and Pablo Model (2000)

Sison and Pablo (2000) viewed value chain of a research university as a network of activities which can be grouped under three major categories – pre-education, education and post-education. This model (figure 1) is very different from service value chain postulated by Porter (1985).

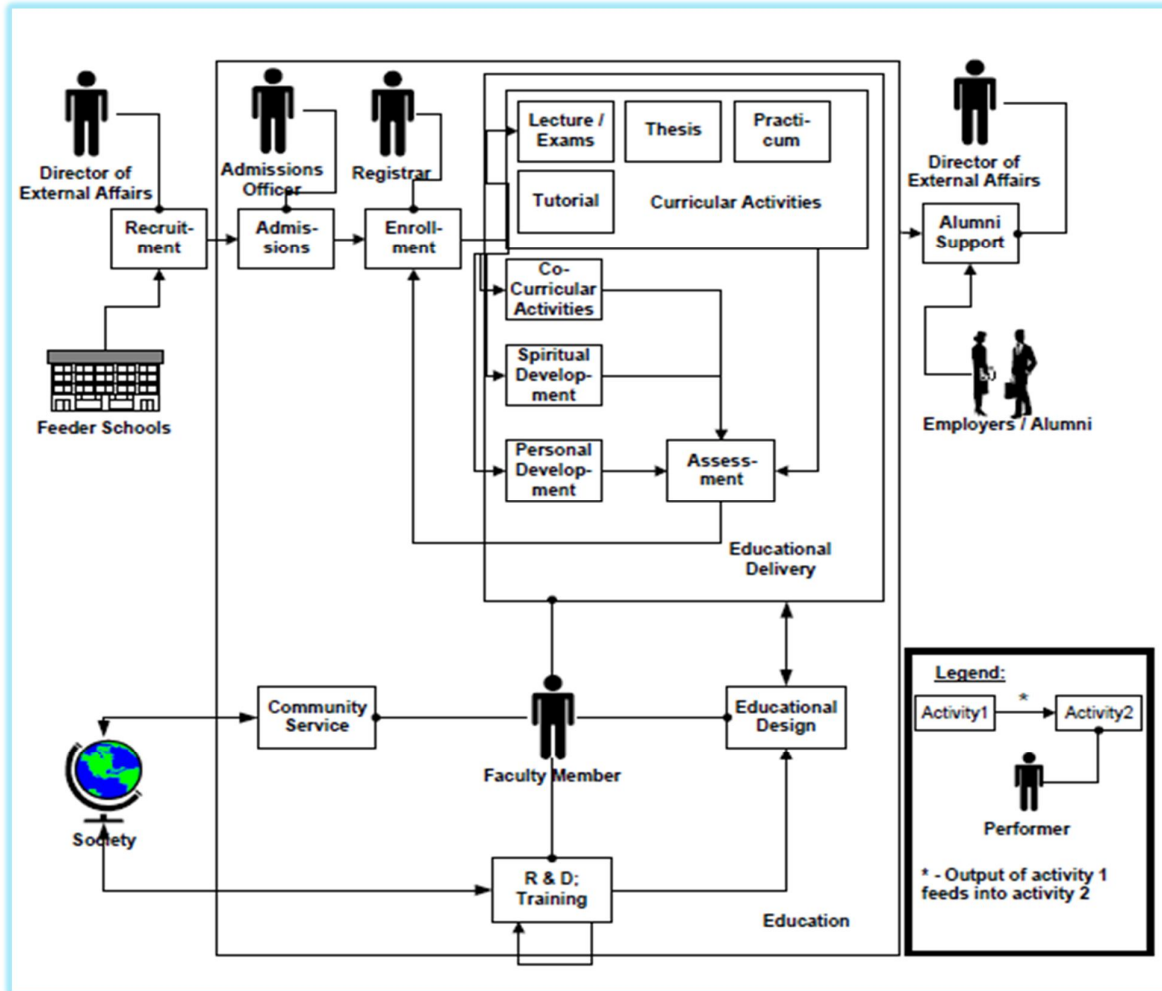


Fig. 1: Education Value Chain Framework

Source: Sison and Pablo, (2000, p.2).

This model (figure 1) suggests that although there is a seemingly infinite set of tasks that are performed in any modern-day university, these myriad tasks can be analyzed using the notion of a value chain. The value chain of a research university can be viewed as a network of activities centered around teaching, research, and community service, and on an individualized educational package of learning opportunities and tools that enables students' acquisition of target knowledge and skills, and formation of target attitudes and values. These activities may be clustered into three major groups, namely, pre-education (student recruitment), education (with its elements discussed later), and post-education (graduate placement and alumni support). The education activity may be said to consist of the different activities in an educator's professional life: educational design, educational delivery, research, professional development, and community service.

Khaled Abed Hutaibat's (2011) model

Khaled Abed Hutaibat's (2011) model depicted in figure 2, classifies support and primary activities in detail.

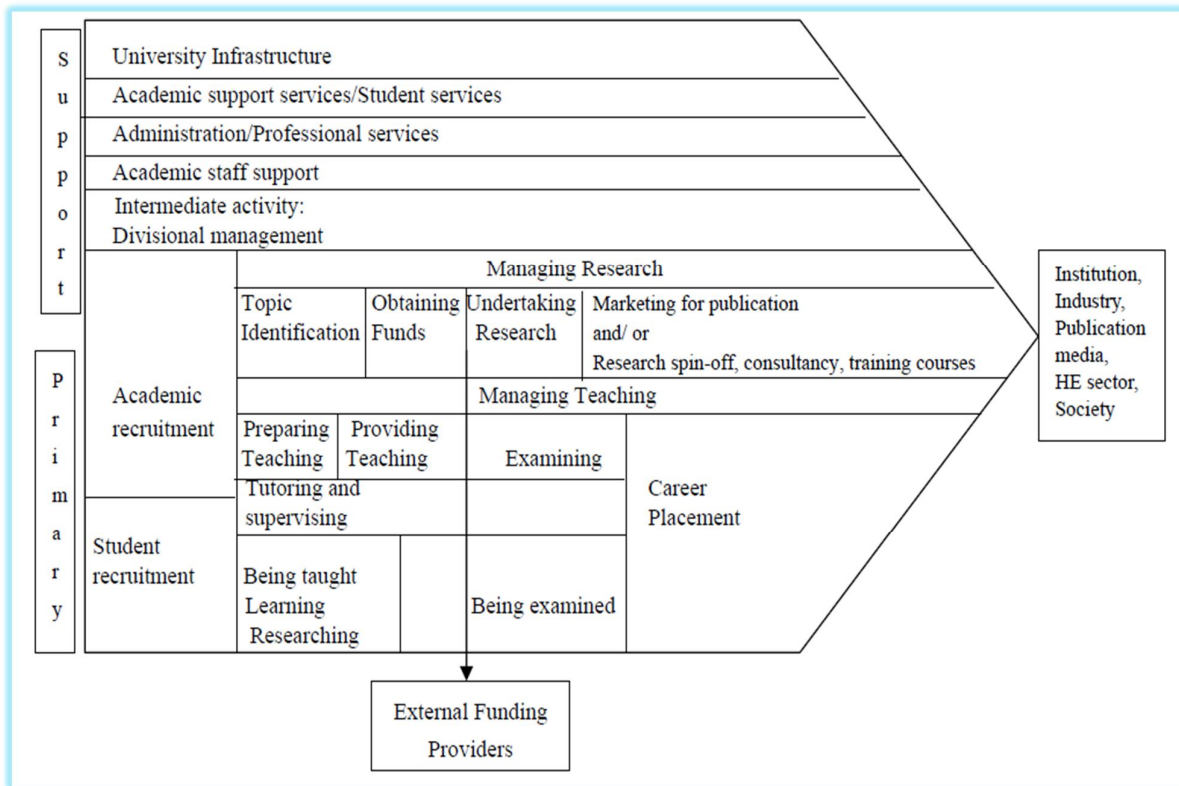


Fig. 2 Value Chain Model for Higher Education

Source: Khaled Abed Hutaibat, (2011, p. 218).

Khaled Abed Hutaibat's (2011) model extensively explains the value chain in the higher education and can be applied universally to the higher education. It is evident that the mode (figure 2) identifies three areas: perception of academic actuality as the context, research and teaching activities. Perception of academic actuality comprises the fierceness of the academic world, referring to issues such as the tightness of financial funds, the constant tension between research and teaching (as part of the overall education context), and the difficulties of staff acquisition and retention in subjects where the outside job-market is very competitive. The activities of research and teaching are the main operational activities and strongly related to major strategic foci. Teaching stands for the actual class time but also the care outside the class room, for instance the time a lecturer spends with a student discussing their questions, concerns or specific issues.

c) Van der Merwe and Cronje Model (2004)

While all the other models are the modifications and extensions of the Porter's value chain model, Van der Merwe and Cronje (2004) have given a graphical tool which can help in identifying the bottlenecks.

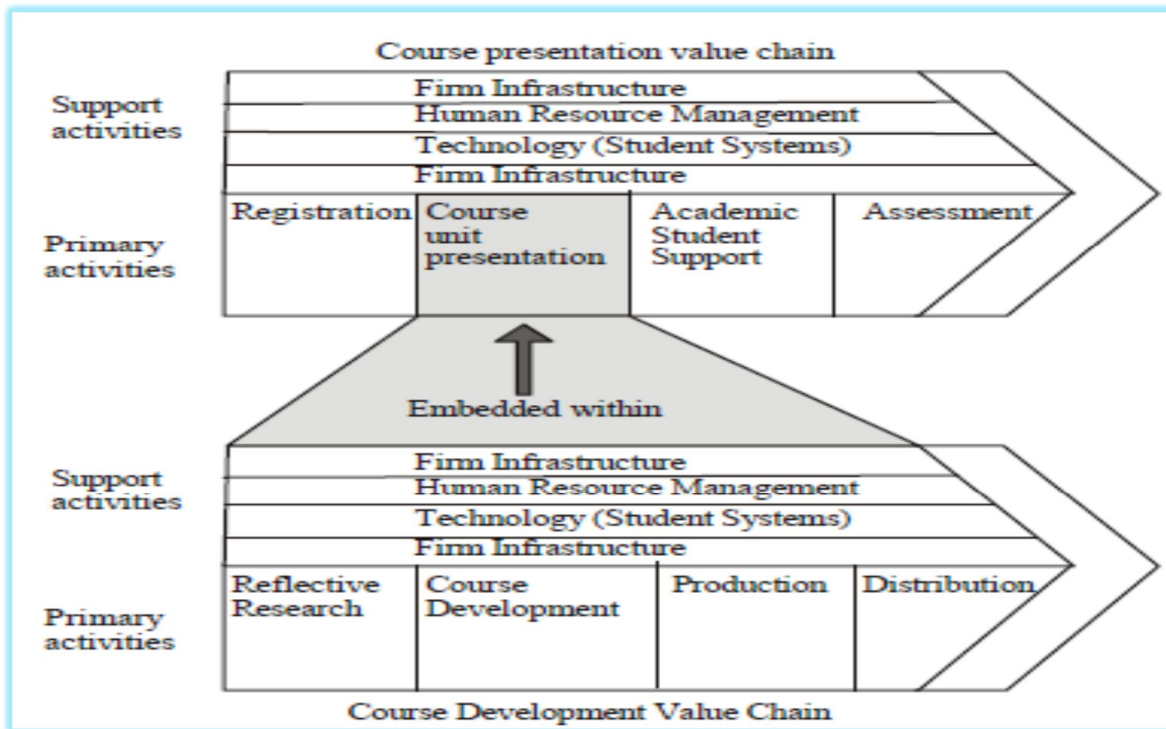


Fig. 3 Education Value Chain Model for Course Development

Source: Van der Merwe, et al., (2004, p. 127)

The authors developed a value chain model which explains all the components in a detailed manner. They introduced the educational value chain as a graphical tool (figure 3) that developers may use in re-engineering efforts to identify possible bottlenecks that are likely to occur, as well as providing a route to follow when determining the value added elements by technology. Further, support processes include those identified by Porter with student systems being the driving force behind technological innovations such as e-learning and technology which adds value to the educational value chain even if it is not seen as a primary activity within the chain. The authors determined that the value-chain approach for higher education can help detect where bottlenecks occur. Van der Merwe and Cronje (2004) introduced the “educational value chain” as a graphical tool that developers may use in re-engineering efforts to identify possible bottlenecks that are likely to occur, as well as providing a route to follow when determining the value added elements by technology.

Makkar, Gabriel &Tripathi (2008) illustrate necessary components within the tertiary education service industry with need to co-create value. Their perspective is that in order to create outstanding value, both service providers and users be involved. The emphasis was on the concept of “co-creation” (Makkar, Gabriel &Tripathi 2008, p. 197). This is justified in a context where the socio-economic development of the country largely depends on the performance of the higher educational institutions” (Makkar, Gabriel &Tripathi 2008, p. 185).

Based on the model developed by Van der Merwe and Cronje (2004) (Fig 3 above), and the several steams of literature reviewed, the following proposition was made:

Proposition1: A critical evaluation of the Tertiary Education value chains can assist to identify areas of need and hence help many African economies to development.

METHODOLOGY

Research Design

The general design of the research was exploratory in nature (Silverman, 2004; 2005) which demanded a deeper understating of the main value creating components at the various Universities. This was an appropriate design since the major objective was to find out/explore more from the various stakeholders.

Research strategy

A case study approach was employed whereby 17 local Universities in Zimbabwe participated by providing insight into the value chains in tertiary education. One of the great strengths of case studies as compared with other methods is that evidence can be collected from multiple sources. Triangulation uses evidence from different sources to corroborate the same fact or finding (Yin 1994).

Target population

The research targeted University heads, recent graduates, industry representatives, policy makers and representatives of feeder schools. This holistic approach is in line with the dictates of the stakeholder theory (Freeman 2003), wherein the major stakeholders in the value chain were interviewed. Figure 4 below is an educational process outline (Tatikonda, 2007) which helped the researchers in the selection of the key stakeholders to interview.

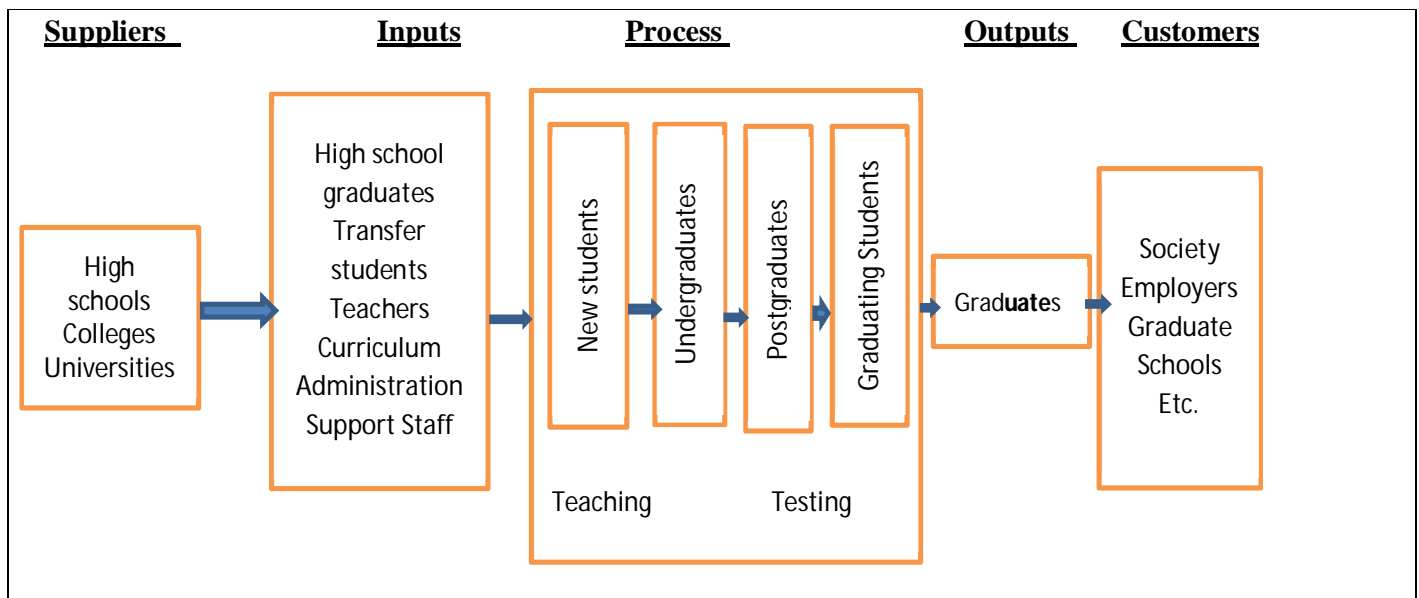


Figure 4. Education Process

Source: Tatikonda, (2007, p.29)

Sampling Method

A purposeful sampling method was used for the identification of company representatives as well as the customer groups. In this sampling method, the researcher considered the aim of the research and selected samples accordingly (Coyne, 1997). The most important guiding principle was maximum variation; that is, the researchers sought to include people who represented the widest variety of perspectives possible within the range specified by their purpose (Higginbottom, 2004). A valid purposeful sample in this case was drawn from a wide spectrum of stakeholders in order to draw conclusions about interactions or relationships between them.

Sampling frame

The researchers relied on internal University records to identify recent graduates while publications by the Zim-Trade and Zimbabwe Stock Exchange were used to identify industry representatives. Executives from companies known to provide internship to graduates such as those in the Telecoms, Mining and Banking Industries were deliberately targeted. Policy makers in the Ministry of Higher and Tertiary Education provided insightful information on the challenges faced in their endeavor to improve the quality of education.

Sample size

Whilst there are no defined rules for sample size (Baum 2002; Patton 1990), sampling in qualitative research usually relies on small numbers with the aim of studying in depth and detail (Miles & Huberman 1994). On the basis of the aforementioned, the sample size was purposefully determined as follows:

Table 1: Sample composition

Population group	Number of representatives
a)University representatives	12
b)Student representatives	6
c) Industry representatives	5
d) High schools representatives (feeder schools)	5
e) Policy Makers	2
Total	30

The Universities sample consisted of 9 state-owned Universities and 3 private Universities; giving a total of 12 representatives. Student representatives were drawn from the broad faculties of Engineering, Humanities, Commerce, Medicine, Agriculture and Industrial Science. This was deliberately done in order to maintain a balance and representativeness in the sample. Five high schools were purposefully selected and questionnaires submitted to the school heads for completion. Similarly, two representatives from the policy makers were identified detailed on Table 1 above.

Research instrument and design

The main instrument of the research was a semi-structured questionnaire. According to Lenon and Clever (1983), a questionnaire is a useful tool to collect data. The use of open and closed questions was designed in order to be able to obtain both quantitative as well as qualitative data. This way, the researcher will be able to triangulate the research results. The open questions were useful for exploring new areas or ones in which

the researcher has limited knowledge since the respondents can answer however they wish. Conversely, closed questions helped to enhance comparability of answer since “they were presented with a set of fixed alternatives from which they have to choose and appropriate answer” (Bryman, 2004).

Validity and reliability of findings

Joppe (2000) defines *reliability* as the extent to which results are consistent over time and an accurate representation of the total population under study. If the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable (Joppe 2000). Consistency with the above, the reliability of the research was tested through calculating the Cronbach’s Alpha using the Statistical Package for Social Sciences (SPSS) for all the questions based on the research themes created as shown on Table 2 below. The average Cronbach’s Alpha was found to 0,809; indicating a high reliability of the research instrument used. Fornell and Larcker (1981) suggest that if the reliability exceeds the level of 0.7, it indicates a high reliability of the instrument used.

The validity of research was guaranteed through combining both quantitative and qualitative research techniques in gathering and analyzing research data through the use of a semi-structured questionnaire as mentioned. Triangulation helped to strengthen the study (Patton 2001) and thus increase its validity.

Table 2: Scale reliability

Theme	Cronbach’s Alpha
Resources	0.813
Degree specific	0.753
University Policy	0.795
Current student status	0.865
Student Background	0.854
Government Policy	0.772

ANALYSIS AND FINDINGS

Inbound logistics

a) Students’ grades at entry

An ANOVA test was carried out at the 5% level of significance to assess the effects of the low student grades on graduate knowledge.

Table: ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.867	2	.433	3.900	.033
Within Groups	3.000	27	.111		
Total	3.867	29			

P Value of 0.033 showed that low student grades affected the graduate knowledge.

We rejected the null hypothesis since the p-value obtained was less than 0.05, and concluded that there was no plausible reason to suggest that there was a relationship between the poor performance of students in industry and their low grades at point of entry into University.

b) Funding

ANOVA showed that there was a relationship between funding and infrastructure.

Table ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poor infrastructure	Between Groups	1.177	1	1.177	4.926	.035
	Within Groups	6.690	28	.239		
	Total	7.867	29			
Lack of learning resources (books, learning theatres etc.)	Between Groups	.777	1	.777	8.089	.008
	Within Groups	2.690	28	.096		
	Total	3.467	29			

We tested this at 5% level of significant and significant value of 0.035 was found. Also, a significant value of 0.008 was found on testing the relationship between funding and learning resources.

Processing

The challenges of the 'brain drain' which affects many countries in Africa was manifest in an analysis of the quality of the degree programmes with respect to a number of factors as shown on Table 2 below:

ANOVA

		Sum of Squares	d.f	Mean Square	F	Sig.
Poor lecturer Experience	Between Groups	.600	2	.300	5.357	.015
	Within Groups	4.200	27	.056		
	Total	4.800	29			
Poor research output	Between Groups	.000	2	.000	.	.
	Within Groups	.000	27	.000		
	Total	.000	29			
Brain drain	Between Groups	2.917	2	1.458	4.660	.018
	Within Groups	8.450	27	.313		
	Total	11.367	29			
Poor University induction system	Between Groups	1.092	2	.546	6.205	.006
	Within Groups	2.375	27	.088		
	Total	3.467	29			
University competition based on quantity rather than quality	Between Groups	.900	2	.450	2.095	.143
	Within Groups	5.800	27	.215		
	Total	6.700	29			

The ANOVA test showed that poor lecturer experience resulted in degree programs with no relationship with industry. Similarly, poor degree programs were also caused by brain drain ($p=0.018$) and poor university induction system ($p=0.006$). However university competition had no effect.

Secondary Activities

a) Infrastructure

Lack of adequate infrastructure remains a key challenge to many Universities across the African continent. This secondary activity (according to Porter's value chain model) not only affects the quality of education but also works against the need to retain the limited experienced staff the country still has. Findings from the research revealed that there is a positive correlation between poor funding and the state of infrastructure at many Universities across the country. This is shown by the high coefficient of correlation R equal to 0.687.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.687 ^a	.650	.619	.171

a. Predictors: (Constant), Poor infrastructure

In support of the above finding, interviews with students further revealed that the lack of resources is indeed a key challenge.

One-Sample Test

	Test Value = 2					
	t	d.f	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Lack of learning resources (books, learning theatres etc.)	-2.112	29	.043	-.133	-.26	.00

P-value of 0.043 was found when we carried out t-test. This showed that most students agreed that there was lack of resources.

DISCUSSIONS

a) Impact of primary activities

Primary activities are divided into two streams, one for students and the other for academics, which is connected to the research aspect. Groves et al. (1997) consider student recruitment as a mixture of inbound logistics and marketing. Indeed many Universities across the continent are grappling with the challenges of managing the high demand for Tertiary Education against stagnant or some cases declining economies. Results of the research demonstrated that management of the inbound logistics is crucial in the entire value chain. The old adage of "garbage in garbage out" seems to be confirmed through this research as Universities continue to churn out graduates (output) with limited abilities due to failure in managing the recruitment process (input). This is in line with the clearly observed trend that many Universities in the country are competing on the basis of the quantity of the output rather than the quality. It became apparent that the poor performance of graduates in industry can be traced to the universities' recruitment policies and the inherent failure to retain qualified staff. This makes academic staff a rare resource, and their respective knowledge and abilities in many cases inimitable. Movement among institutions is a common feature. This includes poaching by other institutions, moving to industry, private universities. Increased competition in the sectors means that all institutions are seeking to hire the top and most promising academics in their field.

Career placement; which remains a key challenge to many African economies due to low industrialization levels, requires that institutions establish external linkages with industry that students can exploit for employment opportunities. It is critical to prepare the students in our classrooms to think about the kind of world they will encounter in the future. Higher education is a necessary and productive investment that is pervasive in its contributions and powerful in its impact – one of the keys to ensuring our future together.

b) Impact on secondary activities

The secondary support activities comprises all services offered by Tertiary Institutions such as general management, finance, human resources and any advisory services for Schools and students. This also includes academic support and student services activities like the library, any information technology services, student accommodation, career services and both academic, i.e. for new lecturers, and students. Given the current stretched capacity of many African higher education institutions and, at the same time, the significant need for additional graduate degree holders in Africa, there clearly needs to be more work done on developing effective programs and policies, at both a national and institutional level, that provide incentives for graduates to stay in or return to Africa.

The impact of supporting activities is assessed in terms of how they contribute to quality of the grandaunts. For example, Universities with good infrastructure are highly rated as this has direct implications on other elements of the value chain including the ability to attract highly skilled manpower.

CONCLUSIONS

The research proposed to evaluate Tertiary Education values chains in order to assess critical areas of need in order to provide solutions which may help many African economies to develop through managing these value chains. Our paper has thus interpreted the concept of value chain analysis as applied in Tertiary Education in Zimbabwe through an evaluation of the key value drivers and how this analysis assists Zimbabwe and indeed Africa in achieving their developmental agendas with a strong emphasis on the need to align both primary and secondary activities in our Universities.

Porter (1985) considers assessment of the elements of the value chain as critical. This suggests that all aspects are inextricably intertwined, therefore none can be neglected. Modern day educational systems require that institutions infuse technology in their bid to equip students with the requisite knowledge and skills. Porter (2001) observed that established companies that are most successful are those that use Internet technology according to strategies derived from a smart analysis of internal and external value chains and those that make “traditional activities better and those that find and implement new combinations of virtual and physical activities that were not previously possible” (Porter, 2001, p. 77). Without technology and support from policy makers, all proposed solutions are remedial. The value chain framework is still relevant today.

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