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Impact Analysis of Strategic Management and Technical University Education Standards: Sunyani Technical University in Perspective, Ghana

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Abstract:

Technical university education in Ghana is somewhat maiden hence very friable and face great pressure paving its way in the midst of an economy with its own inimitable constraints. This paper seeks to assess strategic management practices at these Technical Universities in Ghana with emphasis on the Sunyani Technical University. The results were compared with international standards to determine the practicality and visibility of the adopted policies and how strategic management could be leveraged to ensure competitive advantage and maximum productivity. This paper adopted pragmatic research approach and was also exploratory in design. Quantitative and qualitative data were gathered from primary and secondary sources. The findings show that institutional effectiveness is positively influenced by strategic management: strategic resources, internationalization and innovation ecosystem were noted to impact positively on institutional effectiveness.

Keywords: *Technical university, strategic management, polytechnic, institutional theory, innovation ecosystem, internationalization, higher education*

1. Introduction

Strategic management has over the years gain recognition especially in higher educational institutions (Abukari & Corner, 2010). Contemporary, higher educational institutions are been run as business entities simply because they are confronted by the reality of working in a more globally competitive environment. Government policies and stakeholders' expectations coupled with the inevitable recurring issues of financial constraints and other significant internal and external forces thwarts the smooth operation of these institutions.

Technical University education in Ghana which started in 2016 could be considered as maiden hence very friable and face great pressure paving its way in the midst of an economy with its own inimitable constraints. Technical Universities' success in attracting resources and high-caliber staff and students, and perhaps an all-inclusive transformation from polytechnic to a University business model, which are essential for long-run survival requires a holistic approach. This paper critically assesses the strategic management practices in Technical Universities in Ghana and the outcome compared with international standards to ascertain how practical, and effective adopted strategic management policies are to the enhancement of national and international visibility of Technical Universities.

Additionally, this paper explores how Technical University education could be strategically managed, sustained and enhanced by establishing new University business models, nonetheless sustaining commitments to the prime purpose of the University. The paper is set to spur enormous contributions on how improved management theory could be integrated into the management of the University. Furthermore, the paper offers illumination and in-depth insight into the strategic management practices of Technical Universities in Ghana by comparing them with standards of higher education of some developed economies.

2. Literature Review

Armstrong (2010); Hill, Jones, and Schilling (2014), posit that the definitive goal of strategic management is to aid organizations further augment its flexibility, effectiveness and efficiencies. Armstrong and Taylor (2014), defined strategic management as encompassing the analysis, decisions, and actions an organization assumes in order to establish and ensure competitive advantages. Hill and Jones (2011) defined strategic management as a development and processes in an organization management comprises of establishing the mission, vision and goals, analysis of external and internal business environment, selection of an advantageous strategy, strategic planning, and proposals for organizational, administrative changes, establishing control systems, implementation of strategy and strategy evaluation.

Thompson and Martin (2010), contends that strategic management contributes significantly to the growth and enhancing efficiency in organizations of all types – diversified or single product orientated; international or local; large or small and profit making or non-profit making. Freeman (2010) assert that organizations which practice strategic management concepts and techniques generally do better than those that do not. From the aforementioned on the relevance of strategic management practices and tools in enhancing competitiveness among organizations, it is expedient to explore strategic management practices in Technical Universities in Ghana and its implications on the institution in their quest to become globally competitive and attain the purposes for which they were established.

3. Theoretical Framework

The study is tied down on institutional theory derived from considerable research writings on institutional sociology by (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Scott, 1987). This theory basically emphasizes on the impact of an institution's environment and the cognitive, normative and regulative structures that encompasses the institution. It endeavours to clarify how these structures affect the activities of the firm. These structures give solidness to activities, schedules and cultures; define legality and constrain activity. The theory centers around how establishments are made, how they pervade social orders and businesses; and lastly how organizations change after some time. Institutional scholars battle that an institution's authenticity explains survival. An institution (school) succeeds if everybody concurs it is a school; it comes up short if nobody trusts that it is a school notwithstanding little respect to its accomplishment in instruction or socialization. Institutional theory helps our comprehension of the weights for institutions to end up more comparable, which diminishes institutional assorted variety.

Technical universities though new in the Ghanaian context has existed over decades in other countries like South Africa, Germany, and Singapore. Thus, for Technical Universities in Ghana to pick up acknowledgment across the country and compete globally, there is the need for them to fit in with unmistakable and satisfactory benchmarks inside their field of operation which would help encourage the institution's authenticity. Bresser and Millonig (2003) contends that the environment within an institutional theory structure constrains the discretion of institutions to participate in certain strategic exercises and pressures organizations toward conformism. Institutional theory underlines the normative effect of the environment on institutional activities. Universities exist within an institutional domain in which outside partners decide to an extent the expectations for institutional conduct and practices (Dacin, Goodstein, & Scott, 2002). Thus, institutional theory contends that the environment decides authoritative alternatives and breaking points prudence in the decisions accessible for university administration. External pressures for similarity drive the scope of choices accessible for institutions. Institutional scholars describe two sorts of organizations: technical and institutional organizations, in any case, this paper centers around the later. Institutional organizations utilize equivocal technologies, (for example, teaching or research) to deliver yields (new knowledge) where quality and productivity demonstrates hard to determine (Morphew & Huisman, 2002). For this situation, rather than productivity, the institution endeavors to create activities and structures identifiable both locally and globally as authentic. Caplow, (2017), universities work within an organizational field where an assortment of external bodies recommend how institutions ought to work, characterizing them as institutional organizations. For instance, government bodies, accreditation bodies, and disciplinary affiliations all endeavour to manage the activities of universities. At the point when institutions work within the regulations and acknowledged ideas, external constituents see the institution as a legitimate actor within the higher education domain. The environment at that point rewards authenticity with extra help as far as financing, quality personnel, and intrigued students. Accordingly, the more extensive environment with normative expectations gives both positive and negative support that shapes institutional conduct. DiMaggio and Powell (1983) describe these expectations and weights on the institution as the "iron cage," which pushes universities toward isomorphism. Universities take part in isomorphic propensities when following the attributes of different institutions considered successful within their specific specialty or higher education niche.

The institutional theory is adopted for this study since Technical Universities in Ghana requires both the internal and external environment in which they operate to recognise them as legitimate higher educational institutional for their survival.

4. Conceptual Framework

The conceptual framework adopted for this paper is fastened to a systematic and rather complete model including components of both the strategic planning and management approach for higher education establishments created by Shirley, Peters, and Adel (1981) and modified to suit Technical University education. The model adopted for the study envelops the different segments and stages in the management process however not exhaustive. The proposed model starts with strategy formulation or strategic planning which commence with a thorough environmental scanning from which critical changes in the institutional environment are ascertained and external opportunities and threats acknowledged.

One more basic segment in the strategy formulation is the issue of internal appraisal of institutional strengths and weakness (scholarly and resources). Internal analysis is dominantly grounded on information gathered by ways of sporadically undertaking reviews of programme (academic), accessible information on human, physical and financial resources. Information from the previously mentioned stages is channelled into a so-called matching-process which relates external opportunities and threats to internal values and strengths. This information determines the strategy of the university. The mission statement, a declaration of institutional purpose– essentially goals and objectives form the strategy. The clientele, service mix or programmes of the university as well as the competitive advantage components of the institution over other institution on a similar level are controlled by the mission and objectives. The strategy is then converted into different comprehensive segments for planning purposes including however not exhaustive innovation

ecosystem (IE)- academic enterprise; infrastructural improvement or facilities plan; financial plan; student's enrolment plan, institutional plan and human resource development plan. Planning strategically is to a greater extent a conventional and periodic biennial or yearly exercises.

The strategic plans are then communicated to the various faculties and departments and various academic support units in the university where plans are developed according to strategies provided by the central administration. The created plans are synchronized into the yearly budgetary systems of the institution to help in the implementation of strategic missions and goals. The implementation stage coordinates leadership style and other relevant issues like corporate culture, legislative issues, corporate social responsibility among significant others. The last phase of a university's strategic management model is the strategic evaluation and control which includes the measurement of institutional performance. Frameworks, for example, feedback and key performance indicators are instituted and resolved to assess the viability of the adopted framework and furthermore helps in exercising command over the strategy, reformulate or construct strategies as regarded suitable.

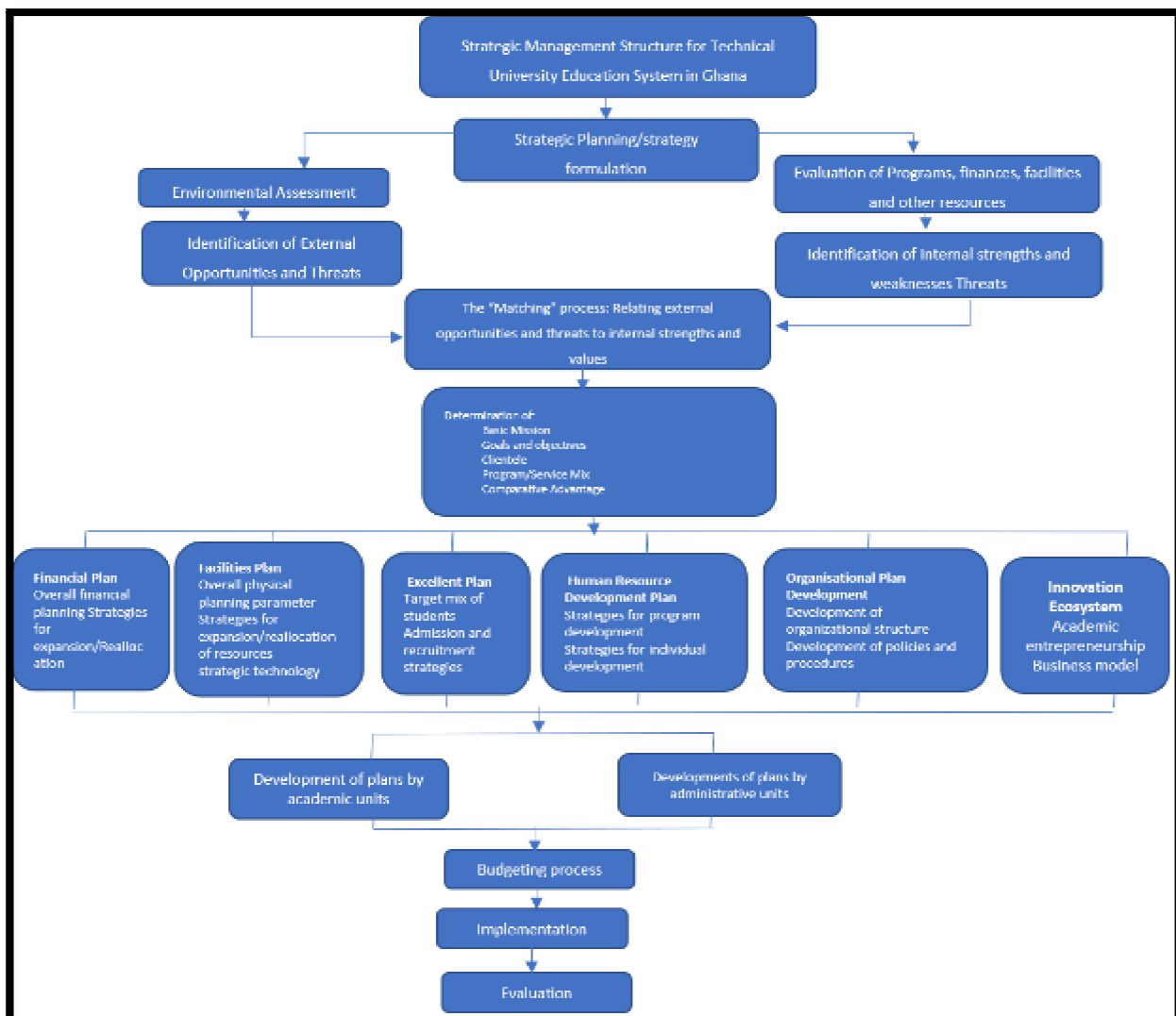


Figure 1: Proposed Strategic Management Structure for Technical University Education
Source: Adopted from (Shirley Et Al., 1981)

5. Research Methodology

The study adopted the pragmatic research approach where both quantitative and qualitative data were gathered from respondents from primary and secondary sources. The study was exploratory in design. The researchers scientifically reviewed existing literature in both developed and developing economies to obtain a global perspective on the subject under review. STU, converted from a polytechnic into a technical university in September 2016 was used as a case study institution. Nonetheless, strategic management initiatives at a couple of Technical Universities in both developed and developing economies were also examined and their standards benchmarked with STU strategic management standards. The primary data was obtained from management and faculty of STU using questionnaire and interview guides. The respondents of the study constituted thirty-six (36) management and faculty members. From the management respondent's category - the Vice Chancellor, Pro-Vice Chancellor, the Registrar and his four (4) deputies, Finance Director, Planning Officer, Internal Auditor, Librarian, Head of Research and Graduate Studies, Dean of students, University Counsellor, Head of Quality Assurance Unit and ICT Director, Purposive sampling technique which belongs to the non-probability sampling technique was used. From the Faculty members respondents' category, convenience

sampling technique was employed in selecting a representative (preferably Deans and Head of Department) from each faculty and academic department in the University. Four (4) Deans and sixteen (16) Head of Departments were selected for the study. In total the sample size for the study amounts to thirty-six (36) respondents. Secondary data was also obtained from official documents – strategic management policies of the selected institution, the Technical Universities Act 2016 (Act 922). Thematic data analysis technique was used for analyzing the qualitative data whereas mean, standard deviation and regression analysis were used to analyzed quantitative data.

6. Discussion of Findings

The analysis and discussions of the study starts with a comparative analysis of strategic resources in higher education in developed economies and that of STU. Descriptive analysis and discussions were also conducted to determine the effectiveness of strategic management in the STU. A critical impact analysis was also conducted to assess the visibility of the adopted strategic management framework in the university. The discussions end with a critical assessment on two critical areas of strategic management in higher education - internationalisation and innovation ecosystem initiatives.

6.1. Strategic Resources in Higher Education – A Comparative Analysis

The STU is a practical industrial training, learning and research centre. The administration and managerial structures are vertical, ordered to create an environment of empowerment and ingenuity at all levels. As a Technical University, its central mission is delivery practical base industrial training, learning and research to produce knowledgeable and highly skilled graduates to meet the ever-increasing competitive demands of the industrial employment market.

Standards for assessment of higher education developed by Lynch and Baines (2004) were benchmarked with strategic resources at Sunyani Technical University and tested with three variables – value; heterogeneity; and stability to determine whether they give a competitive advantage to the university. Value – does the resources aid the University with achieving excellence in education and research? Heterogeneity – are the resources heterogeneously dispersed – Qualitative interpretation? Stability – are the resources prone to fade out or will it turn out to be more heterogeneous after some time?

Lynch and Baines (2004) experienced issues defining strategic resources UK higher education. Lynch and Baines in accord with Grant (1996) partition strategic resources in higher education in the UK into three: tangible; intangible, and organizational assets. As per them, strategic resources may involve; tangible resources – location of campus; physical infrastructure capacity; conferences facilities; and medical research facilities. Intangible resources – eminent professors; patents; prestigious authors and distinguished lecturers. Organizational assets – institutional reputation; innovative capabilities; knowledge-based advantages; and core competencies.

Merged Set	Value	Heterogeneity	Stability
Campus location	Yes	Yes	Yes
Physical infrastructure	Yes	Yes	No
Patents	No	-	-
Faculty quality	Yes	Yes	No
Reputation	Yes	Yes	Yes
Networks	Yes	Yes	No
Student quality	Yes	Yes	Yes

Table 1: Testing Strategic Resources at the Sunyani Technical University with Developed Criteria

Source: Author's own construction

Sunyani Technical University has an excellent campus location. Sunyani Technical University campus is situated in the Sunyani township, along the Sunyani Kumasi main street. Value - In managing strategically in a University, campus location is extremely vital. Where people live matters to them very much, thus, campus location has effect on the University's ability to draw in students and staff. Proximity to a vast populace is a favorable advantage to the Sunyani Technical University. Its location in Sunyani, the capital of Brong Ahafo region gives it advantage of attracting students from the three regions in the northern sector which have few higher educational establishments and furthermore from Ashanti and Western Region which likewise have fewer higher educational institutions. The Brong Ahafo Region itself remains not completely exploited with regards to secondary school leavers waiting to enter into higher education. The location of the University additionally positions it for sponsorship facilities from donor agencies for research and also corporate with close-by Universities. Heterogeneity – at present, there are universities all over Ghana in both rural and urban territories with different economic and demographic attributes. The good location of the Sunyani Technical University campus makes the University heterogeneously distributed among other universities. Stability – the cost of moving the university to a different location is exceptionally difficult since enormous cost is involved, subsequently it is likely that the university will remain where it is.

A strategic resource at the STU is physical infrastructure though there is more room for improvement. Examples includes building capacity, conference and research laboratories. Research facilities, medical center, lecture rooms Lecture rooms, conference halls, laboratories among significant other physical infrastructure are essential to carryout effective education and research work, hence improved physical infrastructure development will naturally lead to quality education and excellent research. Physical infrastructure of the university was noted to be heterogeneously dispersed with varying

quality. Again, there were no know barriers that prevented the university from obtaining infrastructure, so any differences could be cancelled out with sufficient resources.

Patent is the exclusive right to a technology or invention. Patents were noted to have no significant effect on the institution. Patents were noted to generate marginal income compared to the cost of research and do not contribute to make the education better.

The Sunyani Technical University was noted to have good faculty. Quality of faculty (both administrative and academic staff) is a palpable key to excellence both in research and education. The faculty of the university was noted to be heterogeneously dispersed among the various schools and departments. Stability of faculty was conditional. Faculty are more mobile than students and alumni since they can be "bought" with high salaries and generous research funding. At the STU, tradability of faculty was not limited since there were a couple of institutions which were offering high salaries and incentives. Because of this negative feedback loops where good faculty is attracted to other institutions, the resource heterogeneity is likely not to remain.

The STU is still at the verge of uplifting its image. Citizens were noted to still rate the University as second rate to the traditional universities in Ghana, an image which is inherited from the old polytechnic education. Reputation and prestige were upheld in high esteem at STU since it brings about excellence in education and research by attracting good students and faculty and giving credibility to the university. Prestige and brand at STU were heterogeneously distributed. The university was considered better than many others and even among other Technical Universities in the country. Again, because of the mechanisms that concentrate good students and faculty to a few institutions it is likely that the reputation and prestige of STU will increase. The increase in the reputation and prestige of STU could be attributed to the introduction of new academic programmes.

STU was noted to have good network system. This includes personal networks of students, alumni and faculty, but also connections and alliances at a more institutional level, for example exchange programs with universities overseas. STU was noted to have good students – talented, diligent and able students. They were willing to engage in extracurricular initiatives which strengthens the university community. Good students help to attract new good students which make student quality extend beyond the time span of a degree program. Good students had value at the STU since it contributes to excellence in education. It was noted that most able students are increasingly concentrated to a few elite institutions especially the traditional universities in the country. The number of top students is limited, hence the resource (good students) can unquestionably be considered rare and heterogeneously dispersed. With regards to stability, once a student has enrolled at a university, it is improbable that another university will be able to recruit him or her, hence attracting good first-year students is the foundation for attaining this resource of good students. It was noted that once an institution has been able to build up a high student quality, the situation is probable to remain stable. In a nutshell, student and alumni quality is easy to maintain once acquired due to positive feedbacks loops, nonetheless, very difficult to build up from scratch since this requires many other resources employed over long time so resource heterogeneity is likely to be stable or further increase.

6.2. Effectiveness of Strategic Management Practices Employed by Sunyani Technical University

Strategic management practices at the Sunyani Technical University was assessed to determine its practicability. Statistical mean analysis was used to assess the averages of the responses to the data sets. In the analysis, a mean figure below 3 was measured to be low and skewed towards total agreement with regards to a strategic management variable whilst a mean figure above 3 was considered to be high and skewed towards total disagreement of a strategic management variable. To measure variability and spread of the data set and relationship of the mean to the rest of the data, standard deviation was calculated. Table 2 is a descriptive statistic illustrating the effectiveness of strategic management practices employed at STU.

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Aligning Initiatives with Strategy	36	1.00	5.00	1.9706	1.29065	1.666
Institution Structured for Strategy Implementation	36	1.00	5.00	1.8824	1.29719	1.683
Staff are fully informed about strategy	36	1.00	5.00	2.4412	1.37491	1.890
Staff are fully engaged in strategy implementation	36	1.00	5.00	2.0000	1.45644	2.121
Strategy is monitored and adapted where necessary	36	1.00	5.00	2.1765	.99911	.998
Valid N (listwise)	36					

Table 2: Effectiveness of Strategic Management Practices Employed by Sunyani Technical University

Source: Field Survey, 2018

Interestingly, as evident in Table 2, STU manage strategically by aligning initiatives with strategy. This statement had a mean of 1.97. Again, the institution was noted to practice strategic management by structuring the institution to be effective in its strategy implementation. This statement had a mean of 1.88. In addition, as part of managing strategically the institution was noted to be keeping staff of the institution fully informed about institutional strategic direction. This statement also had a mean of 2.44. Furthermore, the institution was noted to practice strategic management by engaging

staff fully in strategy implementation. This statement had a mean of 2.00. Finally, strategic management practices at STU was noted to encompass monitoring strategy and implementation in order to adapt it where necessary to meet the challenges and realities of the times. This statement had a mean of 2.18.

		Strategic Resources	Internationalization of the University	Technology, Creativity and Innovation
Institutional Effectiveness	Pearson Correlation	.912**	.923**	.891**
	Sig. (2-tailed)	.000	.000	.000
	N	36	36	36

Table 3: Correlation between Strategic Management and Institutional Effectiveness

** Correlation Is Significant at the 0.01 Level (2-Tailed)

Source: Field Survey, 2018

The significant 2-tailed level is .000 shows that there is significance between strategic resources and institutional effectiveness and the relationship is 91.2 percent which means that as one variable goes up or down so will the other. Again, the results of correlation coefficient using Pearson correlation indicated that there was a moderately significant correlation between internationalization of the University and institutional effectiveness and the relationship is 89.1 percent ($P=.891^{**}$), since the significant level was less than (0.01). Similarly, there is a correlation between technology, creativity and innovation and institutional effectiveness as the significant 2-tailed level is .000 and the relationship is 92.3 percent ($P=.923^{**}$). Generally, the correlations among strategic resources, internationalization of the University and technology, creativity and innovation and institutional effectiveness have demonstrated moderate levels of correlation. Furthermore, a linear regression model was conducted in order to indicate the impact of each of strategic resources, internationalization of the University and technology, creativity and innovation separately as independent variables on institutional effectiveness as a dependent variable as shown in Table 4.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	.034	.182		.187	.852
	strategic resources	.649	.156	.631	4.154	.000
	technology, creativity and innovation	.372	.133	.407	2.794	.006
	internationalization of the University	.108	.171	.099	.633	.528
Dependent Variable: institutional effectiveness Source: Field Survey, 2018						
ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	184.693	3	61.564	178.957	.000 ^b
	Residual	28.898	84	.344		
	Total	213.591	87			
Source: Field Survey, 2018 Dependent Variable: institutional effectiveness						
b. Predictors: (Constant), strategic resources, internationalization of the University and technology, creativity and innovation						
Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	FChange df1
1	.930 ^a	.865	.860	.58653	.865	178.957 3

Table 4: Linear Regression for the Impact of Strategic Management on Institutional Effectiveness

Source: Field Survey, 2018

The results of regression model as shown in Table 4 indicated that there was a positive relationship between strategic resources and institutional effectiveness since the significant level was less than (0.01). The findings indicated that strategic resources explain .000 of significance in institutional effectiveness, since this value is low that means strategic resources is also a good predictor in institutional effectiveness. Thus, in the standardized coefficient, if strategic resources increase by one-unit, institutional effectiveness will increase by .631 unit. It is also found that there was a positive relationship between technology, creativity and innovation and institutional effectiveness since the significant level was more than (0.06). Internationalization of the University also indicates a relationship on institutional effectiveness with a .528 level of significance. Therefore, if internationalization of the University increases by one-unit, institutional effectiveness will increase by .099 unit. The researcher concluded based on the findings of this study that there is a positive relationship between strategic management as measured by strategic resources, internationalization of the University and technology, creativity and innovation and institutional effectiveness.

6.3. *Internationalization is Critical in Managing Strategically in the Sunyani Technical University*

A distinctive feature of the strategic management of the Sunyani Technical University Strategic Management Policy is the component of internationalization. The internationalization agenda enables the institution to increase both national and international visibility, leverage institutional strength through strategic partnerships, develop sturdier research groups and also add vital, current learning outcomes to faculty and students experience. Hudzik (2014), Internationalization comes in two major dimensions and one facet sometimes referred to as internationalisation at home, consists of incorporating intercultural and international dimensions into the curriculum, teaching, research and extracurricular activities and hence helps students develop international and intercultural skills without ever leaving their country. Hénard, Diamond, and Roseveare (2012), other fast-growing forms of internationalisation are emerging (e.g. transnational education sometimes delivered through off-shore campuses, joint programmes, distance learning, etc.) and suggest a more far-reaching approach, especially where higher education is now seen as an integral part of the global knowledge economy. A significant goal of internationalisation in Technical University education in Ghana is to provide the most relevant education to students, who will eventually be the citizens, scientist and entrepreneurs of tomorrow. The issue of internationalisation is not holistically an end in itself, nonetheless, a drive for improvement, thus aid build skills needed to sustain growth and development in the 21st century and as well engineer innovation and create an enabling environment and also foster job creation. Internationalisation aids students to achieve their educational goals via quality education and as well pursue research. It offers students real time and real-world experiential learning in areas that cannot simply be taught. It also offers institutions to gain global reputation. Hénard et al. (2012) the main reasons for internationalization are, in order of importance, to improve student preparedness; internationalize the curriculum; enhance the international profile of the institution; strengthen research and knowledge production; and diversify its faculty and staff.

Taking into cognizant various disparities from economy to economy and institution to institution, it is widely acknowledged that internationalization from a comprehensive strategy can offer students, faculty and institutions valuable advantages. It can engineer strategic thinking leading to innovation, offer platform to modernize pedagogy as well stimulate faculty and student's collaboration and new tactics to learning assessment.

Internationalization in Sunyani Technical University will enable educators and students gain a greater awareness of the global issues and how educational systems operates across countries, cultures and languages. At present, the University has signed MoUs with two Universities in Germany and the USA separately. The MoUs center around Academic Exchange programs between the STU and the UMES, Maryland, USA and Fochoschule Dortmund, in Dortmund, Germany to exchange staff and students. In the MoUs, students will be permitted to take at least a semester course in Germany or Maryland in the USA and their credits will be transferred to the STU when they return. Students on STU Pharmacy Technology program, after completion, will likewise have the chance to enroll on a 3-year Doctor of Pharmacy (Pharm-D) program at the UMES, USA, to have the capacity to hone as expert Pharmacist after their training. Additionally, summer vacation employment has been organized for Tourism and Hospitality students of STU at Ocean city in Maryland, USA, a world class tourism centre, to enable them to increase their practical experience and global exposure in the Hospitality and Tourism industry beginning from June, 2018. The Department of Agric likewise have the chance to send six staff to the UMES for training under the sponsorship of a US government's sponsorship.

6.4. *Managing Strategically to Sustain and Enhance Technical University Education – Innovation Ecosystem is Critical*

Managing strategically to sustain a productive Technical University Education in Ghana requires an integrative holistic approach. Innovation ecosystem models in the university context focuses on the economic dynamics of relationships that accrue between actors or entities whose practical goal is to empower technological development and innovation. In the Technical University setting, the actors would incorporate the materials assets (funds, physical infrastructures, facilities and so forth) and human capital (students, faculty, industry representatives and so on); institutional units taking part in the ecosystem (university, schools and departments, businesses, venture capitalists); industry-university institutes (e.g. Brong Ahafo Research & Economic Centre - BAREC); national or local economic development and business assistance associations, funding agencies, policy makers etc.

In the Technical University structure, an innovation ecosystem includes two discrete, regardless, to a great extent separated economy, the research economy – predominantly driven by fundamental research; and a commercial economy – driven by the market environment. The two major approaches to increment in economic output in an economic setting are to firstly increase the quantity of inputs in the productive processor secondly to consider newer approaches to get more output from the same level of inputs. The latter is the soul of what is sketchily referred by Schumpeter's ideology of innovation. Innovation is defined as the introduction of new or altogether enhanced products – goods and services; organizational procedures; processes; and marketing techniques in internal business procedures or the market environment. Innovation is apparently believed to be an essential ingredient for significant wealth generation within an economy. This conviction is the foundation of Ghana's government strategy for economic recuperation and growth.

6.5. Model of Innovation Ecosystem in the Technical University Context

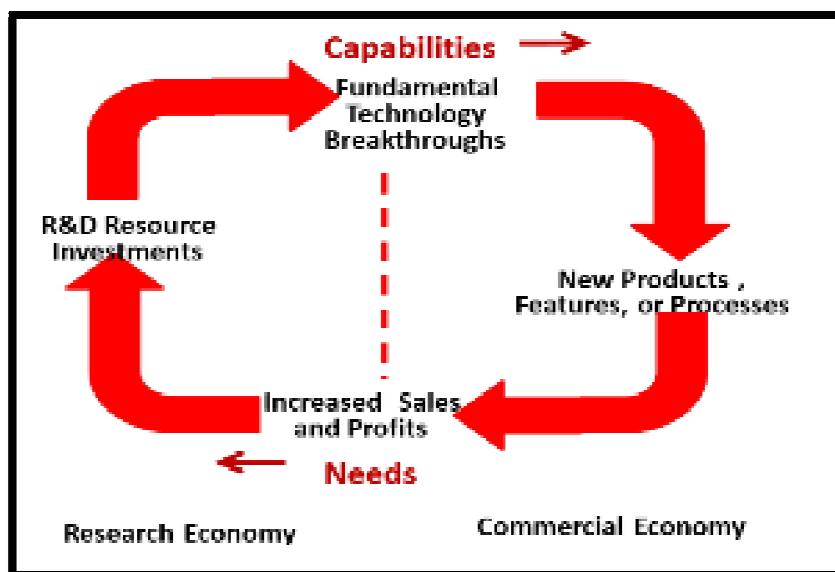


Figure 2: Virtuous Cycle Depicting How Research and Development (R&D) Resource Investments are Replenished through Increased Profits in the Commercial Economy in a Thriving Innovation Ecosystem
Source: Adopted from (Jackson, 2011: 4)

At the point when the IE induced development in profits surpasses the initial R&D investment, rather than being balanced, the IE is said to be growing. Obviously, the goal of most government entities that fund innovation is to put their economies into a growth phase with expanding taxable income.

6.6. Innovation Spectrum in Sunyani Technical University

Major areas of innovation exclusive to STU includes: commercial Auto Mechanic services (Department of Mechanical Engineering); commercial carpentry and joinery services (Department of Wood Technology); commercial food production and processing (Department of Agriculture); commercial fashion and industrial art services (Department of Industrial Art); commercial eatery (Department of Tourism and Hospitality); Construction Consultancy Services (School of Engineering); and commercial binding and reprographic services at the University Library. The STU is strategically positioned in an atmosphere where these IE will flourish when given innovation touch. Manageability of such projects is visible given the accessibility of ready market and raw materials in expansive quantities.

A critical policy scan of the STU's strategic management policy revealed that the impediment to creating growth in an IE is figuring out how to transform the breakthroughs of R&D energies into profitable products. Accomplishing this objective is convoluted by the fact that the two economies work on various reward frameworks, in this way making it challenging to connect discoveries from fundamental research with creative items that can convert into profits in the commercial environment.

Another challenge is the scarcity of resources for execution, for technology exhibition and development. In Figure 3, the innovation spectrum demonstrates the dispersion of assets invested in into projects aimed at discovery, technology demonstration, technology development and commercialization. At the furthest left of the spectrum (i.e. where academic research is concentrated), there is an overwhelming convergence of institutional and significant partners' investment in fundamental research; while to the furthest right of the spectrum (i.e. in the commercial market environment) there is a considerably larger amount of industry investment in direct products and services development. This gap in resources for Technology Demonstration and Development (TD&D) is casually known as the Valley of Death. The actors involved with moving innovations from the discovery through commercialization are the academia, small business entities, the investors, and commercial industry. For these actors, it is mostly with this valley that numerous potential innovations die for non-existence of the resources to develop them to a phase where industry or the investors can recognize their commercial potential and assess the risk related with putting up them in the commercial market.

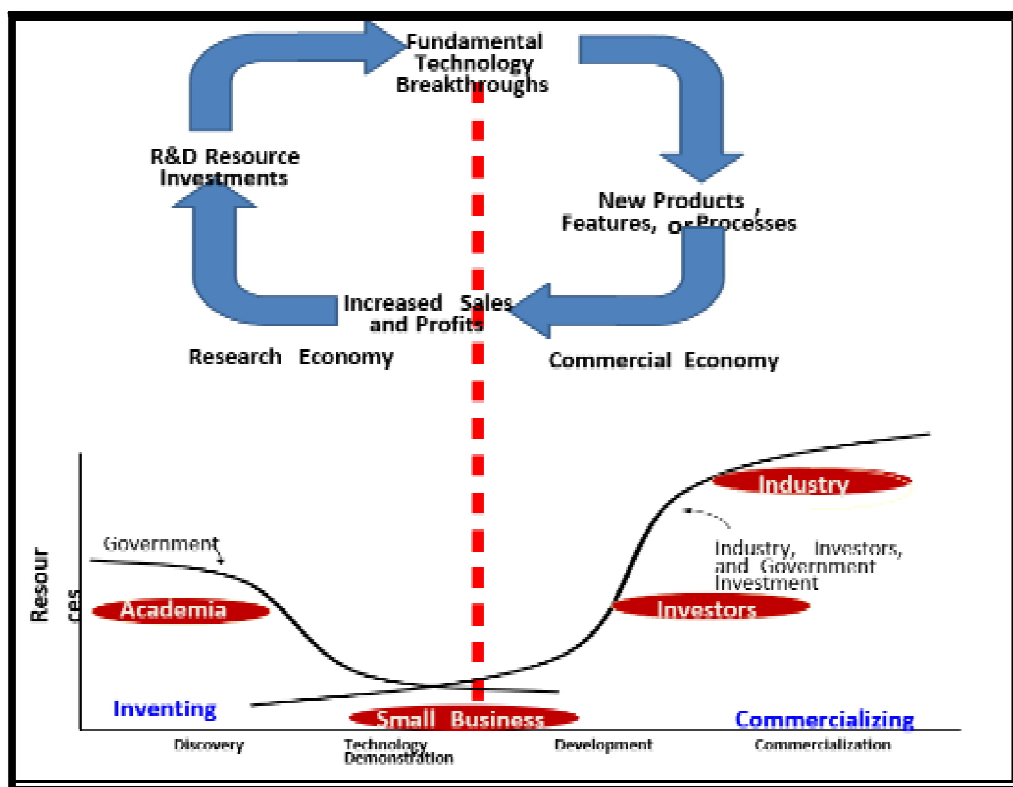


Figure 3: Innovation Ecosystem Spectrum
Source: Adopted from (Jackson, 2011: 4)

Figure 3 links the innovation Spectrum to the two economies in the virtuous cycle; thereby illustrating the projection, along the different development stages, of the available resources within an ecosystem for discovery, technology development, and commercialization

One may gullibly expect that the best method for helping the ecosystem to flourish is by considerably expanding TD&D resources available in the Valley of Death. Though this may effectively move more innovations into the commercial circle, it doesn't warrant a flourishing IE on the grounds that the presumption neglects to account for resource limitations and different vulnerabilities that could restrict development and profits in the commercial environment. To legitimately account for these vulnerabilities, a better comprehension of the difficult-to-model economic dynamics within the ecosystem is required. In any case, when the framework is required to fulfil the constraints to the virtuous cycle, a straightforward resource projection of the model uncovers that the impact of expanding the TD&D investments and additionally decreases the ecosystem's aggregated profits, in this manner requiring an enormous innovation induced profit, to finish the virtuous cycle.

To summarize all, fundamental research is an important element for the development of transformational innovations that have potential for conveying vital economic development. In any case, sustainability policies ought to be first considered in IE initiatives.

6.7. Practical Implications

The findings of this study have several vital implications for major stakeholders of Technical University in Ghana. As a contribution to existing writing, this paper has offered one of the conceptualizations on what exist between strategic management and Technical University management in the Ghanaian setting. Empirically, this study has given sound evidence to internationalization and IE and their implications in managing strategically Technical University Education.

7. Conclusion and Recommendations

For Technical Universities to live up to expectations amidst of an economy with several challenges, strategic management is the way forward. This study reveals that it is critical for higher educational institutions irrespective of its geographical setting to focus on how best to leverage strategic management into its managerial function. Internationalization and IE as studied in this paper are noted to impact positively on higher educational institutions in several dimensions. Both variables when strategically managed can give the institution a competitive advantage and high productivity. The study recommends that Management of Technical Universities should allocate sufficient resources to support and augment the strategic management policies and practices since strategic management policies come with associated cost implications and for them to see light, they need adequate funding and resource allocation. Again, management should regularly review strategic management policies of the institution to ascertain loopholes, shortcomings, and potentials limitations that might accrue out of the policy.

8. Limitations and Suggestions for Further Studies

This paper offers various ramifications for both theory and practice. Notwithstanding the vital illumination this study has given regarding the subject under survey, there are a couple of limitations that ought to be noted, consequently addressed by future researchers in this field of study. Geographical, the study was restricted to Sunyani Technical University, as results the findings cannot be generalized to other Technical Universities in the nation. Internationalization and IE are not the only variables to consider when looking at Strategic management in the Technical University context; other contributory variables may be identified with further studies.

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