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The Role of Government Promotion in Advancing Open Innovations among Science and Technology Parks in Africa

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Abstract: ***Open innovation advances sustainable development, fosters collaborations and partnerships among key stakeholders. However, open innovation appears to be a phenomenon of developed economies with emerging and developing economies significantly lagging behind. This study investigates how government promotional roles influence open innovation within Science and Technology Parks (STPs) across Africa. Using a cross-sectional descriptive design, data was collected from 70 managers across 14 STPs through structured questionnaires. Reliability and validity were established using Cronbach's alpha and the Kaiser-Meyer-Olkin (KMO) test. Linear Discriminant Analysis (LDA) revealed that government promotional efforts account for approximately 75.7% of the variation in open innovation classification, with a canonical correlation of 0.870. The model achieved 90% classification accuracy in both original and cross-validated cases. Findings highlight the strategic importance of government-led initiatives-such as funding schemes, partnership facilitation, and reward systems—in driving innovation ecosystems within STPs. The study recommends that African governments intensify their promotional strategies to foster sustainable innovation practices across sectors.***

Keywords: open innovation, government policy, science and technology park, Africa, innovation promotion

1. Introduction

1.1 Background of the Study

The African Union (AU) Agenda 2063 highlights the importance of innovation and technology as drivers of economic growth, job creation, and sustainable development. It advocates transforming African economies into knowledge-based systems fueled by innovation. This study aligns with Agenda 2063 by investigating how governments can foster conducive environments for innovation and technology development through science parks. It examines mechanisms for supporting the creation, diffusion, and commercialization of knowledge and technology. Globally, approximately 78% of large multinational corporations have adopted open innovation practices, with industries such as pharmaceuticals, information technology (IT), and automotive sectors leading the way, Chesbrough & Bogers (2014). This shift has been driven by the need to leverage external knowledge and reduce R&D costs. By 2020, over 50% of global innovation collaborations involved partnerships between businesses and universities, research institutions, or startups. Europe and North America lead these initiatives due to well-established ecosystems for collaborative innovation, Randhawa, Wilden & Hohberger (2016). Open innovation in Africa is an emerging and evolving concept, with various regions and sectors beginning to recognize its potential. While Africa faces unique challenges, such as infrastructure and funding constraints, the continent is also leveraging its strengths, such as a growing tech-savvy youth population and innovative startups, to drive open innovation (Adegbile and Sarpong, 2018). A survey of technology firms in Africa revealed that 36% engage in open innovation, particularly in agriculture, healthcare, and fintech. Collaboration with international organizations and local startups has played a significant role in fostering innovation, Amankwah-Amoah, Osabutey & Egbetokun (2018). In South Africa, approximately 40% of SMEs in the technology sector practice open innovation, driven by platforms like OpenIX and government initiatives supporting innovation hubs. Nigeria has seen the rise of innovation in agriculture and renewable energy due to open innovation partnerships supported by international NGOs, Egbetokun, Siyanbola & Adeniyi; 2017.

In Africa, the Science, Technology and Innovation Strategy for Africa 2024 (STISA–2024) places science, technology and innovation at the epicentre of Africa's socio-economic development and growth. STISA documents five programmes; to improve policy conditions, building innovation mechanisms, including science and technology policies, and their measurement through the African Science, Technology and Innovation Indicators (ASTII) initiative. The founding of the African Observatory on Science, Technology and Innovation (AOSTI) and the African Innovation Outlook series (AU, 2010, 2014b, 2019) indicates African governments' commitment to science and technology as a backbone of the economy.

In Kenya, 29% of ICT firms reported engaging in open innovation practices, particularly through partnerships with startups, universities, and research institutions. This trend is heavily influenced by the ICT sector's growth, including the Silicon Savannah ecosystem, Gathungu & Mwangi; 2018. Kenya is ranked 8th among 28 economies in Sub-Saharan Africa in the 2023 Global Innovation Index (GII) report by the World Intellectual Property Organization (WIPO). Kenya Vision 2030 aims to transform Kenya into a newly

industrialized, middle-income country driven by innovation and technology.

1.2 Problem Statement

Open innovation has transformed the way organizations approach innovation by integrating internal and external ideas to accelerate innovation processes (Chesbrough, 2003). Despite its widespread adoption in developed economies, there remain significant gaps in understanding and implementing open innovation in developing regions such as Africa. Such gaps are reflected in the uneven adoption, policy effectiveness, and unique challenges faced by organizations in these regions.While over 80% of large firms in developed countries report using open innovation strategies (Chesbrough, 2006; West & Bogers, 2014), only 30% of European SMEs actively engage in such practices, highlighting adoption gaps even in regions with established frameworks (European Commission, 2020). In Africa, open innovation adoption is nascent, hindered by challenges such as limited infrastructure, insufficient funding, and inadequate policy frameworks (Adegbile & Sarpong, 2018). Only 20% of African firms engage in open innovation compared to over 50% in more developed regions underscoring the need for tailored approaches.

Governments play a pivotal role in fostering innovation ecosystems. In Science and Technology Parks (STPs), open innovation serves as a catalyst for technological advancement and economic growth (Runiewicz-Wardyn & Eliashvili, 2022). Global leaders such as the United States, Singapore, and Israel dominate innovation rankings, while some African countries show promise in specific areas like venture capital and digital technology adoption (Pagani et al., 2023). However, despite increasing technological proficiency across Africa, rising from 25% to 41% in recent decades (Lee, 2001), understanding the factors influencing open innovation within STPs remains limited. Existing literature highlights the role of government in fostering innovation through funding, policy formulation, and regulatory frameworks (Kang & Park, 2016; Savage, 2015). Yet, the strategic role of African governments in driving open innovation within STPs is underexplored. Most studies adopt a silo-based approach, focusing on single countries or variables, thereby neglecting a broader, multi-country perspective necessary to understand open innovation across diverse cultural and economic contexts. STPs in Africa aim to enhance collaboration among academia, industry, and government (De Beer et al., 2020). However, the mechanisms through which government policies, funding, and promotional roles influence STP openness and innovation remain poorly understood. Furthermore, the mediating effect of STP size on open innovation practices has not been comprehensively examined.

This study addresses these gaps by investigating the strategic role of government in driving open innovation among STPs in Africa. By analysing key government interventions, including policies, funding mechanisms, and promotional roles, the research aims to provide actionable insights for policymakers, STP managers, and stakeholders. It also evaluates how the size of STPs moderates open innovation practices, offering a holistic perspective. The study draws on data from 14 IASP-registered STPs across Africa, representing a comprehensive analysis across time and geographic locations. By addressing these critical gaps, the study contributes to the limited empirical evidence on open innovation in African STPs and provides guidance for fostering innovation ecosystems tailored to the region's unique needs and challenges.

2. Literature Review

2.1 Tripple Helix Model

The Triple Helix model of innovation, conceptualized by Etzkowitz and Leydesdorff (2000), provides a framework for understanding the complex interactions between universities, industry and government in fostering innovation. The framework emphasizes the importance of collaboration among these three spheres to create a dynamic environment conducive to open innovation. The Triple Helix model posits that the interactions among universities, industry, and government are key drivers of open innovation with each sphere playing a key role in driving open innovation (Etzkowitz & Leydesdorff, 2000).

Governments play a strategic role in the Triple Helix model by creating supportive policies, providing funding and infrastructure, and facilitating collaboration. They perform a critical role in shaping the innovation landscape through strategic policies and regulations. Establishing clear regulations that support emerging industries and technologies can reduce barriers to open innovation (Edquist, 2005). Governments are pivotal in providing the necessary funding and infrastructure to support open innovation as well as grants and subsidies for university research and public-private partnerships (Geuna & Martin, 2003). Establishing and maintaining science and technology parks that provide essential facilities and services for innovators through infrastructure development remains a strategic role for governments (Phan et al., 2005). The Triple Helix model suggests that the synergy between universities, government and industry can significantly enhance innovation capabilities and economic development. The model assumes that academia, industry and government possess relatively equal capabilities and resources to contribute to innovation processes. Conversely, it is conceptualized in this study that government can drive open innovation through promotional role in policy, laws and regulations within the academia and industry players. This theory supported the objective that analyzed the influence of government promotional role in driving open innovations among Science and Technology Parks in Africa.

2.2 Empirical Literature

Open innovation offers a pathway to overcome these challenges by enabling African countries to leverage global knowledge networks, enhance local capacities, and drive inclusive growth. Their interventions can significantly influence the innovation capacity of a region by creating an enabling environment for R&D, facilitating public-private partnerships, and providing the necessary resources and incentives for innovation activities (Phan et al., 2005). Investing in modern research laboratories, co-working

spaces, and high-tech facilities within STPs creates an enabling environment for innovation. These investments attract both local and international companies to set up operations within the parks (Hobbs et al., 2017). Facilitating partnerships between universities and industries through joint research initiatives, technology transfer programs, and collaborative innovation projects can enhance the overall innovation ecosystem (Borras& Edquist, 2005). Governments partnerships can accelerate the commercialization of innovations and reduce the financial risk for both parties (Hodge & Greve, 2007). Additionally, participating in global innovation networks and platforms allows African STPs to access international markets, knowledge, and funding. Governments can support participation in international conferences, trade missions, and innovation competitions (Dutta et al., 2021).

Effective reward systems can significantly enhance the innovation ecosystem by recognizing and rewarding contributions to open innovation. Firstly, establishing national and regional awards that recognize outstanding contributions to innovation can boost the visibility and reputation of innovators. These can include medals, certificates, and public acknowledgments (Chesbrough, 2003). Secondly, offering expedited processing of patents for high-potential innovations encourages inventors to share their ideas more quickly, facilitating faster commercialization (Chandra & Liaqat,2019). Thirdly, providing free or subsidized access to state-of-the-art laboratories, research facilities, and co-working spaces helps reduce barriers to entry for startups and small businesses (Republic of Kenya, 2012). In addition, South Africa offers significant tax incentives for companies engaging in R&D activities, encouraging both local and international firms to invest in innovation within the country (Westmore, 2013) in addition to providing a tax deduction for companies undertaking scientific and technological R&D. This incentive encourages private sector investment in innovation by reducing the effective cost of R&D activities. Kenya's Digital Economy Blueprint outlines strategies to enhance digital infrastructure, promote e-commerce, and support innovation in digital technologies, positioning the country as a leader in Africa's digital transformation (Union, 2020). Rwanda's ICT policy focuses on building digital infrastructure, enhancing ICT skills, and promoting innovation through initiatives such as the Rwanda Innovation Fund (Sharangabo, & Szczepaniak, 2020). This literature suggests that statistically, that the scale of open innovations among the STPs in Africa can be predicted by the level promotional role of government in their respective countries

2.3 Conceptual Framework of the Study

Government promotional role among Science and Technology Parks (STPs) in Africa was conceptualized as the predictor for open innovation scales.

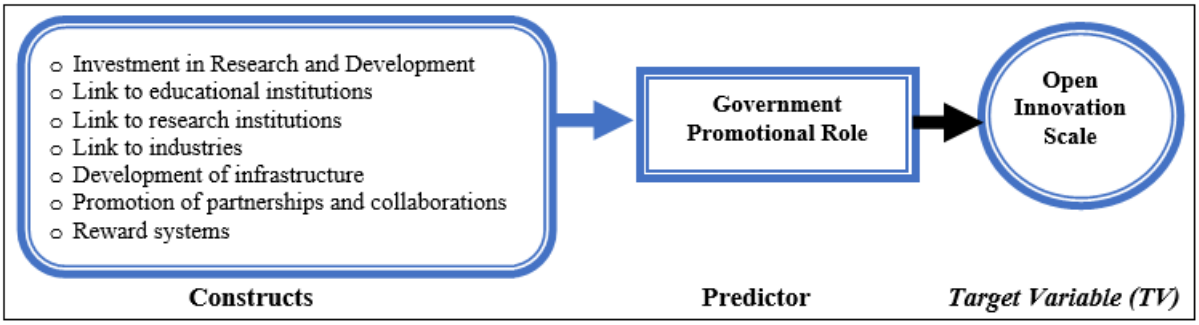

Figure 1: Conceptual Framework for Promotional Role of Government and Open Innovations among STPs in Africa

2.4 General Objective

The general objective of this study was to analyze government promotional role in driving open innovation among Science and Technology Parks in Africa.

2.5 Research Hypothesis

This study tested the hypothesis that H01: Government promotional role is not statistically significant in predicting open innovation among Science Technology Parks in Africa.

2.6 Research Gaps

Most of the studies carried on open innovations and specifically within Science and Technology Parks have focused on the government initiates in general and are country specific, limiting generalization among the STPs in Africa. In addition, most of the studies have analyzed the possible roles of government and its effect on innovation outcomes. However no study has answer the question, does government role have bearing in predicting "open innovation success" among STPs in Africa?. No study has applied a predictive model to explain if actually government promotion initiatives can explain open innovations among the STPs in Africa. As such, this study sought to examine the promotional role of government in predicting open innovation among STPs in Africa.

2.7 Significance of the Study

The study will provide insights among the governments across Africa, in development of the promotional policies, regulations and policies for driving open innovations among Science and Technology Parks in Africa.

3. Method

3.1 Philosophy, Design and Instrumentation and Data collection

This study applied a positivism research paradigm and cross-sectional descriptive research design. The unit of response was five senior officers from each of the Science and Technology Park/ Area of Innovation; manager/ director, chief executive, business development managers or chief managers, innovation and technology transfer officers, research and development Coordinators and government liaison officers. The target population in this study consists of the 14 Science and Technology Parks and Areas of Innovation in Africa, registered by International Association of Science Parks (IASP) as at 30th March, 2024, which was the deadline for payment of annual fees by existing members and registration fees by new members. A census approach was taken in this study.

Primary data was collected using an email -structured questionnaire. Scaling of primary data was based on opinion and belief and/or attitude of the respondent regarding the state of affairs and lived experience within the Country and STPs. As such a five-point ordinal scaled tool was used with the equivalences of agreement to 'no extent at all, to a small extent, to a moderate extent, to a high extent and to a very high extent (Sekar & Anandakumar 2011). The study utilized the Statistical Package for Social Sciences (SPSS) version 26 and Python Libraries, that is Python Library pandas, NumPy, matplotlib and seaborn to extract the numerical test statistics. Linear Discriminant Analysis output was generated to test the null hypothesis.

3.2 Internal Consistency and Validity of Instrumentation

Reliability was evaluated using Cronbach Alpha Coefficient. The seven measures used to examined government promotional role generated a coefficient of 0.893 while the eight measures for open innovation generated a coefficient of 0.942. and the results are presented in Table 1. Principal Component Analyss (PCA) was used to analyze the construct validity and extract quality measures for the predictor and predictand. Kaiser-Meyer-Olkin (KMO) coefficient of 0.808, Chi- Square of 1212.949, 21 degrees of freedom and associated p-value of .000 was generated indicating a satisfactory level validity and sampling adequacy for factor analysis in the case of the predictor, similarly, a KMO of 0.831, Chi- Square of 395.583, 28 degrees of freedom and an associated p-value of 0.000 for the predictand. Confirmatory Factor Analysis (CFA), varimax rotation generated 2 components for predictor and one for the Open innovation with Rotations Sums of Squared Loadings (RSSL) of 82.610% and 72.855 respectively. The factor loadings range implies that all measures for the respective variables were greater than 0.400, hence were (Tabachnik & Fidell, 2014).

Table 1: Reliability and Validity Test Output

Variable	Number of Measures	KMO	Chi-Square & p-value	p-value	Rotations Sums of Squared Loadings (%)	Number of Components	Factor Loadings Range
Government Promotional role	7	0.808	2606.001	0.000	82.610	2	0.914 - 0.677
Open Innovation	8	0.831	395.583	0.000	72.855	1	0.958 - 0.684

2.3 Data Analysis and Presentation of Results

Both descriptive analysis (means and standard deviation), test of regression assumptions and Linear discriminant analysis were carried out. Promotional role and Open innovation generated a composite mean of 3.579 and 3.687 respectively and standard deviations of 1.109 and 1.158 for preliminary evaluation. Hypothesis testing was done using linear discriminant Analysis (LDA) model. The equation used in this study was in the form; $Df = \alpha + V_1X_1 + \varepsilon$; where Df was Open Innovation (OI), the target variable, α denotes the constant level of open innovation unaffected by the predictor variable, V_1 represents the discriminant coefficient for government promotional role. This equation is supported by Montgomery, Peck, & Vining, 2001).

4. Results and Discussions

4.1 Response Rate

This study distributed seventy (70) questionnaires, five to each STP and Areas of Innovations (AOI) in Africa. These five questionnaires to each of the STP and AOI. Out of the seventy questionnaires distributed, 44 of them were properly filled and returned, giving a response rate of 62.86%. The respective response rate by manager position; was managing director/director (13.64%), business development managers/chief managers (22.73%), innovations and technology transfers officers (22.73%), innovations and technology transfers officers (20.45%) and government liaison officers (20.45%) respectively. This response rate was deemed as adequate for this study., given the scope of interest (Charandrakandan, Venkatapirabu, Sekar & Anandakumar, 2011).

4.2 Test of Linear Discriminant Analysis Assumptions

Chatterjee & Simonoff (2013) advocate that prior to hypothesis testing for ratio-scaled data, it is crucial that statistical assumptions should be evaluated. Test of Gaussian Distribution, test of independence and test of linearity were carried out.

4.2.1 Test of Gaussian Distribution for Open Innovation

The eight measures for open innovation and the seven measures for government promotional role were weighted across each variable. The Shapiro-Wilk statistics for numerical tests of normality are presented in Table 2.

Table 2: Gaussian Distribution test for Interest Payment Measures

	Shapiro-Wilk	
Measure	Statistic	Sig.
Open innovation	.972764	1.635967e-01
Promotional Role of Government	.962665	3.774406e-01

Table 2 shows that Government promotional role had a Shapiro -Wilk tests statistic of 0.962665 and a p-value of

1.635967e-01. On the other hand, open innovation had a test statistic of 0.972764 and associated p-values of 3.774406e-01. These tests statistics point that the two variables were generally normally distributed. As such Linear Discriminant Analysis (LDA) could be carried out (Garson, 2012; Shapiro & Wilk, 1965)

4.2.2 Test of Autocorrelation for Government Promotional Role

This test was carried out using Durbin-Watson *d* statistic. A Durbin-Watson *d* statistics of 1.985 was extracted and was within the range of 1.5 and 2.5 for an acceptable level of no autocorrelation in a variable measure. Based on this statistic, the assumption of absence of autocorrelation in the parameters measuring the study variables was achieved (Argyrous, 2011).

4.2.3 Test of Outlier and Test of Homoscedasticity

This test of outlier for the study promotional role of government was carried out using violon plots generated from Python library; seaborn. The output is presented in Figure 2 below. The results Figure 2 show a bar cutting through the violine plot, representing the variables' interquartile range(s). The plot further show a stretched bar ("whiskers") for the lower and the upper adjacent values. It was observed that there was a high-density distribution of values around the mean values represented by the white dot in the middle/centres of the violin plot. It is further observable that, there was no significant outliers of the variable. The interquartile range for the violin plots indicated that the medians were not affected by the extreme values in each of the variables. Based on this output, LDA linear model was deemed appropriate for testing the study hypothesis.

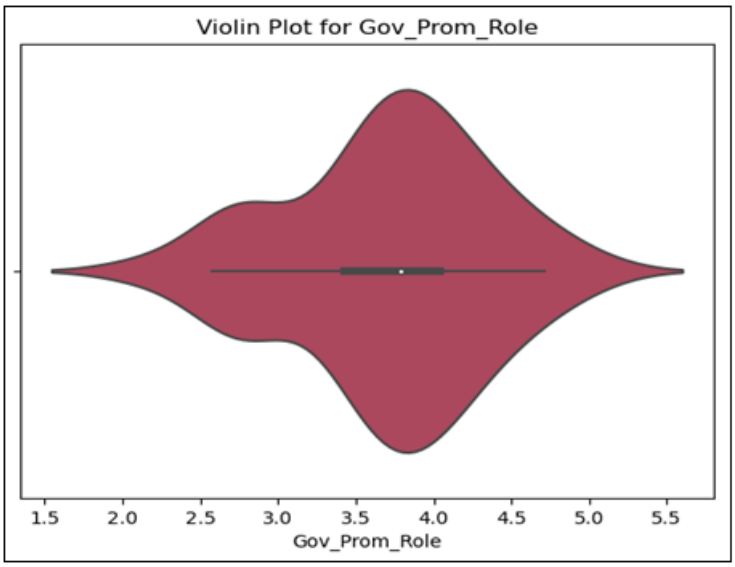

Figure 2: Violin Plot for Government Promotional Role

4.3 Inferential Results

To identify unique categories of open innovations, the weighted scores of the respondents from eleven STPs were weighted. The weighted scores were grouped into three with the thresholds [IF (Q34<=2.7879,"Low", F (Q34<= 3.8939," Medium", "High")). Based on this formulae, three categories of open innovations were arrived at. To improve the accuracy of the model and its predictive capabilities, this study used Statistical Package for Social Sciences (SPSS) and used Linear Discriminant Analysis (LDA) to test the null hypothesis ***H₀1:*** *Government promotional role is not statistically significant in predicting open innovations among Science and Technology Parks in Africa.* The results overall configuration of the OLS linear regression output, overall model performance metrics and statistical significance of the coefficients of the model are presented in Table 3.

Table 3: Group Statistics and Test of Equality of Means- Government Promotional Role

	Group Statistics				
Open_Innovation		**Mean**	**Std. Deviation**	**Valid N (listwise)**	
				Unweighted	Weighted
1	Gov_Promo_ Role	3.265716	0.3789897	5	5
2	Gov_Promo_ Role	3.80357	0.0252579	2	2
3	Gov_Promo_ Role	4.293653	0.1918023	3	3
Total	Gov_Promo_ Role	3.681668	0.5443779	10	10
	Tests of Equality of Group Means				
	Wilks' Lambda	F	df1	df2	Sig.
Gov_Promo_ Role	0.243	10.889	2	7	0.007

The results in Table 4 shows that the group statistics for the government promotional role across the three different clasifiers of open inovation. The table shows that the first category of low-level innovations category was associated with a mean of 3.265716, lower than the one achieved by the medium level category with 3.803570. This was followed by an even higher mean of 4.293653 for the third category of open innovations. The Table further shows that the three

categories had a variation in the standard deviations associated with the group means, ranging from a low of 0.0252579 for the category two of open innovations category, followed by a standard deviation of 0.1918023 for the category one level open innovations category. These statsitsics show that government promorional role can be good classifer in the Linear Discriminant Model as the means are fairly different and the standard deviations are low, (<0.3789897) for all the three categories of oprn inovations.

The Table further presents the test of equality of group means for the predictor. The pupose of these resulst was to determine if the average values (group means) of the three categories of open innovation were statistically significant from each other. This test checked whether the observed diferentce in group means were likely to be due to a random occurance, chance or a real effect. The Tables shows that Wilk's Labda (Λ) was 0.243 with an associated p-value of 0.007. This means that a significant proportion of the variations in the open innovation is explained by the predictor (government promotional role) among STPs in Africa. The coefficient of Wilk's Labda is closer tozero [(→ 0)] and hence implying that government promotional role has a strong discriminant power in the LDA model. Based on this preview, the associated summary of Canonical Discriminant Function coeficients were generated and the results are presented in Table 4.

Table 4: OLS Regression Summary for Income Generating Practices

Table 4.28: Summary of Canonical Discriminant Functions-Government Promotional Role

Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	3.111[a]	100	100	0.87

a. First 1 canonical discriminant functions were used in the analysis

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.243	9.896	2	0.007

	Structure Matrix	Canonical Discriminant Function Coefficients	Functions at Group Centroids*		
	Function	Function	Open_Innovation Function		
	1	1	1	2	3
Gov_Promotional Role	1	3.285	-1.366	0.4	2.01
(Constant)*		-12.094			

The results in Table 4 shows that the predictor had an Eigenvalue of 3.111[a] and an associated canonical correlation of 0.870, meaning that the discriminant function of government promotional role had high discriminant power in the different categories on open innovation. It also implies that the predictor explained a higher proportion of variance between the three groups of open innovation. This Eigenvalue implies that government promotional role contributed a ratio of 3.111 to the between groups sums of squares to the within-group sum of squares and the overall classification accuracy of the Linear Discriminant Model of this predictor and open innovation.

The Table further shows that Wilk Lambda associated with the LDA was 0.243 with and related p-value of 0.007. This means that approximately 24.3% of the variation in the opening innovation categories (category one, category two and category three) is not explained by the function between government promotional role and open innovation among Science and Technology Parks (STPs) in Africa. These results mean that the LDA model can explain approximately 75.7% of the variations in the different categories of open innovation. Based on these statistics, this study ***rejects the null hypothesis that government promotional role is not statistically significant in predicting open innovations among Science and Technology Parks in Africa*** and indeed confirm that government promotional role has a statistically significant discriminant power of open innovation among STPs in Africa.

The Table further show that the structure matrix/ structure coefficient loadings associated with government promotional role is 1.00. This indicates that government promotional role carries a weight of 1.00 in the discriminant model of open innovations among the three categories of STPs/open innovation. This loading is greater than a loading of 0.30 meaning that it has a strong positive influence (coefficient >0.85) in the discriminant model. Similarly, the Table shows the canonical discriminant function coefficients. These coefficients indicate the contribution of government promotional role in the LDA function. The Table shows that the predictor is associated with a coefficient of 3.285, and a constant of -12.094. The coefficient 3.285 is positive (+ve) meaning that it contributes towards the separation of the three categories of open innovation/STPs. The Table also shows that the functions at group centroids for the three categories of open innovation/ STPs. The mean associated with STPs with "category three" innovations was 2.010, followed by 0.400 for those with "category two" level innovations and finally by a mean of -1.366 for the "category one" level of open innovation. These centroids shows that the classification (centres) in each discriminant feature space among the three categories of open innovation were well differentiated as reported in the centroids and they do not overlap at all.

This study measured government promotional role using a five-point Likert scale and the weighted score used in the LDA model. The centroids indicate that low coefficients of the weighted responses for government promotional role favored the first category and the second category of open innovations. On the other hand, high weighted scores of government promotional role had higher likelihood for category three classification. Overall, these results show that higher government promotional role is associated with higher level of reported open innovation among STPs in Africa. These statistics imply that the Linear Discriminant Model for

government financing g mechanism and open innovations among STPs in Africa is.

Open_ Innovation = - 12.094 + 3.285 (Gov_ Promotion……..Model 1

To evaluate the performance of the LDA function for the government promotional role, this study generated both the confusion Table and the 'Jack-Knife'/ cross validated classification Table. The results are presented in Table 5.

Table 5: Confusion Matrix and Jack-Knife Classification Table for Government promotional Role

Classification Results[a,c]						
		Open_Innovation	Predicted Group Membership			Total
			1	2	3	
Original	Count	1	4	1	0	5
		2	0	2	0	2
		3	0	0	3	3
	%	1	80.0	20.0	.0	100.0
		2	.0	100.0	.0	100.0
		3	.0	.0	100.0	100.0
Cross-validated[b]	Count	1	4	1	0	5
		2	0	2	0	2
		3	0	0	3	3
	%	1	80.0	20.0	.0	100.0
		2	.0	100.0	.0	100.0
		3	.0	.0	100.0	100.0
a. 90.0% of original grouped cases correctly classified.						
b. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.						
c. 90.0% of cross-validated grouped cases correctly classified.						

The Tables shows the observed categories of open innovation/ STPs and the predicted categories. The counts and the percentage of corrected predicted cases are presented in the diagonal line and shows that 100% of the cases in original count in category three and count in category two are correctly classified, while 80% in the count for category one are correctly classified. This means that category one of open innovation achieved a less discriminant power relative to category 2 and category 3 based on the predictor_ government promotional role.

In order to evaluate and assess how well the LDA model of government promotional role would generalize any new cases and the unseen data, 'jack-knife' classification results were generated. Overall prediction shows that the cross validated results achieved a 90% correct classification. Based on these results, the study concluded that the LDA between government promotional role and open innovations achieved a hit ratio of 90%. This 'hit ratio' is > a hit ratio of 33.33% which can be achieved by chance in an equal sample size. This hit ratio is also greater that a hit ratio of 75% which is the minimum acceptable for a good classifier.

These results suggests that the promotional role of government is a strong predictor of whether a Science and Technology Park (STP) succeeds in driving open innovation. Such a high hit ratio underscores the effectiveness of government-driven initiatives, such as innovation fairs, public awareness campaigns, matchmaking events, and networking platforms, in fostering open innovation ecosystems. This finding aligns well with existing empirical literature which emphasizes the catalytic effect of government promotional efforts in innovation systems, particularly within developing regions and emerging economies. According to Chesbrough and Vanhaverbeke (2011), governments that prioritize and actively promote open innovation through policy dialogues, innovation contests, and public-private partnerships create fertile environments for knowledge exchange and collaborative innovation. Similarly, Mazzucato (2015) highlights that governments play a critical role in shaping markets and mobilizing actors around missions that stimulate innovation. In the African context, Hossain and Kauranen (2016) observed that where financial and infrastructural resources may be constrained, promotional strategies like government-endorsed innovation platforms and national awards play a crucial role in motivating firms to participate in innovation networks.

5. Conclusions and Recommendations

5.1 Conclusions

The test of equality of group means and summary of canonical discriminant functions' had a Wilk's Labdas (Λ) of 0.243 ≈ 0, Chi- Square of 9.896 and a p-value of .007 at 5% level of significance. The associated canonical corelation for this variable was 0. 870.Based on these statistics, this study rejected the null hypothesis that government promotional role is not statistically significant in predicting open innovation among Science and Technology Parks (STPs) in Africa. As such, the study confirms that government promotional role has a statistically significant discriminant power for open innovation among Science and Technology Parks in Africa at 5% level of significance. As such, the study further infers that promotional role of government could be deemed as one of the strategic roles of government capable of driving open innovations among STPs in Africa.

5.2 Recommendations

Promotional role is key to driving open innovations among STPs. As such, governments in Africa could audit/ develop and implement strategies for securing and managing investments for research and development initiatives, developing and implementing initiatives in promoting collaboration between industry/educational institutions, supporting collaborations between industry and research institutions for provision of specialized expertise, facilities, and resources, facilitates collaboration (with other companies and industry peers) for joint research and development projects; funding, planning, and managing infrastructure projects required in the Science and Technology Park, facilitating sector-specific collaboration and partnership opportunities for the Science and Technology Park and integrating reward systems to support innovation challenges/idea contests / collaboration with external partners.

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