

## Bottlenecks in Strategic Policy innovation Processes in a Developing Knowledge Economy. A Hexagonal Helix Model for Uganda

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### Abstract

A wide range of bottlenecks appear to challenge the process of evidence-based policy innovation in developing economies. This paper develops a hexagonal helical framework that identifies and critically examines the multiplicity of constraints hampering institutional collaboration in strategic policy development, looking at the case of Uganda. On the basis of several sources of evidence and qualitative analysis and synthesis, the paper identifies a myriad of constraints that undermine the process of collaborative knowledge sharing among key policy stakeholders. These bottlenecks include, but are not limited to, inadequate research capacities in research institutions; weak and erratic collaboration efforts among policy stakeholders; ineffectual research evidence dissemination and policy engagements; and, low uptake of research findings by policy agencies. The paper recommends the establishment of regular interinstitutional collaboration in setting research agendas, sharing research evidence, and strengthening policy-oriented research capacities in research institutions, among others.

**Keywords:** Policy innovation, knowledge economy, hexagonal Helix Model, Developing Economy.

## Introduction

Many countries, especially developing economies, seem to experience a myriad of constraints in formulating effective, evidence-based policy measures. These limitations seem to include inadequate research capacity in research institutions; weak institutional linkages between policy stakeholders such as policy agencies, the industry and the academia; irregular knowledge-sharing collaboration efforts; mismatching research agendas; and, low uptake of research evidence by policy makers. This paper critically examines the inter-institutional knowledge-sharing linkages involved in policy development and analyzes the range of bottlenecks denting policy initiatives in a developing economy with reference to Uganda.

The concept of innovation refers to the implementation of novel processes, products, organizational, or marketing ideas (OECD, 2005). Innovation can occur across a diverse range of activities and sectors of the economy, including but not limited to, the business sector, policy formulation, and public management. According to the World Bank, innovation has always been a key factor in productivity improvements, competitiveness, economic growth, and subsequently welfare improvements in societies (World Bank, 2010). Policy innovation refers to the creation of new policies, regulations, or programs that lead to significant improvements in outcomes or experiences for the public. Alternatively, it can be seen as the use of novel processes, tools, and practices for policy design and development that generate better solutions to complex issues (The Brookfield Institute, 2018). Policy innovation is distinguished from “Innovation Policy” which is a policy aimed at stimulating innovation in the economy (World Bank, 2010). Thus, policy innovation requires new ways of thinking and often new partnerships in policy analysis and formulation. Although innovation can occur in any setting where ideas are generated and applied in solving problems, traditionally, and in a formalized setting, three institutions are key in the public policy process. These include the government, academia, and industry or the so-called “Triple Helix Model” (Etzkowitz & Loet Leydesdorff, 1995). These institutions also form part of the national innovation system, that is, the network of institutions, enterprises, and people responsible for the diffusion of information and technology and subsequently innovation in the country (the Republic of Uganda, 2013). Equally central in this paper is the concept of evidence-based policymaking. This refers to the grounding of policy choices on the best available evidence from a wide range of sources usually involving rigorous scientific research (Evidence-based policymaking collaborative, 2016; Government of Uganda 2013). Alternatively, evidence-based policymaking is the process of using high-quality information to inform policy decisions and involves the systematic collection and analysis of high-quality data using rigorous research methods to generate research evidence (Evidence-based policymaking collaborative, 2016). Thus, evidence-based policy making is knowledge-driven and feeds into the knowledge economy that is driven by intellectual capital.

Evidence-based policy making involves 1) building rigorous evidence about what works, including costs and benefits, 2) monitoring program delivery and use of impact evaluation to measure program effectiveness, 3) the use of rigorous evidence to improve programs, scale what works, and redirect funds away from consistently ineffective programs, and 4) encouraging innovation and test new approaches (Evidence-based policymaking collaborative, 2016). These principles

are at the heart of strategic policy innovation. The term developing economy or sometimes, less developed economy is used to refer to countries with low human development indices, and low per capita incomes with the economy largely dominated by agriculture rather than technology-intensive industrial sectors. The World Bank's revised (FY July 1, 2022; June 30, 2023) four-tier classification of countries on the basis of Gross National Income Per Capita is Low-income (<USD 1,085), Lower Middle Income (USD 1,086-4,255), Upper Middle Income (USD 4,256-13,205), and High-income (>13,205). Uganda with a GNP per capita of USD 910 per capita (Estimate by Trading Economics) currently falls in the fourth category of Low-Income Country (World Bank, 2022).

The knowledge economy refers to the economic system of production and consumption that is driven by intellectual capital and the application of knowledge in the economy (World Bank, 2006; 2007). In particular, it refers to the ability of countries to utilize knowledge, scientific discoveries and research evidence in economic production, distribution and consumption of goods and services. Many countries apply knowledge and scientific discoveries in the economy but with varying degrees with the largest share in highly developed economies and the lowest in developing or less developed economies (World Bank Institute, 2008). Prior to 2017, countries were assigned "Knowledge Economy Indices" (KEI) on the basis of 4 pillars, namely, (1) education and skills; (2) level of innovation by the country's innovation system; (3) information and communication technology infrastructure and utilization; and (4) incentives for the application of knowledge in the economy from the country's economic institutions. The index was computed as annualized averages of the scores on a scale of 1-10. Uganda's KEI was 2.46 in 2008 and was ranked 111 out of 140 countries (World Bank Institute, 2008).

In 2017, however, the United Nations Development Program in collaboration with the Mohammed Bin Rashid Al Maktoum Knowledge Foundation (MBRF), developed the Global Knowledge Index (GKI) which now replaces the KEI. The GKI comprises a composite weighted index of the performances of seven vital sectors, namely, (1) pre-university education; (2) technical and vocational education and training; (3) higher education; (4) research, development and innovation (RDI); (5) information and communications technology (ICT); (6) the economy; and (7) enabling environment. On these metrics, Switzerland with a GKI of 71.5 is ranked 1<sup>st</sup> out of 154 countries, while Uganda with a GKI of 37.9 is ranked 122<sup>nd</sup>; and, Chad with a GKI of 24.9 is ranked 154<sup>th</sup> (UNDP & MBRF, 2021). Briefly, the measures indicate the degree to which the respective economies are driven by intellectual capital.

The objective of this paper is to critically examine the policy development processes in the case of Uganda; identify the binding bottlenecks in the policy development processes; explain the generative mechanisms of the constraints; and, finally offer suggestions for dismantling the bottlenecks and stimulating innovations to power the economy. Specifically, the paper examines the interrelationships between academia, industry, the media, the public, think tanks, and government looking at systems of knowledge generation, sharing, and its translation into policy in a developing economy context.

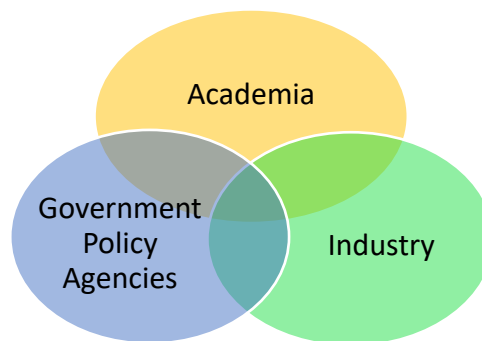
The paper, therefore, examines the prevailing institutional linkages between academia, government policy agencies, the industry, the media, civil society, and the public from a policy

making perspective. It clarifies the bottlenecks that constrain institutional collaboration in strategic policy making, and examines how the bottlenecks undermine the formulation and implementation of public policy interventions. The paper concludes with policy recommendations for eliminating the constraints in policy innovation in Uganda. The significance of the paper should be in providing clarity on policy constraints facing the policy development process, but also the suggestions for eliminating them to pave the way for a welfare enhancing economic productivity in the economy.

### Literature Review

Public policy stakeholders include, but, are not limited to – the government, the industry sector, academic institutions, the media, civil society, policy think tanks, the general public, and development partners. In stakeholder theory, policy is the result of the interaction between these different stakeholders (Laplume, 2008). This formulation has parallels with the helix model of policy innovation which presents the stakeholders as overlapping helixes of influence and collaboration. The helix models have been presented as the triple, quadruple and quintuple models of innovation. In all cases, the illustrations sought to depict the interactions between knowledge institutions, industrial experiences and policy agencies that are informative and instrumental in the development of evidence-based policy.

**Figure 1: The Triple Helix Model of Innovation**



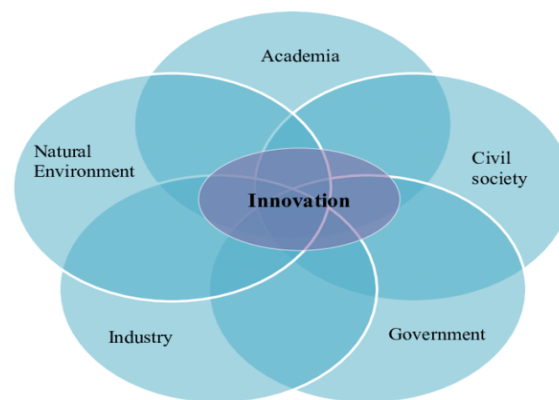
**Note:** Adapted from Etzkowitz & Loet Leydesdorff (1995).

The triple helix model of innovation refers to the system of knowledge-sharing interactions between the academia, industry and government policy agencies which give rise to policy innovation (Etzkowitz & Loet Leydesdorff, 1995). Positive interactions between government, industry and academia are an ideal setting for policy innovation for knowledge-driven socioeconomic transformation in the country. In practice, however, the efforts fall short of the ideal due to numerous constraints and bottlenecks in the system. This paper seeks to make explicit these bottlenecks and their generative mechanisms to enable recommendations for dismantling them. The Helix models highlight the blurring of the boundaries between the various policy stakeholders, namely, the public and private sectors; the academia; the industrial sector; and,

science and technology, among others, in a system of overlapping interactions of knowledge sharing and mutual learning and discovery (Leydesdorff & Etzkowitz, 1995).

The quadruple model adds the “public” to the triple helix model in form of “media-based democracy” and civil society to capture the need for government to effectively communicate its policy proposals and innovations with the general public and other stakeholders to garner the necessary support. The relevance of the public or civil society to the industry is in its public relations aimed at negotiating and constructing a favorable ecosystem for innovation through appropriate media channels of communication (Carayannis & Campbell, 2009; 2010).

**Figure 2: The Quintuple Helix Innovation Model**



**Source:** Carayannis & Campbell, 2009; 2010.

The quintuple helix model, on the other hand, adds the natural environment where knowledge and know-how are generated, transformed, and circulated as inputs and outputs with an impact on the socioeconomic, political, and also natural environment in a knowledge society. The main constituent components of all the helical models are knowledge and its diffusion between institutional subsystems and its ultimate translation into innovation.

In conclusion, this paper underscores the fact that despite the development of the various helical models of policy innovation, very little has been done by way of applying the models as frameworks for critical analysis of the policy development process in a developing economy context. This paper addresses this lacuna, looking at the case of Uganda.

### **Methodology**

The main aim of the paper is to examine the policy innovation process in Uganda focusing on the institutional linkages between key policy stakeholders and associated bottlenecks that impede the policy development process. To this end, the paper develops a hexagonal analytical framework for examining evidence sharing linkages and interactions between key policy stakeholders in the strategic policy innovation process.

The study identified and reviewed relevant literature on policy processes and stakeholders, as well as, documents on innovation and the knowledge economy. The paper reviewed several secondary sources of information that included publications by the Uganda Bureau of Statistics (UBOS) and other Government Ministries, Departments and Agencies (MDAs), Multilateral and Bilateral Institutions, Development Partners, other Non-governmental organizations, Civil Society and Policy Advocacy Groups, and research institutions, among others. The validity and reliability of the data compiled by the national statistical system is guaranteed at the institutional levels. In addition, the paper triangulates several of these sources to ensure greater validity and reliability of the data and conclusions.

Literature from these sources was examined through thematic documentary review and content analysis focusing on policy-oriented research activity, evidence of institutional collaboration in knowledge sharing, research evidence dissemination, policy engagements, and citations of research outputs by public officials. The literature examined includes, National Development Plans, Ministerial Policy Statements, Parliamentary Hansards, Project and consultancy Reports, Policy Documents, and Journal articles.

After identifying massive material of studies covering related topics, a rapid assessment was conducted to identify the ones that were more relevant to this study. Factors used in the selection process included: if the research or paper clarified the key variables or keywords in this study; if the study sought to establish bottlenecks to policy innovation or knowledge economy; and, if the literature source was within the public sector space involving policy engagement.

Evidence from extant literature has been corroborated with key informant interviews (KII), focus group discussion (FGDs), and participant observations carried out through a hybrid of telephone, zoom or google meet techniques and visits to relevant institutions. In doing this, we employed purposive techniques to select respondents and participants based on their knowledge, experience and expertise on the respective issues. The paper triangulated the thematic secondary literature reviews and content analysis with in-depth narrative analysis and logical inferences from the KIIs and FGDs. While gathering the data through the various modes, we ensured that the participants were informed of their right to anonymity and willing participation.

## **Findings and Analysis**

### **The Relevant Institutional Framework in Uganda**

In analyzing the process of policy development within an integrated inter-institutional framework, it is important to identify the key policy stakeholder institutions that are involved in knowledge and research evidence sharing. In Uganda, these institutions include, 1) the academia, which conducts research leading to policy and innovation; 2) industry, which utilizes and at times funds research; 3) civil society, the media and the general public, who raise questions and concerns that require policy change and innovation; 4) the government, which promulgates policy; and, 5) the natural environment in which policy engagement, research and innovations occur. This depiction is equivalent to the quintuple helical model shown in Figure 2.

## **The Nature of Linkages Between Policy Institutions**

In examining the evidence on the nature of institutional linkages, the paper looked at the adequacy, strength and frequency of interactions and knowledge sharing between institutions. The reviews reported few formalized institutional linkages. These include Technical Working Groups (TWGs) and Inter-institutional committees on various issues. However, on the basis of records of events and reports on the nature of institutional linkages between Ministries, Departments and Agencies (MDAs), these interactions tend to be limited to governmental bodies. Interactions with academia and industry tend to be sporadic and far in between. The few reported engagements include validation workshops, seminars and conferences, and technical working groups that involve persons from academia and or industry. These interactions, however, tend to be weak, inconsistent and not detailed in terms of knowledge sharing. In many cases, the frequency of interactions also tends to be low (KIIs, 2022; FGDs, 2022).

## **Policy Goals and Objectives.**

The clarity of policy objectives and goals represents an important factor in the flow of policy development process. Clear policy goals make it easier to benchmark best practices around the world for its attainment. Uganda subscribes to several clear global, regional and national development goals. These include the Sustainable Development Goals (SDGs), the Millennium Development Goals (MDGs), Agenda 2063, Vision 2040, the goals of NDP3, NDP2, NDP1, PEAP, Plan for the Modernization of Agriculture (PMA), Economic Recovery Program and many others past and present objectives and goals. Reviews of relevant literature show that Uganda has no shortage of development goals and objectives. As a result, the country has been able to put in place various strategic implementation plans to move the country toward its goals.

## **Policy-oriented Research Capacity in Research Institutions**

The study found inadequate consultation between research institutions, the industrial sector and policy agencies in developing research agendas. In particular, there is very little evidence of institutionalized problem definition and collaborative research agenda setting for academic institutions with the exceptions of some policy think tanks. This is especially true in relation to much of the research at academic institutions. As a result, academic research findings tend not to be closely related to the policy challenges faced by industry and policy authorities. Much of the research undertaken in academic institutions tends to be inappropriate or far removed from the day-to-day policy and industry challenges. Only a handful of institutions, especially policy think tanks and non-governmental organizations involved in policy advocacy groups undertake research driven by issues trending in the media and or political arena and also proceed to develop policy briefs and fact sheets from their research (KIIs, 2022; FGDs 2022).

The review found teething challenges relating to the conceptualizations of the problems and the formulation of research questions - many of which tend to omit the intricacies of the industry practices and practical policy workings in the policy arena. Another key challenge relates to the availability and or quality of data for rigorous analysis.

Finally, there are challenges of the accuracy in interpretation of results for purposes of policy consumption, the translation of the research findings into immediately actionable summary results,



and policy briefs and fact sheets (KIs, 2022; FGDs 2022). These findings manifest the serious gaps prevailing in the policy (or industry) related research capacities in Ugandan academic institutions.

**Table 1:** Summary of the bottlenecks in policy processes in Uganda

	Type of Bottleneck	Prevalence
1	Lack of formal, regular interinstitutional mechanism for policy research agenda setting	Moderate
2	Lack of collaborative policy research problem analysis and definition	High
3	Lack of support for developing policy research proposal	High
4	Lack of systematic linkage between government policy agencies, the academia and industry	Moderate
5	Weak institutional linkage between policy agencies, the academia and industry	High
6	Lack of funding for policy-oriented research	High
7	Low level of collaborative knowledge and research evidence sharing	High
8	Unsuitable forms of result dissemination / low use of policy briefs/fact sheets / summaries	High
9	Low frequency of policy engagement by researchers	High
10	Low uptake of research evidence by government policy agencies	Moderate
11	Conflict between research evidence and short-term political objectives of politicians	High
12	Bureaucracy and rigidity to procedural innovation	High
13	Ineffectual policy implementation	High
14	Low effort toward policy evaluation and redress	High
15	Lack of support boosting policy related research capacity in research institutions	High

**Sources:** KIs (2022), and FGDs (2022).



## **Research Evidence Dissemination and policy engagement**

In relation to the dissemination of research results and outputs, interviews revealed significant challenges, especially in regards to formats of packaging the research outputs, and the techniques employed in policy engagement. In general, the study found a low level of “policy mindfulness” among researchers in academia in Uganda. Key informant interview results also showed that academic researchers have challenges in effectively disseminating research results in form of policy briefs, fact sheets, and other appropriate summary materials.

The paper established that the overriding objective of academic researchers is the publication of their research papers in peer-reviewed journals rather than influencing policy for better public management. Unlike peer-reviewed publications which directly influence the prospects of promotion of academic researchers, policy influence constitutes only a secondary objective. In addition to the inappropriateness of packaging research outputs, the lack of skills in policy engagement and the busy schedules of public officials render many attempts at policy engagements largely ineffectual (KIIs, 2022; FGDs, 2022).

Exceptions to the above include, think tanks, non-governmental organizations and civil society involved in policy advocacy whose research agenda seems to be driven by prevailing sociopolitical and economic issues, and whose research findings tend to be packaged for policy consumption in forms like policy briefs, fact sheets and summary policy recommendations (KIIs, 2022).

## **Low Uptake of Research Evidence**

A major constraint in the policy process relates to the fact that contrary to expectations, policy analysts in government institutions may not necessarily be open to new research evidence. This is often due to a multiplicity of reasons including, conflict between research evidence and political expediency, rigidity and lack of flexibility to change bureaucratic procedures, and lack of open-mindedness and/or sheer arrogance on the part of technocrats and their political leaders. This lack of openness seems to arise from bureaucratic preoccupation, active resistance arising from the positions taken by their political heads or sheer resistance to new evidence based on policy comfort zones. The other important constraints seem to arise from time constraints as most civil servants and government policy analysts often work according to tight deadlines.

Key informant interviews further revealed that in most cases, moving the policy process forward comes down to building alliances and networking with powerful personalities that have the “ear” of the President or powerful line ministers. Thus, these challenges combined with inappropriate dissemination formats of research outputs and inadequate engagement of the relevant political and technocratic personnel, have often led to low uptake of research outputs by policy formulators.

## **Lack of Indigenous Funding for policy development**

In many cases, policy initiatives can stall due to lack of local financing options. This is especially the case when funding from Development Partners is conditioned to certain sectors and activities. In Uganda, this has been experienced in many sectors, but key documentary evidence is in the

health sector (Tumwesigye et. Al., 2013). This finding shows that dependence on foreign aid to finance key development programs can be a risky venture and constraint in policy implementation (Ijjo & Shinyekwa, 2016).

### **The Media, Civil Society, and General Public**

The media can help clarify on issues that are trending and as a result, bring these to the attention of perceptive researchers. The media can also facilitate the dissemination of research findings by reporting on conclusions, especially where these are clearly articulated. However, this may depend on the seriousness of the media. Tabloids and social media tend to gravitate towards sensational issues, leaving out uninteresting but often crucial findings with potential for pivotal policy innovation. There is an increasing challenge arising from “fake” media and inflammatory propaganda. These can thwart good policy initiatives and derail critical policy innovations and marketing to the public resulting from the associated disinformation.

The media can facilitate the buy-into policy by the public. However, the media can also turn off the public through unconstructive and inflammatory coverage of issues. Thus, possible sources of constraints in the policy processes arising from the media include misinformation and fake news driven by conflicting political agendas and political polarization. Therefore, although the media can be constructive, in a number of cases it has been inflammatory and sensational, particularly tabloids and social media. A good example has been in relation to Covid-19 vaccines. Many people have been scared to receive the vaccine because of the scaremongering of social media (Klls, 2022).

### **Policy Coordination, Implementation, Externality, and Regulation**

Coordination involves adjustments in such ways as to minimize, prevent or counterbalance adverse consequences of any one decision for other decisions (Lindblom, 1965). Coordination is important in that, it can deal with issues of duplications, contradictions, displacements, changing needs, and cross-cutting issues. FGDs and Klls for this paper revealed poor coordination in several inter-institutional engagements. This, in itself, constitutes a major category of bottleneck in collaborative policy analysis and formulation.

The concept of Regulatory Capture occurs when an agency that has been created to uphold public interest instead pushes for commercial and political interests of dominant often politically connected special interest groups and lobbyists in the industry. This phenomenon contravenes evidence-based policy making and constitutes a major bottleneck to policy analysis and formulation in developing economies. FGDs and Klls revealed the presence of regulatory capture in Uganda's situation.

Other bottlenecks identified include negative policy externalities which refer to unintended negative consequences of policy implementation. This is also often the result of inadequate policy analysis and evaluation and is also reported to be prevalent in Uganda (Kll & FGD, 2022).

### **Political Influences**

Political influences can and do present challenges in policy processes. A special form of this is the Deep State which refers to the influence of powerful, secret but illegal or unelected persons and

groups on public policy. Deep state is also seen as a network of influential people in government or the military who are involved in clandestine manipulation and control of government policy. The Deep State effect is often to derail official government policy processes in favor of alternative processes that are geared toward self-aggrandizement, nepotism, and other forms of corruption. Another major bottleneck in policy making relates to political expediency versus equitable growth and development policy making. This is a situation where policies tend to be driven by political convenience rather than equitable improvement in the welfare of society. These kinds of situations have also been reported in the FGDs and KIIs carried out for this study. Political self-interests tend to derail policy making based on the pursuit of overall national interests and priorities, and may be regarded as a bottleneck in the process of policy development.

The challenges facing academia that have often been highlighted include inadequate research capacity; uninformed, unguided, and unplanned research agendas (research agendas are most often not aligned with national priorities); inadequate and non-collaborative research problem definition and analysis (especially the non-involvement of industry); no or poor-quality data; inappropriate or inaccurate conceptualization of the issues (especially the industry or policy dimensions); lack of research rigor; inappropriate results dissemination formats for policy uptake (lack of capacity in policy-oriented communication), and many others. Many times, useful academic research findings and outputs sit on the shelves because they have not been packaged and disseminated in formats that facilitate uptake by policy makers such as, policy briefs, fact sheets and others (FGDs and KIIs).

Another important observation is that, while researchers may not be policy minded or experienced enough with policy procedures, to present research findings in easily consumable formats, the converse can also happen. Policy formulators may be reluctant, not research-minded or simply arrogant toward academic research results for various reasons including political feasibility or expediency. In such cases, researchers will face stiff challenges in getting the buy-in of policy formulators. An additional challenge is the lack of intermediary support to make the researcher-cum-policy agent constructive and fruitful. In a developing country context, most academics receive very few direct benefits from policy engagement besides recognition by the government or occasional appointments in government positions. In other words, there is a kind of “market failure” not only in investing in policy engagements, but also in developing policy targeting research proposals (FGDs, 2022; KIIs, 2022).

Another important point worth noting is that Government policy agencies often suffer from coordination problems, inadequate time and capacity for the rational conceptualization and analysis of the policy problems, and so end up muddling through the policy process. This is something that academic institutions could help with, but all too often such challenges are not even documented let alone shared with academic institutions. There is a need for closer collaboration with academic institutions to ensure accurate analysis of the problem, and the use of research capacity in academic institutions (FGDs, 2022; KIIs, 2022).

In Uganda's governmental systems of MDAs, the problem of uneven distribution of power centers has also been highlighted. It is reported that there are MDAs that have bigger clouts and wield

more power than others and as a result tend to successfully push initiatives that may not necessarily national priorities than others. This leads to the situation of different power centers getting locked in resource appropriation efforts that are driven by selfish rather than national interests often in total disregard of legitimate national priorities (FGDs, 2022; KIIs, 2022).

### **A Hexagonal Helix Model for Uganda**

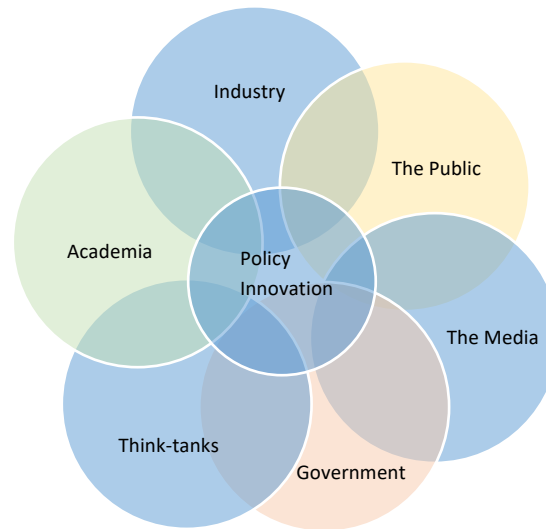
Based on the analysis of the situation obtained in Uganda, we propose a hexagonal analytical framework that includes six (6) institutions including policy think tanks. These are the academia, industry, the government, the media, the general public, and think tanks. Our suggestion for the inclusion of think tanks as a separate helix or category arises from the following:

- i. The fact that academic institutions tend to predominantly carry out basic or “academic” rather than policy-oriented or industry-applicable research with exception of a small proportion;
- ii. There is a lot that needs to be done before these “academic researches” can be easily taken up by policy makers and used in policy formulation;
- iii. There is a lack of direct incentive or “market failure” relating to policy engagements, but also in policy-oriented research proposal development by the academia, especially in developing economies;
- iv. Think tanks could fill the gap between academic and research institutions and government policy agencies to assist translate research into applicable recommendations;
- v. Research departments in academic institutions could be empowered and equipped to work closely with, or as think-tanks to produce applied policy or industry-related outputs.

The hexagonal model highlights (1) the academia – which provides higher education and carries out basic research; (2) industry – which represents production activities on the ground; (3) the public – including civil society, individuals, households, private non-governmental sector; (4) the media – which plays a key role in informing the public and holding public officials to account among other things; (5) government – ultimately responsible for policy formulation; and, (6) think-tanks which specialize in policy-oriented or industry applicable research.

The hexagonal model that we propose (Figure 3) incorporates both an appropriate analytical model of the policy development process but also a recommendation to use think-tanks to bridge the gap between academic research and applied policy/industry briefs and fact sheets. We suggest this could be achieved either by boosting the capacity of research departments in academic institutions to add to the role of think-tanks or the strengthening the linkage between the academic institutions and the existing think-tanks. This formulation should overcome the problem of elitism of academic research and the inability of academics to package research results appropriately for maximum uptake and the effective engagement of policy makers.

**Figure 3:** Hexagonal Helical Model



Source: Developed by the authors from Melodena (2020) and Carayannis & Campbell (2009; 2010).

### **Policy Recommendations**

The paper recommends regular, interinstitutional and collaborative research agenda setting to ensure that the issues mainstreamed into research are industry or policy-relevant. The strengthening of the linkages between academia and industry will ensure that industry-relevant issues are highlighted by the industry practitioners themselves and shared with academic institutions. We propose that these interactions are regular and scheduled to ensure they regularly feed into the research undertaken by academia and think tanks.

In line with the above recommendation, we also underscore the importance of strengthening the sharing of relevant experiences, research evidence, and knowledge between industry, academia and government policy agents. To realize this, there is a need to sensitize the policy stakeholders to be open-minded and receptive to knowledge sharing. In particular, researchers need to be policy-minded while policy makers need to be research evidence-minded.

The paper identified a gap of weak incentives on the part of research academics in developing policy-oriented or industry - related research proposals without funding support. In relation to this, industry collaboration with the academic with the option of funding needs to be encouraged in addition to MDAs calling for policy-oriented research proposals to be funded.

The paper also identified constraints relating to inappropriate packaging of research results by academic researchers and as a result, ineffectual policy engagement due to low uptake of the findings by policy makers who have very little time to assimilate research evidence. The paper, therefore, recommends offering support to academic institutions in form of capacity building to translate research outputs into formats such as policy briefs, fact sheets and concise policy recommendations.

In addition to strengthening the linkage between industry, academic institutions, and policy authorities, it is immensely beneficial to encourage academics to spend some time in government and or industry environments to fully grasp the workings of the systems so as to ensure relevance and objectivity in the research they engage in. Finally, there is need to strengthen the research capacity of academic institutions for policy-oriented/industry-relevant research to enable them undertake effective policy oriented and industry-relevant research. Such investments are strongly justifiable given their merit or social welfare ramifications.

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