GOVERNANCE AND RESILIENCE OF PROJECT NETWORKS AMONG AGRICULTURAL INNOVATION PLATFORMS IN CENTRAL AND SOUTH WESTERN UGANDA

BY

YOSAMU MUGARURA

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DECLARATION

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Signature: ……. Date: ……

Yosamu Mugarura, BCOM, MBA, PMP
Reg no: D86EA/CTY/32516/2015
Management Science Department
Kenyatta University

We confirm that the work in this thesis was done by the candidate under our supervision as the university appointed supervisors.

Signature:…… Date:……..

Dr. Paul Sang
Senior Lecturer, Department of Management Science
Kenyatta University.

Signature:…… Date:……..

Dr. James Maingi
Lecturer, Department of Applied Economics
Kenyatta University

DEDICATION

This work is dedicated to my family who never ceased to inspire me with love and encouragement. Bravo to my wife Judith and our beloved Kevin, Karen, Kimberly and Kitty who despite my divided attention never stopped smiling and hugging.

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ABBREVIATIONS AND ACRONYMS

AIP **:** Agricultural Innovation Platform

APA : American Psychological Association

CIAT **:** International Center for Tropical Agriculture

FARA **:** Forum for Agricultural Research in Africa

ICT **:** Information communication Technology

IFAD **:** International Fund for Agricultural Development

M&E **:** Monitoring and Evaluation

NACOSTI **:** National Commission for Science, Technology and Innovation

NARO : National Agricultural Research Organization

PLS **:** Pilot Learning Site

SPSS **:** Statistical Packages for the Social Sciences

SSACP **:** Sub-Saharan Africa Challenge Program

VIF : Variance Inflation Factor

OPERATIONAL DEFINITION OF TERMS

Project Network: A formation of separate autonomous entities that come together to achieve both individual and common goals.

Agricultural Innovation Platform (AIP): A forum in which multiple actors in the agricultural sector with common interests collaborate in identifying joint problems, diagnose them, together develop ideas, jointly solve their problem while sustaining collaborative structures that keep the formation resilient.

Governance: Collaborative and facilitative functions and policies (premised on non-hierarchical, non- bureaucratic structures) necessary for the effective functioning of a network aimed at maximizing benefits and opportunities from the configured relationships and strengthening such relationships..

Management practices: Facilitative roles of coordination, accountability, monitoring and evaluation necessary for effective functioning of a project network.

Network composition: Configuration and the social construction of network actors in terms of numbers (breadth/density), contribution (depth/centrality), and motivation expressed in terms of actual or apparent interests in the network business.

Cultural attributes: Cultural orientations of actors depicted through their normative behaviour, values espoused and power distance (power distance between actors is depicted through different levels of education, authority, or economic status).

Network interactions: Relationships between network actors depicted by their levels of cooperation, trust, learning from each other, common understanding, and collective action.

Policy Framework: Policy and other regulatory environments that either foster or hinder proper functioning of networks depicted through the involvement and participation of government actors.

Resilience of Project Networks: Ability of a network to face a shock, recover from it, learn from it and be strengthened by it, depicted through innovativeness, sustainability and reproduction.

Innovativeness: AIPs ability to continue searching and implementing new methods and processes, as well as generating new products

Reproduction: Existing network's deliberate or spontaneous ability to expand and form new ones.

Sustainability: Network's ability to keep and strengthen its structure as well as keeping, promoting and multiplying its innovations.

ABSTRACT

Forming agricultural innovation platforms (AIPS) provides a key attempt at integrating stakeholders into project affairs in order to achieve resilient project networks. However, in majority of the AIPs, innovations have either collapsed or not moved beyond locality borders with reported incidents of corruption, resignation of leaders, and conflicts between key sets of actors. The study therefore investigated how governance affects project resilience networks for (AIPS) in the Central and the South western parts of Uganda. Specifically, the research assessed the effects of management practices, network composition, and cultural attributes. Further the study investigated the mediating effect of network interactions as well as how policy framework moderates the relationship between governance and resilience of project networks among AIPS. The study was underpinned by systems theory, stakeholder theory and social network theory. The study used positivism research philosophy with explanatory research design. The participants of the analysis were 220 individuals in 22 AIPs in Central and South Western Uganda. We surveyed 132 actors through stratified sampling techniques in the 22 AIPs in Central and South western Uganda. Semi-structured questionnaires were used for data collection in each of the AIPs in the analysis. From the 132 actors visited, 103 were sampled making up a representative index of 78%. The analysis was performed using a mathematical statistical program SPSS. Both research variables were validated at a 95% degree of trust. The results revealed that management practices and network composition were moderately exhibited while cultural attributes, network interactions, and policy framework were more exhibited. The study concluded that cultural characteristics, network structure, and management activities have a strong impact on the sustainability of project networks in central and the South western Uganda. The study concludes that network interactions partially mediated the relation between governance and resilience of project networks. Policy system proved to have the most important impact on project networks' durability. Cantered on these findings' conclusions, the study suggests the following recommendations: First, AIP leadership should emphasize coordination, accountability, as well as monitoring and evaluation framework. Secondly, management of AIPs should put mechanisms in place that encourage AIP members to embrace network composition. Thirdly, AIPs should put in place strategies that promote proper practice of network norms, values, and power distance. Fourthly, AIPs should embrace common understanding, cooperation, trust and capacity building and learning. Finally, AIPs should encourage involvement of government representatives and align AIP activities with government policies. The study recommends an empirically tested governance framework that articulates clear management pathways of governing AIPs and ensuring their resilience. The study also successfully introduced and validated project network concepts into AIP context. The study successfully tested a combined effect of different governance components on resilience of project networks. Finally, the study validated the application of systems, stakeholder and network theories in project networks that exist in agricultural sector (AIPs).

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The search for sustainable project success through effective governance of collaboration and networking has raised actors' attention towards resilience of project networks. Various actors come together under these different social configurations (project networks) in search for resource efficiencies and complementarities. Away from individualistic tendencies, states are forming strategic alliances and trading blocs, while governments are collaborating with private sector through public private partnerships (PPP). Input and output actors are joining efforts and resources by forming supply and consumer arrangements (popularly known as supply and value chains) (Adekunle, Oluwole, Buruchara, & Nyamwaro, 2013). Research and development collaborators are forming multi-stakeholder networks known as innovation platforms (Kilelu, Laurens, & Cees, 2013).

As a unique development on a rising trajectory, resilience of project networks is attracting critical interest from an array of stakeholders (especially scholars) given the temporary nature of projects and the bureaucratic environments of organizations that house such endeavours (Burström & Jacobsson, 2012). Project networks play a compensating role between the "contrasting temporary organizational configuration of projects and their permanent environments" (Burström & Jacobsson, 2012). When project networks become resilient, they bring about consistency in project conceptualization and operationalization, relative permanency and reliability of critical governance structures, which together and overtime generate enormous efficiencies necessary for effective project delivery.

Companies are compelled into collaborative innovation networks because of the increased complexity in science and technology, higher uncertainty and ever-increasing costs of implementing projects, as well as shortened life cycles of innovations (Ojasalo, 2016). Interestingly, even individualistic entities that do not practically subscribe to collaborative initiatives, do acknowledge the role of networking in fostering innovation. It can be observed that the reason they do not cooperate is that they want to protect their space and accumulate higher gains through competition. However, as Cricelli (2015) opined, even competitors can network in what they termed as "coopetition". It follows therefore, that individualistic entities can take optimum advantage of scarce resources through networking since it does not actually reduce but enlarge actor space. By their collaborative nature, project networks are designed to deliver projects more efficiently and effectively.

Owing to the challenges engulfing the success of networks, it is indispensable to have proper structures that would ensure success and resilience of project networks (Muller, 2017). Achieving this objective calls for finding different ways of facilitating interaction amongst the various actors in a network during planning and development so that they are deeply embedded in the network interconnectedness. Mahoney and Kor (2015) presented non-linear governance approaches that embrace less central commanding and control processes as better placed to manage such complexities. Such governance approaches require multi-institutional, iterative and collaborative arrangements that consider diverse multidimensional and temporal actors. Thus, according to Gielen, Salas and Cuadrado, (2017), to ensure that networks remain resilient there is need for adaptive management in network governance able to accommodate such diversity of actors.

Project networks can be initiated by their members, mandated or contracted by a central authority. They can also be categorized as goal-directed, and serendipitous. Unlike serendipitous networks, which spontaneously develop to take advantage of emerging opportunities, goal-directed networks are purpose-specific, formed either by those who participate in the network or mandated by a certain authority, and develop majorly through deliberate efforts to build a well-coordinated entity that can deliver a common objective (Burström & Jacobsson, 2012).

Viewed from a market viewpoint, a project network is a collection of different business actors (nodes) involved in the production, processing, distribution, regulation and consumption of economic value. The ties (connections) between nodes are manifested by interaction between individuals (Kilelu, Laurens, & Cees, 2013). Networks are dynamic organizations distinguished by the reality that membership, interactions, desires, challenges, capacities, and resources evolve over time. By their very nature, managing projects is inevitably difficult and so is sustaining actor interactions in a network

Ensuring project success is about putting in place systems that manage and support innovation processes and collaboration in a network of project actors (Gustafsoon, Larson and Svensson, 2014). Project networks can also be viewed from two perspectives: as a network of different project team members (these can be individual persons or organizations), or as a network of different projects with similar or common goals. The two perspectives can be termed as intra-project networks and inter-project networks respectively. In both cases, and as concluded by Nangoli, et al, (2013), it is the responsibility of project/network managers to build relationships among project /network stakeholders that support deep collaboration, learning and innovation. It

should however be remembered, that management of these networks calls for good understanding of their complex configuration in order to realize their significant contribution in successful project delivery. Unfortunately, most managers continue to borrow traditional management approaches without due consideration of the fragility of relationships that exist in project networks.

1.1.1 Governance

Governance in project networks is largely viewed as a mechanism by which decision-making is decentralised and broad based, predominantly driven by informal values of shared understanding, transparency, fairness, accountability, and trust, and to a smaller extent as formal structures of authority and responsibility (Provan & Kenis, 2018). In view of DeFillippi and Sydow (2016), governance of project networks acknowledges three notable configurations: single intra-organizational inter-unit/functional project, single inter-organizational project, and series of projects interconnected by inter-organizational relationships.

Project Network governance exists beside other forms of governance like corporate and project governance. The latter two look at maximizing the advancement and achievement of organizational/project goals, while the former looks at maximizing the benefits and opportunities from the configured relationships. Single intra-organizational project networks are embedded into formal structures of their host organizations thereby adopting corporate governance frameworks (Provan & Kenis, 2018). They are less affected by the temporary nature of project arrangements as inter-organizational project networks.

It should be noted however, that the impact of temporally embeddedness becomes less as the diversity in inter-organizational networks and lineage of projects increase. In a

diverse long-term network, the effectiveness of governance systems is no longer a responsibility of a single organization but all the actors on the network (DeFillippi & Sydow, 2016). Success is no longer viewed from a single project but a series of them and the governance systems that ensure consistency and continuity. Governance of project networks is therefore concerned with sustenance and continuous improvement of relationships that bring together the various actors. Authority to manage these efforts may be shared among participating actors, a leading actor may be assigned the responsibility, or a separate entity specialized in managing project networks (otherwise known as network administrative organization) may govern the network (Gustafsoon, Larson and Svensson, 2014).

1.1.2 Management Practices

There are several management practices applicable to different forms of organizations. Such management practices in a network aim at sustaining and strengthening existing relationships. The sustainability of such relationships depends on the level of trust, degree of bonding, cooperation and collective action, which are a function of how network governance is practiced (DeFillippi & Sydow, 2016). In this study, management practices refer to facilitative roles and functions necessary for the effective functioning of a project network. They include transparency and accountability, monitoring and evaluation, and coordination activities. Transparency and accountability was measured by members' involvement in AIP affairs, transparency mechanisms (e.g budgeting and sharing of treasury reports) and Internal controls (e.g existence of bank accounts, atleast two bank signatories). Functional governance structures, functional constitution, regular coordination meetings, and style of leadership were used to measure coordination. Monitoring and evaluation was measured by existence of M&E framework, collection of data about AIP activities and

the existence information sharing mechanisms. These practices are vital in generating trust and learning necessary for cooperation and collective action.

1.1.2 Network Composition

A project network is about actors that constitute it and relationships between them. Before understanding the inter-actor relationships, one ought to appreciate the natural characteristics of those relating. Project networks can be large or small, closed or open to participation, wide or narrow in scope, deep or shallow in attribution. Therefore, investigating factors behind any network resilience logically calls for understanding the properties behind its composition. Likewise, an innovation platform must have the correct number and appropriate type of actors (Nederlof & Pyburn, 2012). For an innovation platform to be resilient, management should understand how its membership is characterized according to breadth (size), depth (value), and motivation (apparent and actual interests).

1.1.4 Cultural Attributes

Project networks bring together different actors of varying personal and organizational backgrounds. To understand relational dynamics of actors in a network, one needs to recognize the diverse organizational normative and value systems. Such systems define cultural orientations of actors thereby shaping the nature and direction of their relationships. Managing a project network requires understanding and shaping common normative and value systems of diverse actors. A common normative and value system in managing power relations is critical throughout the life of a platform (Nederlof & Pyburn, 2012). Power relations can be determined by differences in education, economic or positions of authority. For example, management should be able to

regulate the relationship between; the uneducated and highly educated, the poor and the rich, as well the weak and the strong; for the common good of a project network.

1.1.5 Resilience of Project Networks

Project network resilience refers to a network's ability to establish institutional structures that enable it overcome shocks, learn from them, and emerge strengthened and transformed. Resilience is associated with an entity's inner capacities and ability to reconstitute after a shock or sustained attack (Aranda, Zeeman, Scholes, & Morales A, 2012). Beer (1984, 1989) in his famous 'Viable System Model' viewed resilience as the capacity of a network to quickly regain its original state after experiencing difficulties. The term was initially conceptualised in the study of properties and application of materials to refer to a material's ability to absorb energy after being elastically deformed, thereafter unloading and releasing that energy. In project management, the term resilience was used by Borgert (2013) and, Kutsch and Hall (2016) to mean establishing mechanisms that enable leaders to detect and foresee situations, realistically interpret challenges, better prepare themselves, and quickly and appropriately recover from such challenges at the minimum cost possible.

Consequently, Kutsch and Hall (2016) concluded that resilience in the context of projects involves management's ability to foresee risks, quickly adapt towards unavoidable changing environments, and rapidly mobilizing internal energies to recover from adversity. As such, any system's resilience is premised on its capacity to overcome a disturbance and yet keep its strategic focus, identity and structure, with strength to re-constitute while increasing learning and adaptability to new realities (Laursen & Salter, 2013; MacKinnon & Derickson, 2012).

Therefore, a resilient project network is one, which is able to continuously learn and innovate from disturbances, reconstitute itself after shock, expand and multiply, and sustainably consolidate its achievements to avoid recurrence of instability. However, literature shows that traditional management of networks through a rule-based approach given the complex and dynamic context in which they operate, has often rendered them to be vulnerable and non-resilient (Dalcher, 2016). Nightingale and Brady (2011) opined that the traditional approaches of dealing with uncertainty in networks by focusing on risk identification, mitigation and transfer can only protect networks from the identified eventualities but cannot ensure their resilience particularly in highly uncertain environments.

1.1.6 Network Interactions

Project networks form to interact. Interactions emerge as network actors relate with one another. Where there is no interaction, there is no network. It therefore follows that network strength is dependent on the nature and strength of the ties that bring actors together. The nature of interaction between actors determines the success of an AIP (Adekunle, Oluwole, Buruchara, & Nyamwaro, 2013). Sustaining appropriate levels of interaction among network actors is a key management responsibility; because where actor interactions are well-managed, strong bonds emerge manifesting through common understanding, cooperation, trust, and collective action. The aforementioned combined, form a set of antecedents critical for platform innovation, sustainability and reproduction.

1.1.7 Policy Framework

Policy framework in this study involves the regulatory dynamics (both local and national) which could have positive or negative effect on the smooth operation of a

project network. According to (Adekunle, Oluwole, Buruchara, & Nyamwaro, 2013), formulation, review and implementation of appropriate policies coupled with consistent evaluation of institutional environments within which agricultural actors operate, have the potential to improve household, community and national levels of income and food security. Policy environments can positively or negatively affect actor interactions. Some policy environments enable while others inhibit interaction thereby affecting sustainability and innovation of project networks. In this study, policy framework will focus on how government involvement in the functioning of project networks like AIPs, aligning AIP plans to local and national policies, affect governance and resilience of project networks.

1.1.8 Agricultural Innovation Platforms

Agricultural innovation platforms (AIPS) present a very good example of project networks. They are intermediary arrangements that bring different actors together in an innovation system with an aim of creating effective and sustainable change. Adekunle (2013) describes an agricultural innovation platform (AIP) as a physical or virtual setting designed to promote exchanges and learning among key actors dealing in a specific commodity with a common purpose for shared diagnosis of problems; shared discovery of opportunities and finding alternative options; promotion of technical advances along the defined value chain.

An Innovation Platform (IP) provides a medium through which diverse actors with shared interests cooperate in interrogating their challenges, identify ways to address those challenges, and together apply common solutions to better their lives (Mulema, 2012). AIPs are expected to create space where different actors such as researchers, farmers, extension agents, traders, processors, development specialists, and policy

makers, come together with an aim of facilitating effective, efficient and targeted interventions that yield more and cheaper benefits for all the stakeholders involved. They generate innovation when they join forces in AIPs, by bringing together their indigenous knowledge, business interests and organizational skills (Adekunle, 2013).

The Agricultural Innovation Platform approach was introduced in Africa under the International Fund for Agricultural Development (IFAD) funded project called Sub-Saharan Africa challenge program (SSACP), coordinated by Forum for Agricultural Research (FARA) with an overall objective of testing a concept whether such networks could deliver projects cheaper and more sustainably. SSACP established twelve AIPs in each Pilot Learning Site (PLS) of Eastern and Central Africa (area around Lake Kivu basin), Western Africa and Southern Africa. In the Lake Kivu region, four (4) AIPs were formed in South western Uganda, North-eastern Rwanda and Eastern Democratic Republic of Congo. Each AIP focused on a specific value chain (as an entry point) bringing together stakeholders along a commodity continuum from resource to consumption (Mulema, 2012). The underlying objective was to attract diverse knowledge capacities and skills sets, transform and learn from them, and share resource products thereby testing the concept of AIPS as a cheaper and sustainable approach to agricultural transformation.

As noted by Kutsch and Hall (2016) over 70% of networks fail due to factors attributed to bureaucracy and lack of proper stakeholder engagement depicting weaknesses in the governance of project networks. For instance, according to Cullen et al (2014), AIPs in the Ethiopian highlands could not uphold their desired interventions due to power dynamics. In the Lake Kivu region, SSACP reports (2011) indicate that resilience of these AIPs is not encouraging. In majority of the AIPs, innovations have either

collapsed or not moved beyond locality borders with reported incidents of corruption, resignation of leaders, and conflicts between key sets of actors.

Mudende AIP in Rwanda almost collapsed due to conflicting interests between farmer actors and Inyange milk processing factory (project reports, 2012-2013).

1.2 Statement of the Problem

Agricultural innovation Platforms are formed to not only interact and innovate but also navigate development challenges, continue in existence, grow and expand (Adekunle et al, 2013). For such endeavours to satisfy stakeholder needs, their interactions must be carefully managed. Forming agricultural innovation platforms remains one attempt at integrating stakeholders into project affairs in order to achieve resilient project networks (Cullen, Tucker, Snyder, Lema, & Duncan, 2014). However, in spite of overwhelming literature and models available on how to manage stakeholders and thereby make project networks resilient, project failures attributed to vulnerable networks and stakeholders with unmet expectations continue to be recounted (Huemann, 2013).

According to SSACP reports (2011), resilience of AIPs in Uganda is not encouraging. Majority of the AIPs have either collapsed or not moved beyond locality borders with reported incidents of corruption, resignation of leaders, and conflicts between key sets of actors. The “mamera” innovation of Bubaare AIP in South western Uganda has been stunted due to unresolved conflicts between farming actors and the processor (Kasenge, 2010).

In Kisoro district, western Uganda, Chahi AIP could not sustain interactions and dissolved operations but managed to recover two years after the SSACP project (project

reports, 2015-2016). In summary, of all the AIPs established in Uganda between 2006 and 2017 only 59% of them were functioning in 2018 while the remaining 41% were either existing but not functioning or had collapsed all together (National Agricultural Research Organization (NARO), 2018). In particular, 40% of AIPS established in Kachwekano Zone had collapsed by 2017, 70% of AIPS established in Buginyanya-Mt. Elgon region had collapsed, in Bulindi Zone, 75% of all AIPS were not functional while all AIPS established in Ngetta Zone had failed. At the same time, in Mukono Zone 29% of AIPS had collapsed and only 63% of all AIPS established in Rwebitaba zone are still functional (NARO, 2018). It is therefore imperative to empirically study governance of these Agricultural innovation platforms and interrogate explanations behind their current state of resilience.

1.3 Research Objectives

1.3.1 General Objective

The general objective was to investigate the effect of governance on network resilience among agricultural innovation platforms in Central and South western Uganda.

1.3.2 Specific Objectives

Specific objectives were:

(i) To determine the effect of management practices on resilience of project networks among agricultural innovation platforms in Central and South western Uganda.

(ii) To assess the effect of network composition on resilience of project networks among agricultural innovation platforms in Central and South western Uganda.

(iii) To investigate the effect of cultural attributes on resilience of project networks among agricultural innovation platforms in Central and South western Uganda.

(iv) To examine the mediating effect of network interactions on the relationship between governance and resilience of project networks among Agricultural innovation platforms in Central and South western Uganda.

(v) To establish the moderating effect of policy framework on the relationship between governance and resilience of project networks among agricultural innovation platforms in Central and South western Uganda.

1.4 Research Hypotheses

The following hypotheses guided the study:

H_{01}: Management practices have no significant effect on resilience of project networks among agricultural innovation platforms in Central and South western Uganda.

H_{02}: Network composition has no significant effect on resilience of project networks among agricultural innovation platforms in Central and South western Uganda.

H_{03}: Cultural attributes have no significant effect on resilience of project networks among agricultural innovation platforms in Central and South western Uganda.

H_{04}: Network interactions have no mediating effect of network interactions on the relationship between governance and resilience of project networks among Agricultural innovation platforms in Central and South western Uganda.

H_{05}: Policy framework has no moderating effect on the relationship between governance and resilience of project networks among Agricultural innovation platforms in Central and South western Uganda1.5 Significance of the Study

The research findings are useful in illustrating the impact of governance on long-term stability of agricultural innovation platforms. This illustration is vital in deepening the understanding of AIP management among facilitators/managers/brokers.

The study informs policy makers on the importance and nature of policy framework environment necessary but suitable to AIPs (in particular) and project networks (in general). The study also triggers debate in the academic arena on whether the available management curriculum is adequate for the complex and fragile nature of project networks. As such, it generates interest and serves as reference to academicians and researchers in carrying out further studies on resilience of AIPs (project networks).

1.6 Scope of the Study

The study general objective was to investigate the effect of governance on network resilience among agricultural innovation platforms in Central and South western Uganda. Specifically, the study sought to determine the effect of management practices, network composition and cultural attributes on network resilience. The study also tested the mediating and the moderating effect of network interactions and policy framework respectively.

Governance was conceptualized to mean facilitative functions of leadership that bring actors together and sustain their interactions. Unlike corporate governance, which considers hard management structure and style, network governance embraces soft management style of coordinating actor deliverables, monitoring and evaluation of work performance, accountability systems, influencing composition, culture and behaviour. This conceptual scope is in line with the reviewed literature even though previous scholars studied each dimension of governance was separately. Resilience was conceptualized to mean the ability of a network to resist forces of destruction by being

innovative, sustaining efforts and products, and scaling to new geographical and technological areas.

The study was based in the districts of Kayunga, Masaka and Mukono in the Central region and Sheema, Ntungamo, Kisoro and Kabale in South western region. South western Uganda was selected because it is in this region that initial Agricultural Innovation Platforms under SSACP were established. Therefore, the region has some of the oldest Platforms. The central region was selected because it surrounds the country's major urban centres and has a high number of the young recently formed AIPs. Being close to the Kampala metropolitan city, the region's access to market and economic status are relatively higher than other regions.

The study focused on AIPS that were formed between 2007 and 2017. Fieldwork to collect data for this study was carried out in July 2019.

1.8 Organization of the Study

This dissertation is presented five chapters; background of the study and problem statement are covered in chapter one. The chapter also presents study objectives, study hypotheses, significance, scope and study limitations. The second chapter presents; the theoretical review, conceptual framework & research gaps. Chapter three presents philosophical orientation and the research methodology. Chapter four discusses research findings and their presentation. Specifically, the chapter presents results on demographic information, descriptive analysis, diagnostic tests, inferential analysis, and test of hypotheses. Finally, Chapter five provides a summary of key findings and conclusions where recommendations are drawn.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter presents theoretical and empirical reviews relevant to the study. The first part in the chapter looks at theoretical foundations underlying this study. Three key theories were selected to underpin this study namely, systems theory, stakeholder theory and social network theory. The second part looks at empirical literature relevant to the study variables and their relationships. Literature related to management practices, network composition, cultural attributes, network interactions, policy framework and resilience was reviewed and gaps highlighted.

2.1 Theoretical Literature Review

2.2.1 Systems Theory

The systems approach was first advanced in 1974 by Ludwig von Bertalanffy as a response to the duplication of scientific research in the 20th century. Ludwig, (1968) defines a system as “A matrix of interconnected elements including different principles such as connection, number, mechanization, central planning, rivalry, finality, etc.”. A set of two or more interrelated elements, whereby each element has an effect on the functioning of the whole. It is a structured or complex piece: an assemblage or mixture of items or sections comprising a structured or unitary whole. There is a multi-dimensional effect such that each element is affected by at least one other element in the system and all possible subgroups of elements affect the whole while affecting each other. This implies that for a system to survive there is need for well facilitated, well-organized and coordinated efforts to sustain its structure and function.

The systems theory assumes the concept of synergy such that the whole is more than the sum of its parts. Like AIP actors, every part is committed to developing strategies

that preserve the benefits of having their system. The systems theory therefore introduces very important thinking relevant to this study, for example, individual network actors are the different parts that form the whole (AIP) while multidimensional effects are the relationships that exist between actors. As already alluded to above, the theory is also relevant in as far as facilitation, organization and coordination efforts are important management practices necessary to sustain and render a network resilient to internal and external shocks.

2.2.2 Stakeholder Theory

Even though the notion of stakeholders can be traced back to management literature of 1963 by the Standford Research Institute, the theory is attributed to (Freeman, 1984) who described stakeholders as any entity or individual that affects or is affected by the attainment of goals of a firm. Freeman largely focused on dyadic stakeholder relationships and firm economic value. Initial arguments in the theory placed attention to answering the question on who has more legitimacy, and to whom managers have a responsibility. The theory also attempted to answer the question: who should have more claim to the firm's spoils? By so doing, the theory implied that legitimate stakeholders should get a larger share of the spoils.

A network perspective recognizes that a focal organization's position in a stakeholder arrangement is not merely affected by bilateral structures and relationships but rather multiple positions and ties. The network perspective provides that organizations should address a set of stakeholder expectations such that management choices are influenced by stakeholder interest. It is therefore important to identify the organization's stakeholders and the type of influences they exert. Stakeholder theory does not only

endeavour to understand the type of stakeholder influences, but also, how organizations respond to such influences.

This study is aligned to the theory by highlighting the fact that focusing on stakeholders specifically treating them well and managing their interests, helps a network to create value along a number of dimensions. This theoretical perspective is critical to the study since project network governance takes care of a variety of stakeholder interests some of which are economic. The theory therefore clearly underpins the study by providing a theoretical basis to understand how governance illuminates and regulates multi-stakeholder interests on a project network.

2.2.3 Social Network Theory

The theory describes social networks is a mapping of nodes and links whereby nodes are the individual elements in the network, and ties the associations that bind those nodes (actors) (Wasserman & Faust, 1994). A social network is therefore a collection of all nodes interconnected by related ties among them. Depending on the configuration, network ties can take different forms. Scholars agree that social network theory is important in explaining relationships (ties) among different actors (nodes) and analysis of formations created out of inter-actor connectedness. Relationships (ties) between actors can be weak or strong depending on the depth and density of their interaction. This line of thinking forms a very important theoretical foundation to the study of project networks, composition of actors and the governance of their interactions. Conversely, understanding actor composition and their cultural orientations as underpinned by the social network theory, is key to interrogating and understanding their relationships: a very relevant component to this study.

Table 2.1: Summary of Theoretical Review

Theory	Associated objective	Argument	Contribution to the study
Systems theory	Objective 1 Management practices	For a system to survive, there is need for well facilitated, well-organized and coordinated efforts to sustain its structure and function	The argument is relevant to the study in supporting the proposition that facilitation, organization and coordination efforts are key network management practices.
	Objective 2 Network composition	A system is an assembly of two or more interrelated elements, whereby each element has an effect on the functioning of the whole.	A project network is a system with different actors whereby each other's action has an effect on the functioning and resilience of a network (AIP).
	Objective 3 Cultural attributes	Every system has an established way of running its processes and regulating the different parts to ensure harmony of interactions between parts.	The argument is relevant for network managers to manage values, norms and power distance among actors to sustain harmony of interactions.
	Objective 4 Network interactions	The success of a system is based on how well each part of the system is able to function together. Synergy results in successful functioning of a system.	This argument is so relevant to the study in such a way that for a network to be successful and hence resilient, interaction between actors should occur in a synchronized manner.
	Objective 5 Network resilience	The systems theory assumes the concept of synergy such that the whole is more than the sum of its parts. As such, every part is committed to developing strategies that preserve the benefits of having their system in place	This argument concurs with the concept of resilience in the study of project networks. Strong and effective interactions ensure that every actor is working towards network innovativeness and sustainability.

Stakeholder Theory	Objective 1 Management practices	The theory considers external pressures arising out of various stakeholder interests. It considers the focal organization as a facilitator/broker, which bears the responsibility of accounting to other stakeholders according to their respective stakes.	The theoretical component of varying stakeholder interests and the role of a facilitator/broker in ensuring accountability is consistent with the study objective one. It provided a theoretical basis upon which the influence of management practices (i.e coordination and accountability) on network resilience would be tested.
	Objective 2 Network composition	The theory as advanced by (Rowley, 1997) conceptualizes stakeholders based on their density and centrality of their position in a network. The higher the density, the higher the influence stakeholders have on the focal organization. A focal organization that is centrally located possess higher ability to resist stakeholder influence	The concept of density and centrality are relevant in understanding the theoretical foundation relating to the constructs of breadth vs depth, and closedness vs openness
	Objective 3 Cultural attributes	The nature of relations between stakeholders and their position in the network shapes their behaviour and interaction with others. Continuous behaviour will overtime shape network normative and value system.	The thinking behind dense networks shaping normative and value system is consistent with the study in understanding how norms, values and power distance influence network resilience.
	Objective 4 Network interactions	A focal organization responds to multiple stakeholders in the entire network. Understanding how organizations	Management of complex actor interactions in a network is a key objective in the study, which is consistent with theoretical

		respond to their stakeholders requires an analysis of the complex array of multiple and interdependent relationships existing among them	perspective on focal organization's response to multiple stakeholder pressures.
	Objective 5 Network resilience	A high density set of stakeholders and high centrality of the focal organization creates a balance of influence providing a coherent and unified course of action.	A sustained power symmetry resulting from the intersection of high-density stakeholders and centrality of the facilitating organization is relevant to the study's objective on understanding the effect of actor interactions on resilience of networks (AIPs).
Social network theory	Objective 2 Network composition	The theory explains how nodes and ties form a network through interactions that propagate long-term relationships.	Nodes are indeed the specific actors, and connections are partnerships between such actors. This argument is important in determining the number and nature of network composition.
	Objective 4 Network interactions	The theory also explains a network in terms of network depth and density i.e the number of nodes determine the depth while the degree of interaction among those nodes determines the density.	The argument is relevant in that relationships (ties) between actors can be weak or strong depending on the number and intensity of their interactions

Source; Author and Literature Review (2019)

The three theories, that is, systems, stakeholder and social network provide a fundamental foundation for this study. Stakeholder theory is critical in explaining how actor interests are handled while social network theory underpins the interaction of AIP actors to generate bonding necessary for resilience. However, for all these to happen,

there must be a form, an infrastructure that allows stakeholders to operate and interact. This form is defined by the systems theory, which explains both the hard and soft wares of an AIP. The existence of actors alone is not enough without them interacting in a systematic way. Therefore, the study was anchored on systems theory.

2.3 Empirical Literature Review

2.3.1 Management practices and Network Resilience

Over the years, the importance of understanding governance of projects has been growing among organizations mainly because suitable governance forms determine the success or failure of these projects (Gustafsoon et al, 2014). However, literature shows that due to factors such as regulatory requirements, increasing business complexities, globalization, together with rapid ever-changing technology and business environments render implementation of effective project governance framework very challenging. For this reason, many organizations do not have a consistent approach to project governance (Sanderson, 2013). Further, despite extensive studies on networks, few have specifically focused on the governance of project networks. Indeed, even guidelines on governance of portfolios, projects and programs of Project Management Institute (PMI) (2016), emphasize structural governance domains (i.e committees, boards, sponsor etc), and how they align with the strategic direction, integration management and benefit realization of host organizations.

Analysing how various stakeholder management approaches and principles of sustainable development are embedded in international project management standards, Eskerod and Huemann (2013) used desk research by applying an analytical framework developed from stakeholder theory on (ICB, PMBOK and PRINCE2) project management standards. The study showed that project management standards treat

issues related to stakeholders in a superficial manner. The results also showed that the current stakeholder management approach seeks to make stakeholders comply with project needs as opposed to a management-for-stakeholders approach. However, since the study results were based on a desktop research, they suffer from generalization because they lack contextual anchorage, hence a need to carry out another study.

Gustafsoon et al. (2014) on governance in multi-project networks observed that whereas appropriate governance structures (for example committees and boards) are necessary, to regulate and generate compromise between different interests, sustaining constructive interactions within those structures is a difficult endeavour. This is mainly because project networks comprise of many actors for example private sector, non-governmental organizations, different special interest groups, governments, and beneficiary communities. The study concluded that project network governance requires solid resource mobilization and management, long term strategic planning and proper coordination. The focus of this study was to interrogate process dynamics in project networks while the current study went beyond the process and evaluated all the aspects of project networks for their resilience.

In their study on governance integration of multiple project management offices (PMOs), Tsaturyan and Müller (2015) conceptually developed a framework of PMO governance consisting of four-dimensions. The dimensions are structural, relational, procedural and regulative tested using qualitative techniques on a European bank case. The study found relational and regulative dimensions as being predominant when integrating multiple-PMO governance structures. The study used qualitative techniques based on a European case, which has significantly different contextual dynamics thus necessitating the current study. Secondly, this was a case study of one banking

institution while the current study was anchored on innovation platforms in the agricultural sector.

DeFillippi and Sydow (2016) studied project networks from two perspectives: as single inter-organizational projects and several projects executed on a platform of inter-organizational relationships. Using theoretical and extant literature review, the study concluded that governance and coordination of project networks could take several forms: by a lead organization, shared by actors, or by a network administrative organization. The study observed that in managing actor interactions, network governance should emphasize management of project stakeholders, that is, individual actors (for simple networks and personal nodes) and organizational actors (for complex networks and organizational nodes). In this study, the authors conceptualized coordination as being different from governance, but in the current study, coordination is conceptualized as part of project network governance. Current study used primary data as opposed to secondary data as used in the reviewed study. In addition, the study conclusions were drawn from conceptual literature review and have no empirical backing.

In a study on governance in inter-organizational project networks, Thordur (2018) carried out a qualitative case study on a significant EU sponsored research project to promote a modern governance model in multi projects. The findings of the study showed that inter-organizational projects are focused on contractual arrangements and must put all participants together for sustainable project networks. However, the study offered recommendations on the basis of case study findings and literature references only. As such, the results may not be confidently inferred on the governance of interdependent project networks of agricultural contexts. Finally, the study did not show

the relationship that exists between management practices such as M&E framework, coordination and accountability as adopted in the current study.

2.3.2 Network Composition and Network Resilience

Network composition can be characterized by size (breadth) and quality of membership (depth) as propagated by Laursen & Salter (2006) cited in Laursen & Salter (2013). The authors regarded breadth as the size of network membership in terms of number of actors. They measured network breadth in terms of how many members a given network has irrespective of their contribution towards network objectives. On the other hand, they refer to network depth as the extent to which different actors influence one another and direction of the network towards achieving their common goals. Network depth considers the value contribution by the different types of actors in influencing quality of interactions. The study used secondary data collected through the UK innovation survey conducted by the office of national statistics. Data was analysed using Probit regression model while in the current study ordinary least squares model were used.

Reinholt, Pedersen and Foss (2011) while studying motivation and information sharing in employee networks, highlighted the concept of centrality as a vital aspect concerning actor dependencies among networked arrangements. The study found the actor's network position is determined by their capacity to shape new partnerships or amplify previous ones. As such, actors who are centrally positioned act as major channels of information sharing. The study collected data using web-based questionnaire. Qualitative responses were subjected to factor analysis before multiple regression analysis. However, it does not show the relationship between composition of a network and its resilience.

A study of 250 rice farmers in Ghana using cross-sectional primary surveys highlighted the supporting and/or restricting factors influencing farmers' ability to engage in agricultural innovation platforms, Martey, Etwire, Wiredu and Dogbe (2014). It was concluded that the key limitation to smallholder rice farmers' desire to engage in platform agenda was their distance from action sites. Findings of this study showed only the actors and factors that influence the farmer's readiness to engage in AIP activities, but did not show how project network composition affects resilience of agricultural innovation platforms. The study used qualitative data from evaluations, questionnaires and focus groups, whereas the current study employed both qualitative and quantitative methods of data collection.

Teirlinck and Spithoven (2015) in their study on how network characteristics influence outcomes of publicly funded university research initiatives, found out that number of actors (breadth) is important in stimulating basic research while importance of actors (depth) is important in inspiring action (use) based research. They noted that internal resource endowments and their distribution mechanisms determine the need for in-house or outsourced research and development (R&D). Although the study results highlights the relationship between network resources, internal capabilities and R&D outsourcing intensity, the study does not explain how project network composition affects resilience of the project networks studied. The researchers were preoccupied with configuration of network resources as opposed to network composition as envisaged in this study. Additionally, the conclusions reached in the study were based on analysis of innovation survey in Belgium, which has significantly different contextual arrangements from this study.

Sariola and Martinsuo (2015) using a conceptual approach investigated project networks in a construction industry to appreciate how third-party relationships can be strengthened. The study systematically reviewed empirical literature on project networks, third-party relationships and their strength. The study found that for a network to be resilient and outlive the projects implemented thereon, managers/facilitators must realize and take into account the different (unique) interdependencies (ties) which bring diverse actors together. The study focused at developing a framework for project networks to enhance third-party relationships by purely employing literature review approach without any empirical analysis, which presents an obvious limitation to validity. There was therefore need to conduct the current study and empirically test the provisions.

In their study (on motivation for collaboration in scholarly networks), Mo, Hayat and Wellman (2015), obtained quantitative and qualitative data using online survey aided by semi-structured interviews. The results showed that showing interest in the opportunities available for networking does not necessarily result into actual participation, which calls for active involvement of all stakeholders in network composition to enhance their collaborative ties. Moreover, the study showed how adjusting institutional arrangements might be useful in enhancing collaborations that are dispersed geographically and multidisciplinary in nature. The study findings highlighted motivation for collaboration in networks based on Canadian scholarly network and therefore the findings may not be inferred on Uganda's innovation platforms.

The more diverse network ties are the more the ability to acquire diverse knowledge, because pursuing various types of ties affects innovation differently. Hao and Feng

(2016) in their study made good attempt in understanding how radical innovation is affected by heterogeneity of network ties. The study relied on existing empirical literature to develop a theoretical framework for analysing the relationships between networks and radical innovation. The study established that diverse (open) networks create weak ties while dense (close) networks create strong ties, which are important for positive interaction. The study only showed how different types of networks and their motivating factors affect radical innovation while the current study aimed to determine how network composition affect resilience of agriculture innovation platforms in Uganda, targeting the Central and Southern western regions.

2.3.3 Cultural Attributes and Network Resilience

The term cultural attributes is derived from the famous cultural dimensions model first developed by Hofstede, (1980), later magnified by Hofstede, (1984, 2005 & 2011). Using secondary data collected from over 50 countries around the world, the study empirically identified four cultural dimensions, that is, individualism vs collectivism (values), power distance, uncertainty avoidance (norms) and masculinity versus femininity.

The Hofstede 2011 study deduced power distance as a situation where less powerful members in a given institution, admit, expect and accept that power is unequally distributed and that such distribution affects all aspects of human collaboration. The study conceptualized Collectivism vs individualism as the extent to which an individual pursues individual as opposed to collective goals. In addition, the study conceptualized uncertainty avoidance as regulating behaviour in order to minimize levels of stress in society. The study concludes by asserting that societies, which practise lower power distance, emphasize equality, decentralized power, and shared authority.

On the other hand, societies, which practise large power distance, manifest centrally managed structures and minimum interaction between powerful and non-powerful actors. This study presents the three dimensions of power distance, values, norms as key considerations that a network manager should consider while dealing with actor relations. Current study used primary data in explaining the relationship between cultural attributes and network resilience as opposed to secondary data used by Hofstede (2011).

In their study about culture and climate for innovation, Ahmed cited by Valencia, Jiménez & Sanz-Valle, (2011) noted that innovativeness thrives in a culture where organisations deliberately nurture innovation and creativity. The study focused on how organisational factors affect innovation concluding that companies, which have created appropriate cultures and climates, are the ones that will dominate the future. Study findings showed that appropriate cultures and climate nurture innovation. However, these results are based on literature review, which calls for empirical testing of the results. In addition, whereas the study findings highlighted the need for creating appropriate cultures and climate for innovation, they did not show the relationship between culture and resilience of agricultural innovation platforms as the current study envisaged.

While studying management of open innovation platforms, Ojasalo (2016) noted that behaviour/relation control (norms) is important in protecting network values. Norms help to control members from behaving in a manner that hurts the core values of a network. Norms create a social control mechanism that require members conform to an expected behavioural standard. A good value system is one whose normative system is

strong enough to keep members focused on what brings them together and makes them proud as a network.

Studying the influence of organizational culture on commercial banks performance in Kenya, Maina (2016) used a descriptive survey design to collect data from 120 employees sampled from 42 banks in Nairobi, Kenya. Data was analysed employing descriptive and inferential analysis to understand the impact that corporate culture has a on the success of commercial banks in Kenya. The study also concluded that organization culture determines work dynamics, creating a like-mindedness environment among employees while holding similar beliefs and values. The study further noted that banks are guided by values of effective communication, adaptability, and consistency. Although the study found that culture influences performance, results were based on data collected from commercial banks that have different operational environment from agricultural innovation platforms.

2.3.4 Governance, Network Interactions and Network Resilience

Network interactions occur at different levels depending on the nature of composition and type of projects implemented (Sariola & Martinsuo, 2015). For example, social interactions among collaborating organizations in construction projects, largely takes place among individual actors. The relationship between collaborating organizations is thus characterized by the interaction of individuals (representatives) working on the project. Literature supports the fact that most managerial activities for strengthening organizational relationships, and building trust and confidence are generally left to individual actors.

This is despite the fact that trust and confidence are the key parameters of measuring relationship strength. Interpersonal relationships function around apparent

(organizational/official) and actual (individual/informal) interests. Besides mutual benefit, it is important that actors clearly disclose their individual benefits they expect to realize from the network. Without clearly defining what each individual is bound to benefit on a network, it is unlikely that actors will pursue collaborative activities purely on apparent interests. As such, failure by network managers to understand actor's actual interests could present an easy source of conflict.

Ahuja, Yang and Shankar (2010) used the interpretive structure modelling (ISM) methodology to assess collaborative ICT adoption benefits constructing project management. The paradigm has demonstrated that all initiatives, including infrastructure, team management and organizational advantages, are intertwined and cannot be completed on an individual basis. However, the aspects of technology and organization offer higher competitive benefits. As a means of strategically growing these advantages, project team organisations are urged to devote more focus to ICT implementation. The study deployed qualitative approaches while the current used both quantitative and qualitative techniques. The research was also focused on building schemes in India, while the new study was based on sites for agricultural development in Uganda.

Lloyd-Walker and Walker (2011) while studying leadership and project delivery observed that there is need for different approaches, attributes and skill sets to manage the demands of 21st century projects. The study noted a generational shift in attitudes, values and work methods that need to be seriously considered by the current transgenerational leadership. A leadership that is collaborative, demonstrating trust-building attributes, encouraging communication, dialogue, team building and commitment. They concluded that setting joint objectives, ensuring proper conflict

resolution techniques, sound contracts management principles and authentic leadership are clear ways to strengthening relationships in partnership and alliance projects. The study aimed at addressing the need for a new style of project leadership that is consistent with the project management environment of today and the future. The study was carried out in Australia but does not provide a detailed methodology used.

In a study on trust building in collaborative construction projects, Laan, Noorderhaven, Voordijk and Dewulf (2011) sought to generate insights into how collaborative, cooperative and trusting project relationships are established and maintained between client and contractor organizations. Using an exploratory design to study a project network conducting railway development in the Netherlands, the research showed that circumstances obtained during the early stages of construction project network might be trusted and preferred in terms of rewards and opportunities. However, the results of the research were focused on data from a building network while the current study was cantered on data from agricultural platforms for innovation. The research also has an established and distinct operational climate in the Netherlands from that of a developing world like Uganda.

Weiss (2011) conducted a study on social-ecological resilience and governance of natural resources focusing on diversity, power and scale. The study concluded that effective communication systems, continuous learning and dissemination of knowledge, cross cultural trust building, transparent and equitable allocation of resources are key processes towards management of social-ecological resilience. However, the focus of the study was on social-ecological resilience, which was tested as an independent variable while the current study used network resilience as the dependent variable. Additionally, the study was based on marine sector while the

current study was based on agricultural innovation platforms. Finally, the findings were based on data collected in Northern Australia, which has significantly different social economic factors from Central and South western Uganda.

Pant (2012) while evaluating transportation network resiliency adopted Heaslip, et al. (2009) definition of resilience as the system's ability to keep a visible level of operation or recompose itself to original level of operation in a given period after a shocking event. The study showed that a robust and optimized recovery process significantly enhances network performance and resilience. This study also showed that effective network performance measurement provides faster self-annealing abilities and resilience in the aftermath of disasters. Although this study provided insights into resilience of networks, it was based on transportation networks, which have significantly different operational frameworks from agricultural innovation platforms. Further, in this study, resilience of network was operationalized through total loss on a network's robustness and recovery optimization while in the current study network resilience was operationalized through innovativeness, sustainability and reproduction.

Nangoli, Ahimbisibwe, Namagembe and Bashir (2013) while studying social networks focusing on strategies for enhancing project-stakeholder commitment sought to understand the effect of social networks on commitment of stakeholders towards achievement of project goals. The study findings revealed that project stakeholder commitment is significantly influenced by network transitivity and network degree. However, the findings in this study were pegged on commercial banks while the current study focused on establishing innovative agricultural platforms in Central and South western Uganda. Additionally, the study doesn't convey the effect of project network interactions on network resilience. Further, the study only focused on social network

interactions, which was treated as an independent variable while in the current study network interactions was treated as mediating variable.

In their study of project networks and third-party relationships, Sariola and Martinsuo (2015) observed that network boundaries might be ambiguous and confusing, unless there is an access regulator. The authors observed that inter-organizational relationships can be characterized as weak or strong and detached or entrenched. The concept of relationship strength brings together the actor's belief and their action as components of such a relationship. The actor's belief in the spirit of cooperating and trusting each other, and their actions towards a common goal are indicators of strength in a relationship. This study however, only focused on third party relationships within networks leaving out actors who directly interact within the networks. Additionally, the study was not context based and therefore could not be inferred on the current study context since it lacks empirical evidence.

Koumar (2016) while studying cloud computing in agriculture industry found that the introduction of cloud computing into agriculture processes has globally catalysed output input value chains. In particular, the authors noted that cloud computing plays a vital role by providing latest technologies that makes the management and monitoring of agricultural processes very simple and easy. Further, it was noted that it facilitates the storage, management, access, and dissemination of the agriculture information rapidly and at low cost. In summary, cloud computing helps farmers through higher production, marketing, selling and decision-making processes. However, this study only sought to show how farmers can benefit from cloud computing individually not collectively say in AIPs. In addition, the study did not conduct any empirical tests to show the relationship between study variables.

2.3.5 Governance, Policy Framework and Network Resilience

Local, national legal and regulatory mechanisms promote or inhibit interactions. Policies create enabling or disabling environments for platform actors to interact and innovate. Networked innovation efforts should therefore invariably but smartly engage policy actors to influence both local and national policy environments. In the Lake Kivu region, SSACP noted varied policy environments between the three countries. Uganda showed existence of good policies but weak implementation, Rwanda showed both good policies and strong implementation, while DR Congo was weak in both (SSACP reports, 2011).

One way of influencing policy is running platforms with government staff and make them take lead roles (Nederlof, Wongtschowski, & Van der Lee, 2011). By working together and assigning key roles, platform members slowly build their capacity to influence policy-making processes related to their local issues. Close interaction with policy makers also increases civil awareness and empowers platform members to not only influence in making but also implementation of policies at community level. AIPs also provide avenues for policy makers to influence and educate communities on policy matters (Adekunle, Oluwole, Buruchara, & Nyamwaro, 2013).

Sterbenz et al. (2013) investigated network resilience, destructive resistance and survival capacity when distressed by large-scale catastrophes, assaults and other shocks. The authors identified a sequence of network durability assessment approaches using a mix of experimental replication techniques, simulation, examination, and topology generation to improve network power. It should be noted that in this study the authors only showed how to evaluate network resilience but does not show the factors that affect network resilience. Additionally, the study was hypothetical and thus has no

empirical test foundation unlike the current study which is aimed at investigating the effect of innovation platform governance on its resilience

In his study on Policy networks in action, Colgan (2016) sought to investigate how various stakeholders pull efforts together in developing policies and their implementation strategies aimed at alleviating childhood poverty and vulnerability. The results showed that when working within a network, there is a need to adjust to operating outside of a hierarchical structure, with clear lines of control and authority. While the results in this study show the relevance of interaction between governments and other policy stakeholders and the opportunities offered by these networks in policy development, the study did not show how the policy framework such as policy alignment and government involvement affect the resilience of networks. The study also concentrated on two cases while the current study conducted a survey of all AIPs in Central and South western Uganda. Clearly, there is a significant difference in the context and methodological approach of the two studies, which necessitated the current study.

2.4 Summary of existing Literature and Research Gaps

The foregoing discussion concludes that project networks (AIPs) are important frameworks for managing multi-stakeholder collaborations. They offer efficiencies arising out of repeated collaborations thus making project delivery cheaper. The reviewed literature also demonstrates the importance of a manager, facilitator, coordinator, or broker to moderate and nurture actor interactions. Existing literature acknowledges the role of Information Communication Technology (ICT) in fostering information flow among platform actors. Scholars acknowledge the role of transparency, accountability, and M&E in fostering common understanding,

cooperation, trust and commitment. They also acknowledge the role of cultural attributes in shaping the nature of interactions among actors. Likewise, comprehensive studies about the number of actors and their quality, their motivation to collaborate, their apparent and actual interests in affecting actor interactions are evident. Reviewed literature acknowledge that repeated interactions, sustained bonding and commitment create enduring and persistent collaborations. The literature highlighted how different policy environments can regulate interactions and innovation.

It should be remembered however, that majority of studies on formation, functioning and operationalization of AIPs were conducted by biophysical scientists and to a smaller extent by social scientists. Few of the reviewed studies investigated the coordination of such collaborative efforts from a management perspective. Further, the review of literature has successfully magnified the deficiency that most network managers continue to borrow (with minimum or no creativity) traditional management discourses with no purposeful consideration to the fragility, complexity and dynamic structural and process configuration of project networks.

It has also indicated that even though the current study variables have been considerably studied, none has combined them to bring out the composite effect of governance on resilience of project networks. Since none of the reviewed studies has investigated the collective effect of all these variables on endurance and persistence of networked collaborations, the study found conceptual, empirical and methodological gaps in the existing literature, which calls for more studies on the topical area. This study therefore sought to investigate combined effect by governance on the changes in resilience of AIPs.

This study contributes towards designing a management approach that is able to accommodate and take full advantage of potentialities that come with dynamism and complexity in project networks. Such an approach that draws unique but appropriate competencies, that matches the unique organizational configuration of project networks, remains elusive to majority of project network scholars and managers.

Table 2.2 below summaries the review of existing literature and research gaps identified.

Table 2.2: Summary of Literature Review

Related Variable	Authors	Focus of the study	Key Findings	Identified gaps
Management practices	Ojasalo (2016)	management of open innovation platforms	While actors would like ant a leadership that possess and can exercise authority in the network, too hierarchic and rigid network operation erodes the advantages gained from networked product development.	The study was qualitative in nature. The study only compared different management approaches on innovation in various networks but failed to show the effect of the governance approaches on network resilience
	Eskerod and Huemann (2013)	Stakeholder management approaches and sustainable development principles.	Project management standards treat stakeholder issues superficially. Current project stakeholder practices represent mainly a management-of-stakeholders approach as opposed to a management-for-stakeholders approach.	The study was a desktop research and results suffer from generalization for lack of empirical support.
	Gustafsoon, Larson, & Svensson (2014)	Governance in Multi-Project Networks:	Collaboration and trust, common goals, network access, clear form of governance, role definition of actors, coordinated expectations, resource availability and allocation, legitimization, are key to project success	This study focused on process network dynamics in multi-project networks. Additionally, the study was qualitative in nature. The current study went beyond the process and evaluated all the aspects of project networks such as for their resilience. Quantitative and qualitative data were utilized.

	Tsaturyan and Müller (2015)	Integration and governance of broad organizations with several project management offices	There is so much emphasis regulative and relational dimensions in integrating multiple-PMO governance structures	The results based on qualitative analysis of a case study of one banking institution within European banking sector.
	Thordur (2018)	Governance in inter-organizational project networks	Inter-organizational projects are based on contractual agreements which must bring together all actors in the projects for project networks to be sustainable. i.e the governance structure should be coordinated by a central organization of the network, which builds consensus through compromise and negotiations.	The results of the study were based on an EU funded research project which has different operational scope from agricultural innovation platforms in Uganda.
Network composition	Reinholt, Pedersen and Foss (2011)	Centrality aspects regarding interdependencies in networked arrangements	Actors who are centrally positioned act as major channels of information sharing, since an actor's position (depth/degree of importance) in a project network is measured by their capacity to form new, expand and strengthen existing relationships	The results do not show the relevance of network composition on its resilience.
	Martey, Etwire, Wiredu and Dogbe (2014)	Willingness of farmers to participate in innovative platforms	Willingness was constrained by the distance to meeting place. Age of household head, household size and household income	The study relied on parametric data analysed using Kendall's coefficient of concordance and Probit model. The

			significantly affected farmers' willingness to participate on the platform.	current study used both qualitative and quantitative data.
	Teirlinck and Spithoven, (2015)	Influence of network characteristics on outcomes of publicly funded university research projects	intensive internal R&D strongly creates a positive need for outsourcing complimentary R&D capacities	The study was preoccupied with configuration of network resources as opposed to network composition as envisaged in this study. The study did not show the relationship that exist between project network composition and resilience of the project.
	Sariola and Martinsuo (2015)	Project networks in a construction industry and how third-party relationships can be strengthened.	The study found that for a network to be resilient, managers and facilitators must realize and take into account the interdependence (ties) which bring diverse actors together	The study aimed to develop a theoretical framework (using existing literature) for understanding project networks in a construction industry, and how third-party relationships can be strengthened. The study is merely theoretical with no empirical basis.
	Mo, Hayat, & Wellman (2015)	Motivation for collaboration in scholarly networks	Actor motivation to participating in a network influences the nature and outcome of collaborative efforts. In addition, understanding different motivations behind diverse network actors is key to successful management of collaborations.	The findings were focused on the Canadian scientific network and cannot be based in the Central, and South West of Uganda on agricultural platforms.
Cultural attributes	Hofstede (2011)	Power distance within a collaborative arrangement	The study concludes that societies, which practise lower power distance, emphasize equality, decentralized power, and shared	This study conceptualizes the three dimensions as cultural attributes such as power distance, values and norms, which were not considered in the study.

			authority. Societies, which practise large power distance, manifest centrally managed structures and minimum interaction between powerful and non-powerful actors.	
	Valencia, Jiménez & Sanz-Valle, (2011)	Culture and climate for innovation	The study found that appropriate cultures and climate nurtures innovation.	The results were based on literature review, which calls for empirical testing of the results. The study did not show the relationship between culture and resilience of agricultural innovation platforms as the study envisages.
	Maina (2016)	How organizational culture influences performance of commercial banks in Kenya	organization culture determines work dynamics, creating a like-mindedness environment among employees while holding similar beliefs and values	The results were based on data collected from commercial banks that have different operational environment from agricultural innovation platforms.
Network Interaction	Laan, Noorderhaven, Voordijk and Dewulf (2011)	Establishment and maintenance of cooperative, trusting relationships in partnering projects between client and contractor organizations	initial conditions of project alliance are conducive to trust, both in terms of opportunities and incentives	The paper looks at commercial networks which focused on economic interest. The author's propositions need to be interrogated in a non-profit setup.
	Huemann, P. E. (2013).	Role and management of project stakeholders in sustainable development:	Principles for constructive engagement of project stakeholder's engagement is premised on values, balancing	These principles were interrogated in an innovative environment and how to sustain ever changing product and process innovations

			their interests, long term focusing, and wider geographical outlook.	
	Sariola & Martinsuo, R. S. (2015).	Enhancing actor relationships in project networks	The relationship between collaborating organizations is characterized by the interaction of individuals (representatives) working on the project	The paper highlights very important interactions that should be tested against resilience
	Ahuja, Yang and Shankar, (2009)	Importance of perceived benefits and their driving power in ICT adoption	All the benefits related to projects such as technology, team management, and organization are inter-connected and therefore not achievable in isolation.	The study was based on construction projects in India while the current was based on agricultural innovation platforms in Central and South western Uganda.
	Koumar (2016)	Cloud computing in agriculture industry	cloud computing into agriculture processes has globally catalysed output-input value chains	The study only sought to show how farmers can benefit from cloud computing individually but did not in the AIPs. In addition, the study did not conduct any empirical tests to show the relationship between study variables.
Network Resilience	Catherine W. Kilelu, L. K. (2013).	Role of innovation platforms in fostering innovation	Innovation platforms are effective intermediaries that connect diverse actors into innovation systems in order to create impactful change	The role of management (facilitation/brokerage) is not well articulated
	Pant (2012)	Transportation network resiliency	The study showed that a robust and optimized recovery process significantly enhances network performance and resilience.	The study was based on transportation networks which have significantly different operational frameworks from agricultural innovation platforms. Resilience was operationalized through total loss on a network such as robustness

				and recovery optimization while in the current study network resilience is operationalized through innovativeness, sustainability and reproduction.
	Nangoli, Ahimbisibwe, Namagembe and Bashir (2013)	Strategies for enhancing commitment of project stakeholders among social networks	The engagement of project stakeholders is hugely influenced by overall interplay of network components.	The results were based on projects implemented in the banking sector while this study will be based on agricultural innovation platforms. The study focused on social network interactions which was treated as an independent variable while in the current study network interactions was treated as moderating variable.
Policy framework	Colgan (2016)	How various stakeholders pull efforts together in developing policies and their implementation strategies aimed at alleviating childhood poverty and vulnerability	When working within a network, there is a need to adjust to operating outside of a hierarchical structure, with clear lines of control and authority	The study did not show how the policy framework such as policy alignment and government involvement affect the resilience of networks. The results in this study were based on social justice and children's rights organisations in South African context while the current study will be based on AIPs in Uganda.

Source; Author and Literature Review (2019)

2.5 Conceptual Framework

This schematic structure demonstrates the association of independent variables with dependent variable, independent and mediating variable, mediating and dependent variable, moderating and dependent variable. It is presented in figure 2.2:

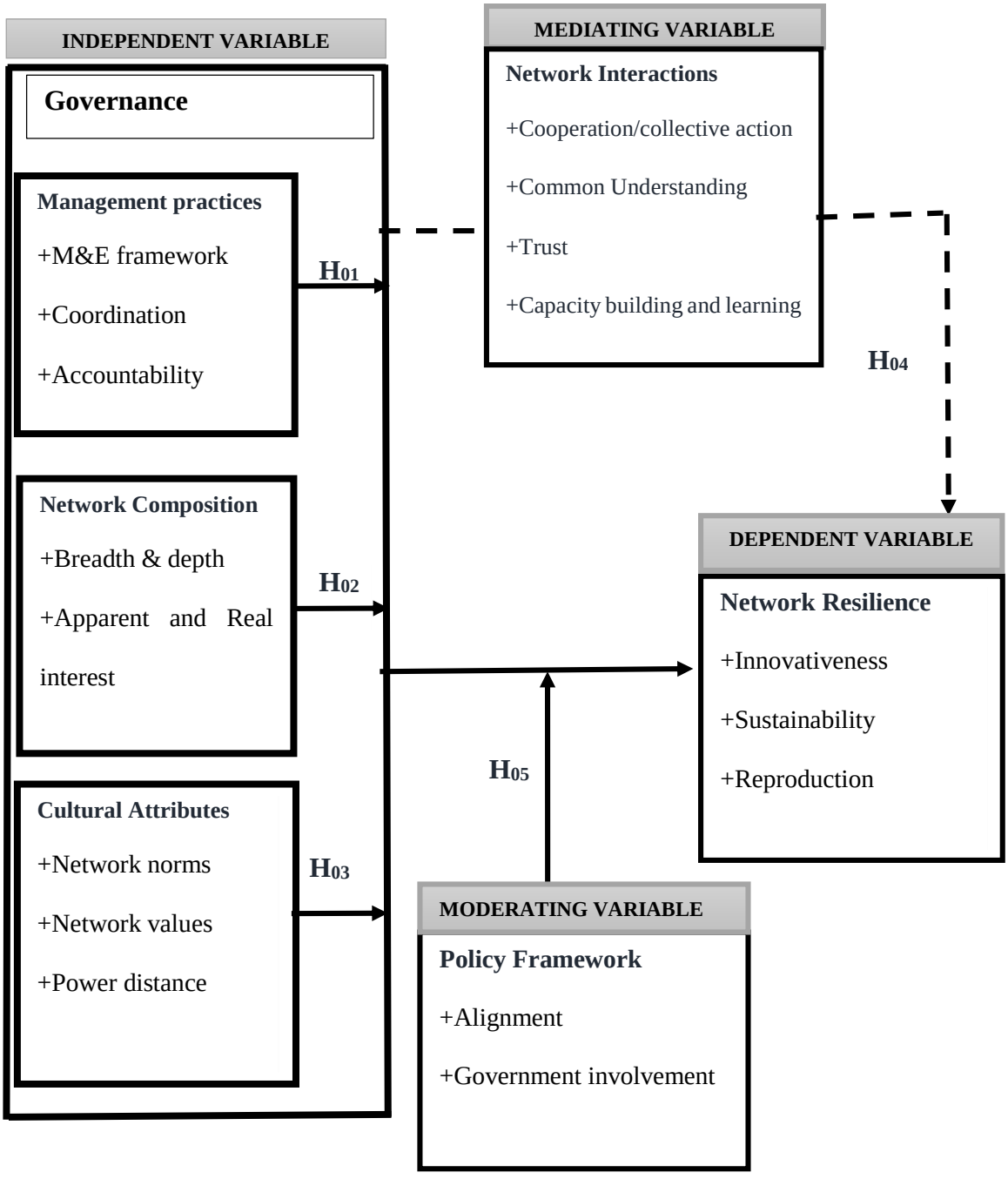

Figure 2.1: The conceptual framework.
Source: Author (2018)

The conceptual framework presented in figure 2.2 illustrates the relationships between study variables. The variables were drawn from reviewed literature while relationships were schematized by the researcher. The framework presents the independent variables of management practices, network composition and cultural attributes, and their relationship with resilience of agricultural innovation platforms (dependent variable). It also presents the mediation relationship created by the introduction of network interactions between independent variables and dependent variable. Lastly, it presents the relationship resulting from the moderating interaction of policy framework.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the research methodology used in the study is discussed. The chapter also discusses research design, underpinning research philosophy, operationalization and measurement of variables, instruments for data collection, data collection procedure, study area, target population, sampling design and determination, validity and reliability measures, diagnostic test, data analysis and presentation, empirical model, as well as ethical considerations.

3.2 Research Philosophy

Research philosophy is an expression of values, beliefs and important assumptions about the way researchers view the world (Saunders, Lewis, & Thornhill, 2009). These assumptions influence the type and nature of knowledge developed through research processes. They underpin research strategy and methodology. A positivist philosophy was adopted for this study. Positivism contends that a researcher is independent of research subjects, is able to design a research strategy based on existing theory to draw research hypotheses, use a rigorous methodology to enable replication, and quantify all the responses to allow for statistical analysis (Almalki, 2016). A positivism paradigm was therefore adopted since the researcher was independent from the subjects, the study consisted hypothesized variables based on existing theories, subjected them to a rigorous methodology and quantified them for statistical analysis.

3.3 Research Design

In this study, explanatory research design was adopted. Explanatory design was used in order to characterize and understand study subjects, while explaining casual relationships between study variables as advised by Saunders, Lewis, & Thornhill,

(2009). In addition, according to Creswell (2014) explanatory research design is suitable for determining and measuring relationships between explanatory and response variables. In this study, correlation and regression analysis was used to establish the relationship existing between management practices, network composition, network interactions, policy framework, and resilience of project networks. The design is thus consistent with the study in characterizing agricultural innovation platforms, and understanding relationships between their governance and resilience.

3.4 Empirical Models

This section explains how inferential analysis of study variables was carried out and the models used. The study used multiple regression models to test the relationship between governance and resilience of project networks. Thereafter, mediating and moderating relationships of network interactions and policy framework on resilience of project networks were tested. The empirical models for direct relationship, mediated relationship and moderated relationship were used to test direction and strengths of relationships between the variables in order to address study objectives.

3.4.1 Testing for Direct Relationship

The primary Relationship between management practices, network composition, cultural attributes on one hand and resilience of project networks on the other is given by the following function:

$$RPN = f(MP, NC, CA) \quad \text{(3.0)}$$

Where:

RPN: Resilience of Project Networks

MP: Management Practices

NC: Network Composition

CA: Cultural Attributes

The individual and combined effect of variations in the independent variables on RPN was tested using a multiple regression model below. According to Field, (2013), multiple regression is the most suitable technique for analysing strengths in cause–effect relationships. The study therefore adopted the same technique in analysing the effect of independent variables on the dependent variable.

$$RPN = \beta_0 + \beta_1 MP + \beta_2 NC + \beta_3 CA + \varepsilon \quad \textbf{(3.1)}$$

Where:

β0: - intercept

β1: - coefficient of Management practices

β2: - coefficient of Network composition

β3: - coefficient of Cultural Attributes

ε: - Error Term

The model above measured the strength of relationship between independent variables (MP, NC, and CA) and Resilience of project Networks (RPN) as stated in objectives one through three, by determining the significance of beta coefficients β_1, β_2, and β_3. Using the significance of beta coefficients determined in equation 3.1 above, the respective hypotheses (specified in section 1.4) were tested. Regression analysis is important in predicting outcome on the dependent variable resulting from changes in the independent variables. Therefore, the β coefficients indicate how many shifts in the dependent variable is expected by adjustments in the explanatory variables. For instance, an insignificant coefficient value meant that changes in the independent variable have no predictive effect on the dependent variable thus confirming the null hypotheses. Essentially, significant values of β coefficient indicate powerful

relationships, which explain changes in the dependent variable as a result of variations in the independent variables hence rejecting null hypotheses.

3.4.2 Testing for Mediation

Network interactions was hypothesized to mediate the relationship between governance and resilience of project networks. To examine this relationship, the study used the three regression equations for testing linkages of a mediation model as provided by Baron and Kenny (1986). The study chose the equations advanced by Baron and Kenny because they are clear and straightforward in measuring the extent to which a mediator variable accounts for the relation between independent and dependent variables. Equation 3.2 tested significance of the direct relationship between governance and resilience of project networks (Step-i). Equation 3.3 tested the significance of the relationship between governance and network interactions (Step-ii). Equation 3.4 tested the relationship between network interactions and resilience of project networks when the former was combined with governance as predictors of resilience of project networks (Step-iii). To determine the extent of mediation, significance of the relationship in (step-i) was compared with significance of the relationship in (step-iii).

Step-i, RPN was regressed against G using model 3.2.

$$RPN = \beta_0 + \beta_4 G + \varepsilon \quad \text{…….……} \quad (3.2)$$

Where,

G = Governance (composite index of MP+NC+CA).

ε = error term

Step-ii, Regress NI against G.

$$NI = \beta_0 + \beta_5 G + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$

Where,

NI = Network interactions

In Step-iii, RPN was regressed against G and NI as independent variables.

$$RPN = \beta_0 + \beta_6 G + \beta_7 NI + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.4)$$

In Step-iv, compared regression coefficients between equations 3.2 and 3.4.

Table 3.2 Provides decision criteria to reject or not reject H_{04}

Table 3.1: Criteria for determining Mediation

RESULT		**DECISION**
1	Significant β_4 in model 3.2	Full mediation and *Reject H_{o4}*
	Significant β_5 in model 3.3	
	Non-significant β_6 - β_7 in model 3.4	
2	Significant β_4 in model 3.2	Partial mediation and *Reject H_{o4}*
	Significant β_5 in model 3.3	
	β_6- β_7 significant in 3.4 but less significant than β_4 in 3.2	
3	Significant β_4 in model 3.2	No mediation and *Do not reject H_{o4}*
	Non-significant β_5 in model 3.3	
	Both β_4 in 3.2 and β_6- β_7 in 3.4 are significant and equal	

Source: Baron & Kenny, (1986)

3.4.3 Testing for Moderation

Policy framework was hypothesized to moderate the relationship between governance and resilience of project networks. In accordance with (Baron & Kenny, 1986; MacKinnon et al. 2007), a two-step procedure was used to test for moderation. The first step was to treat policy framework (PF) as an independent variable:

$$RPN = \beta_0 + \beta_8 G + \beta_9 PF + \varepsilon \quad \text{(3.5)}$$

The second step was to interact governance and policy framework as follows:

$$RPN = \beta_0 + \beta_{10} G + \beta_{11} PF + \beta_{12} G * PF + \varepsilon \quad \text{(3.6)}$$

If β_{10}-β_{12} are not significant in model 3.6 but β_9 is significant in model 3.5 then policy framework is simply an independent variable and the decision is not to reject H_{05}. However, if $\beta_{10} - \beta_{12}$ in model 3.6 are significant and β_9 in model 3.5 is significant, then policy framework is confirmed as a moderating variable and the decision is to reject H_{05}.

Table 3.2: Criteria for determining moderation

Model 3.4	Model 3.5	Decision
When β_9 is not significant ($p>0.05$)		Overall, there is no moderating effect
When β_9 is significant ($p<0.05$)	When β_{10}-β_{12} are not significant ($p>0.05$)	The hypothesized moderating variable is simply an independent variable hence don't reject H_{05}
When β_9 is significant ($p>0.05$)	When β_{10}-β_{12} are significant ($p>0.05$)	There is a moderating effect hence reject H_{05}

Source: Mackinon, et al (2007)

3.5 Test of Hypotheses

Using the empirical models presented in table 3.3, the study hypotheses were tested in accordance with research objectives.

Table 3.3: Testing Study Hypotheses

Hypothesis	**Model**	**Conclusion**
1. Management practices have no effect on resilience of project networks among agricultural innovation platforms in Central and South western Uganda.	Multiple linear regression model: $\boldsymbol{RPN = \beta_0 + \beta_1 MP + \beta_2 NC + \beta_3 CA + \varepsilon}$	Given the values of r^2, $\boldsymbol{\beta_1}$ and F If $p<0.05$, reject H_{o1} If $p>0.05$, do not reject H_{o1}
2. Network composition has no effect on resilience of project networks among agricultural innovation platforms in Central and South western Uganda.		Given the values of r^2, $\boldsymbol{\beta_2}$ and F If $p<0.05$, reject H_{o2} If $p>0.05$, do not reject H_{o2}
3. Cultural attributes have no effect on resilience of project networks among agricultural innovation platforms in Central and South western Uganda.		Given the values of r^2, $\boldsymbol{\beta_3}$ and F If $p<0.05$, reject H_{o3} If $p>0.05$, do not reject H_{o3}
4. Network interaction has no mediating effect on the relationship between governance and resilience of project networks among agricultural innovation platforms	Step 1: $\boldsymbol{RPN = \beta_0 + \beta_4 G + \varepsilon}$ Step 2: $\boldsymbol{NI = \beta_0 + \beta_5 G + \varepsilon}$	Given the values of r^2, $\boldsymbol{\beta_4}$ and F in step 1, if $\boldsymbol{\beta_4}$ is significant, there is a relationship to be mediated Given the values of r^2, $\boldsymbol{\beta_5}$ and F in step 2, if $\boldsymbol{\beta_5}$ is significant,

in Central and South western Uganda.	Step 3: $RPN= \beta_0+\beta_6 G+\beta_7 NI+\varepsilon$	then governance affects network interaction. Given the values of r^2, β_6, β_7 and F in step 3: If β_6 and β_7 are not significant, but β_4 and β_5 are significant, there is full mediation. Do not reject $H_{o4.}$ If β_6- β_7 is significant but less significant than β_4 and yet β_5 is significant, there is partial mediation. Do not reject $H_{o4.}$ If β_4, β_6 and β_7 are significant and equal, no mediation. Do not reject H_{o4}
5. Policy framework has no moderating effect on the relation between governance and resilience of project networks of project networks among agricultural innovation platforms in Central and South western Uganda.	**Step 1:** $RPN = \beta_0 +\beta_8 G+ \beta_9 PF + \varepsilon$ **Step 2:** $RPN =\beta_0 +\beta_{10} G + \beta_{11} PF + \beta_{12} G * PF +\varepsilon$	Given the values of r^2, β_9 and F in step1, r^2_1 and r^2_2 in step2, if β_{12} is statistically different from zero, there is a significant moderation. If $p<0.05$, reject H_{o5} and If $p>0.05$, do not reject H_{o5}.

Source: Author (2019)

3.6 Study population and sample size

3.6.1 Target Population

The study targeted AIP actors, including farmers, traders/processor, researchers, government agents, extension agents and NGOs. The study population was drawn from actors who participate in the study. South western Uganda was selected because it is in this region that initial Agricultural Innovation Platforms were established thus hosting some of the oldest AIPs in the country. The central region was selected because it is semi-urban and has a high number of the young and recent AIPs. This region is situated closer to the metropolitan Kampala city with higher purchasing power and stronger market linkages compared to other regions. According to NARO (2018), the two regions have a total of twenty-two (22) active AIPs, each with six (6) actor organizations i.e farmers, processors/ traders, researchers, extension agents, government agents and NGOs. Five (5) members represent farmers while one member each represents the other five actor organizations. In Table 3.4, study target population has been summarised.

Table 3.4: Study target population

Region	**No of AIPs**	**AIP actors**						
		Farmers' leaders	Processors /traders	Researchers	Extension agents	Government agents	NGOs	Total
Central	11	55	11	11	11	11	11	110
South-western	11	55	11	11	11	11	11	110
Total	**22**	**110**	**22**	**22**	**22**	**22**	**22**	**220**

Source: NARO (2018)

It was noted that AIPs are governed by farmers' representatives (NARO, 2018). NARO requires all the AIPs it coordinates to have five farmers' representatives, the five being

chairperson, vice chairperson, organising secretary, secretary for mobilisation and the treasurer. Additionally, the other actors such as traders/processor, researchers, government agents, extension agents and NGOs are required to have at least one representative each. Therefore, there are 10 actor representatives in each AIP. In total, there are 220 actor representatives in the two regions with each region having 110 representatives. The unit of analysis was AIPs in the Central and South western regions of Uganda while the unit of observation was the actor representatives in each of these AIPs. The respondents in this study were individuals representing farmers, processors, researchers, extension agents, government agents and NGOs in each AIP.

3.6.2 Sample Size and Sampling Procedure

Sampling involves selecting a few representative members out of entire population to provide adequate data for analysis (Bryman & Bell, 2015). Sampling should be done in such a way that it amply represents the entire population such that a researcher can make conclusions based on sample findings (Etikan, Musa & Alkassim, 2016). According to NARO (2018), each AIP has five farmers' representatives and one representative from rest of the actors that is, traders/processors, researchers, government agents, extension agents and non-governmental organizations.

The population was stratified into farmers, processors, researchers, extension agents, government agents and NGO representatives in each of the AIP. From the five farmers' representatives, the chairperson was purposively selected to represent the farmers. The chairperson was selected because he/she is elected by farmers to lead them as head of the AIP executive and can therefore represent them externally. Additionally, the chairperson is heavily involved in the management of AIPS and therefore can provide all the relevant information about the AIP. For this reason, the chairperson was best

suited to represent the farmers. Where the chairperson was not available to respond to the questionnaire, the vice chairperson was selected. If the vice chairperson was not available, whoever assumed the role of the chairperson in his/her absence was selected. Other respondents in each AIP included one (1) processor, one (1) researcher, one (1) government agent, one (1) extension agent and one (1) non-governmental organizations representative. Ultimately, six (6) respondents, each one representing the different categories of actors, were selected from each of the 22 AIPs making 132 respondents as indicated in table 3.5 below.

Table 3.5: Sample Size

Region	**No of AIPs**	**Sampled AIP actors**						
		Farmers' leaders	Processors /traders	Researchers	Extension agents	Government agents	NGOs	Total
Central	11	11	11	11	11	11	11	66
South-western	11	11	11	11	11	11	11	66
Total	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**132**

Source: Author (2018)

3.7 Data Collection Instruments

A semi-Structured questionnaire was used to gather data from respondents. The method conducted was preferred because it maintains accuracy while the functional dimensions of the study variables are captured in consistent and reliable manner. The instrument was developed to gather background information of study respondents as well as on all study variables.

3.8 Pilot Testing

To ascertain the validity and reliability of the tool, a pilot testing was conducted in accordance with Creswell, (2014). Results were used to improve the instrument before

final administration to the study respondents. The pilot study selected 10 actors from two AIPs in north-western region of Uganda. The 10 actors in the two AIPs selected for pilot study do not belong to the study area and therefore were not part of the final study respondents. The tool was administered using personal interview in order to make any clarifications required and assess the attitude of the respondents toward the research questions as advised by Cooper & Schindler (2003).

3.8.1 Validity of the Instruments

Instruments built to calculate the same factor should have the same degree of reliability (Field, 2013). There are four main forms of validity assessment tests. The instrument was pre-tested to determine its characteristics such as material validity and face validity. This research pursued the supervisors' knowledge for element confirmation. Operational definition of variables was based on literature and theorized fundamental philosophical structure.

3.8.2 Reliability of the Instruments

Data was subjected to consistency tests to confirm that when the same research entities are measured under different environments, the data collection instrument has the ability to produce consistent results (Field, 2013). A reliable instrument is one where an individual has the same score on a questionnaire when administered at two separate points in time. Cronbach Alpha was used to measure internal consistency whereby a reliability coefficient is used to show whether there exists positive correlation between items. A higher Alpha indicates a higher consistency and hence higher reliability. According to Field (2013), alpha ≥ 0.7 generally indicates adequate reliability. According to Cooper & Schindler (2003), alpha of above 0.50 is considered an indication of reliability. In their PHD studies, Muathe (2010) and Kiiru (2015) used a

threshold of 0.05 while Sang (2015) used 0.7. According to Jackson (2009), an alpha of 0.7 to 1.00 shows strong internal consistency, 0.3 to 0.69 shows moderate consistency, ≤0.29 shows the data collection instrument has a weak reliability.

3.9 Data Collection Procedure

The study used a survey strategy for data collection, because it allows the researcher to collect data from a sizeable sample at a reasonable cost. Survey strategy also provides the researcher an opportunity to control the process in accordance with study plan (Creswell, 2014). Data collection instruments were pretested to determine whether they are clear, understandable and able to collect the data intended by the study. Feedback from the pretesting exercise was reviewed and tools revised accordingly, after which recruitment and training of research assistants was carried out.

The data collection exercise used online software whereby computer tablets were connected to a cloud computer server. Research assistants operated the tablets while the researcher operated the server. The researcher adequately trained research assistants to understand the study objective, the data collection instrument, and proper use of tablets. The software contains data control to guard against incomplete questionnaires and incorrect coding. It also allows instant questionnaire recall in case the data does not meet the criterion set at the server level. The process enhanced validity and reliability of the data collection instruments. The use of online technology meant that data was automatically entered into the analysis software immediately a questionnaire was passed complete and saved by the server operator. The online system saved time of collecting questionnaires from the field and data entry. Examples of internal consistency controls included marking for cross validation responses on Household head and age. Other examples included skip features where the software automatically

skipped certain questions depending on a preceding response. The software also sets outlier constraints thus reducing on burden of data cleaning and improving normality.

3.10 Operationalization and Measurement of Variables

The study variables were conceptualized based on systems, stakeholder, and social network theories. Independent variables are given as management practices, network composition and cultural attributes. Network interactions is the mediating variable, policy framework the moderating variable, and resilience of agricultural innovation platforms the dependent variable. The study used Likert scale to rate opinions of AIP actors about governance and resilience of agricultural innovation platforms. Table 3.6 below shows how each of the study variable was operationalized.

Table 3.6: Operationalization and measurement of research variables

Variable	Nature	Operationalization	Indicators	Measurement
Management practices	Independent variable	Efforts by AIP leadership to keep members engaged, focused and informed	Coordination ▪ Functional governance structures ▪ Functional constitution ▪ Regular coordination meetings ▪ Style of leadership	Respondents opinion on a five-point Likers scale on: ▪ Existence of functional governance structures ▪ Existence of a functioning constitution ▪ Regular coordination meetings ▪ Opinions on style of leadership (soft or hard)
			Accountability ▪ Member involvement in AIP affairs, ▪ Transparency mechanisms ▪ Internal controls	Respondents opinion on a five-point Likers scale on: ▪ Member involvement ▪ Existence of Transparency mechanisms ▪ Existence of Internal controls systems
			M&E framework ▪ Collection of data about AIP activities ▪ Information sharing	Respondents opinion on a five-point Likers scale on: ▪ Existence of business and work plans ▪ Existence of departmental reporting templates ▪ Existence of reporting standards ▪ Collection of data ▪ Existence of Information sharing mechanism
Network composition	Independent variable	Configuration and the social construction of platform actors in terms of numbers (breadth/density), contribution (depth/centrality), and motivation expressed in terms of actual or apparent interests in the platform business	<u>Breadth and Depth</u> ▪ Number of actors per AIP[1] ▪ Diversity of actors in an AIP[2] <u>Closeness and Openness</u> ▪ Payment of entry fees[3] <u>Apparent and Actual interests</u> ▪ Existence of a mechanism to declare apparent and actual interests[4] <u>Attraction and retention</u> ▪ Allow non-members to attend AIP meetings[5] ▪ Mechanism for following up achievement of actual interests[6] ▪ Mechanism to obtain feedback from deserting members[7]	Respondents opinion on a five-point Likers scale on: ▪ Breadth and Depth of AIP ▪ Closeness and Openness of AIP ▪ Apparent and Actual interests ▪ Attraction and retention of members

Cultural attributes	Independent variable	Actor cultural orientations depicted through their normative behaviour, values espoused and power distance.	▪ Values ▪ Norms ▪ Power distance	Respondents opinion on a five-point Likers scale on: ▪ Existence of a set of values ▪ Existence of a set of norms ▪ Existence of powerful members ▪ Existence of mechanism for regulating power distance
Network interactions	Mediating variable	Relationships between platform actors depicted by their levels of cooperation, trust, common understanding, and collective action	▪ Common understanding ▪ Cooperation and collective action ▪ Trust ▪ Capacity building & learning	Respondents opinion on a five-point Likers scale on: ▪ Members understanding of AIP objectives. ▪ Existence of cooperation and collective action ▪ Existence of trust ▪ Existence of opportunities for Capacity building & learning
Policy framework	Moderating variable	Existing policies which may encourage or discourage formation and functioning of AIPs	▪ Involvement ▪ Alignment	Respondent opinions measured on a Five-point Likert scale regarding: ▪ Involvement of actors in AIP activities ▪ Alignment of AIP activities with government policies
Resilience	Dependent variable		Innovations ▪ New products, ▪ New methods/new processes	Respondents opinion on a five-point Likers scale on: ▪ Development of new products ▪ Existence of new processes
			Sustainability ▪ Ability of AIP to live long ▪ Ability of innovations to survive shocks and mature	Respondents opinion on a five-point Likers scale on: ▪ Ability of AIP to live long ▪ Existence of sustainable innovations
			Reproduction ▪ AIP reproduction /scaling is encouraged ▪ New AIPs/value chains have been/are likely to be born	Respondents opinion on a five-point Likers scale on: ▪ Deliberate efforts to encourage scaling out of AIP approach ▪ Ability of the AIP approach to be reproduced by other farmer groups.

Source; Author and Literature Review (2019)

3.11 Data analysis and Presentation

Data analysis was conducted using descriptive and inferential techniques. Descriptive statistics show basic characteristics of the study variables hence providing an informed foundation for conducting inferential analysis (Creswell, 2014). Descriptive results obtained was used to supplement inferential analysis and hypothesis testing results in making final conclusions.

Inferential statistics were also used to determine the existence and strength of the relationship between governance and resilience of project networks among agricultural innovation platforms. Pearson Correlation Coefficient was used to determine the path (positive or negative) and degree of relationship between the research variables. The coefficient of determination, R^2, was computed to measure the extent by which the changes in resilience of project networks project networks are attributable to changes in governance. Analysis of Variance (ANOVA) test was carried out ascertain if the selected empirical model was fit for the study. All hypothesized relationships, were analysed using multiple regression. The research hypothesis was tested at 95% confidence interval.

To facilitate regression analysis, an average of values obtained from Likert scale responses were computed to generate composite indices for individual indicators under each study variable. A weighted average of the composite indices derived for each indicator was computed to obtain values representing each study variable.

Qualitative questions were analysed using content analysis whereby composite variables were generated for the various content themes derived out of the open-ended

responses. For each of the composite variable, principal component analysis was performed and Eigen values calculated. For further statistical analysis, the study considered factors that have Eigen values greater than one in accordance with Field (2013).

3.11.1 Controlling for Type I and Type II errors

Statistics use techniques like confidence levels to predict reality in the population using sample data. Even at the lowest levels, there is still a chance to conclude a phenomenon as true when it actually is not. This type of error referred to as Type I leads to incorrect rejection of null hypothesis. On the other hand, there is also a probability of concluding a phenomenon as untrue when it actually is. This type of error referred to as Type II leads to incorrect non-rejection of null hypothesis.

According to Field (2013), minimizing each of the two errors requires careful balance because extreme control of one error increases chances of the other occurring.

The researcher used a conventional significance level of 5% to control for type I error. A reasonably large number of respondents of 132 was also used to limit chances of type II error.

3.12 Diagnostic Tests

To ensure suitability of the regression model, the study variables were subjected to diagnostic tests of linearity, normality, multi-collinearity and heteroscedasticity. The tests were conducted in accordance with assumptions underlying multiple regression analysis.

3.12.1 Test for Linearity

The regression model used is linear and for it to be a valid, the mean values of the outcome variable for each increment of the predictor(s) must lie along a straight line (Field, 2013). As such, the study used Pearson correlation coefficient to test for linearity. Values for Pearson's correlation coefficient range between -1 and +1. A coefficient between -1 and zero signifies a negative linear relationship such that a unit increase in explanatory variable leads to a decrease in in the predicted variable. Where the correlation of coefficient is zero, it means no linear relationship between the variables. A coefficient between zero and +1 signifies a positive linear relationship such that a unit increase in the explanatory variable leads to an increase in the predicted variable.

3.12.2 Test for Normality

Before analysis and in line with assumptions of multiple linear regression, the study carried out a diagnostic test for normality. Shapiro-Wilk and Kolmogorov test are the two common numerical methods for testing normality. Field, (2013) contends that Shapiro-Wilk is an appropriate test for small sample sizes ($n < 50$ samples), but can also handle sample sizes as large as n=2000. For sample sizes greater than 2000, Kolmogorov-Smirnov test is used. Given a size of 132 respondents, Shapiro-Wilk test was applied. The study followed Field, (2013) recommendation that a p-value >0.05 indicates that the error term was evenly distributed.

3.12.3 Test for Multi-collinearity

The study conducted multi-collinearity tests to confirm whether the data is appropriate for component analysis and multiple regression. As noted by Field (2009), collinearity

exist where correlation between two variables is greater than zero. If correlation is equal to 1, then there is perfect positive correlation. However, if correlation is -1 then there exists a perfect negative correlation. High collinearity means high standard error of coefficients thus making them less reliable for hypothesis testing. Multi-collinearity was tested using a Variance inflation factor (VIF). According to Hair et al. (2010), a VIF value of below three indicates absence of multi-collinearity, VIF of above 3 suggests that there could be some multi-collinearity while a VIF of 10 or more and a tolerance less than 0.1 indicated presence of multi-collinearity.

3.12.4 Test for Heteroscedasticity

Data was checked for heteroscedasticity before further study. This happens as the variances of a dependent variable shift dramatically over a number of values for independent variables. In this analysis, the Breush-Pagan procedure was used to test for heteroscedasticity. In order to refute the null statement, P-values must be 0.05 or less (Warner, 2008)

Table 3.7: Diagnostic tests and decision rules

Test	**Relevance**	**Decision Rule**
Linearity	Pearson's correlation coefficient	$+1 > r \neq 0 > -1$
Normality	Shapiro- Wilk Test	P >.05
Multi- Collinearity	Principal component analysis – r matrix	< 0.3 r > 0.9 inappropriate
	Regression coefficients	VIF >10
Heteroscedasticity	Regression analysis	P >0.05

Source: Researcher, (2018)

3.13 Ethical Considerations

The researcher ensured that necessary steps were taken to comply with ethical standards of academic research. Consent was sought from the National Agricultural Research Organization (NARO) which is the body mandated to facilitate the establishment and management of AIPs in Uganda. Likewise, approval was sought from the Uganda National Council of Science and Technology through the Research Ethics Committee of Makerere University school of Social Sciences. The data collection instrument was restricted to asking questions that are only related to the study objectives without any private or personal questions asked to the respondents. The purpose of the study was clearly communicated to the respondents. It was also emphasized to respondents that they could only participate upon their consent and will. The questionnaire clearly indicated researcher's commitment to ensuring confidentiality of the information obtained. No degrading, discriminating, offensive or indecent language was used in the study. Lastly, all materials used in the study for example journals, books belonging to other authors were fully acknowledged.

CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents research findings on the data collected and analysed based on the methodology outlined in the previous chapter, and the discussions thereof. The chapter presents the response rate, reliability of the research instrument, demographic analysis of the respondents, descriptive statistics, inferential analysis (correlation and regression analysis), and test of hypothesis.

4.2 Response Rate and Reliability of Research Instruments

4.2.1 Response Rate

The study targeted actors in AIPs both in central and South western Uganda. The actors included farmers (AIP leaders), processors/traders, researchers, extension agents, government agents and NGO representatives. The response for the study according to type of actors was as shown in Table 4.1

Table 4.1: Response rate

Actors	Target respondents	Respondents received	Response rate per actor
Farmers (AIP leaders)	22	19	86%
Processors	22	16	73%
Researchers	22	17	77%
Extension agents	22	19	86%
Government agents	22	19	86%
NGO representatives	22	13	59%
Total	**132**	**103**	**78%**

Source: Research Data (2019)

From the results in Table 4.1, it is observed that out of the 132 targeted respondents, 103 responded forming a 78% response rate. This response rate was found to be excellent as recommended by Walliman (2017) who stated that a response rate of 50% is deemed adequate for analysis, a response rate of 60% is considered good while a response rate of above 70% is considered excellent. Thus, based on these recommendations, the response rate was considered excellent to permit data analysis.

4.2.2 Reliability of Research Instruments

Reliability of the research instrument was tested via internal consistency using Cronbach's alpha. The results of the analysis were as shown in Table 4.2.

Table 4. 2: Summary of Reliability Statistics

Variable	Cronbach's Alpha
Management practices	.890
Network composition	.738
Cultural attributes	.802
Network interactions	.688
Policy framework	.738
Resilience of project networks	.863
Overall	.793

Source: Research Data (2019)

Table 4.2 indicates overall reliability coefficient of 0.793. Specifically, the Cronbach's alpha coefficient for management practices was 0.890, network composition had a coefficient of 0.738, cultural attributes had 0.802, network interactions had 0.688, policy framework 0.738 while resilience of project networks had a coefficient of 0.86. According to Field (2013), a coefficient of equal or greater than 0.7 indicates adequate reliability. Field (2013) further stated that the higher the Alpha, the higher the

consistency, hence higher reliability. Based on these recommendations, the study established that the research instrument was reliable.

4.3 Demographic Information

The study sought to identify the demographic information of the respondents such as gender of the respondents, age of the respondents, highest level of education attained, time the respondent joined the AIP as well as whether the respondents attended AIP meetings and how often they did so. The demographic results for gender, age and education level of respondents are summarised in table 4.3.

Table 4. 3: Demographic information

Gender	**Frequency**	**Percent**
Female	22	21.4
Male	81	78.6
Total	**103**	**100.0**
Age		
26-35	22	21.4
36-45	38	36.9
46-55	32	31.1
Over 50	11	10.7
Total	**103**	**100.0**
Education level		
PLE	3	2.9
O-level	7	6.8
A-level	10	9.7
Bachelors/Tertiary	31	30.1
Post-graduate	52	50.5
Total	**103**	**100.0**

Source: Research Data (2019)

Table 4.3 indicates that 78.6% of respondents were male while 21.4% were female. This result suggests that the leadership in the AIPs in central and South western Uganda is dominated by men as opposed to women. It was also established that 36.9% of the respondents were aged between 36-45 years, 31.1% were aged between 46 and 55 years, 21.4% were aged between 26 – 35 while 10.7% were over 50 years of age. This

implies that majority of AIP actors were of middle age. These results may suggest that in both central and South western Uganda AIPs the contemporary agricultural industry is led by middle aged people.

The results also show that among the respondents, 50.5% were postgraduate degree holders, 30.1% had a bachelors/tertiary degree holder, 9.7% had reached A- level of education, 6.8% had attained O-level of education while 2.9% only went up to the primary level PLE. This result implies that a good number of actors in participating AIPs were highly educated holding at least a bachelor's degree. They were therefore in a position to easily comprehend the constructs of governance and resilience, and were able to provide informed responses relevant to the study. In addition, the study examined how often the meetings were held at AIPs and whether the respondents attended the meetings and how often they did. The findings were as shown in table 4.4

Table 4.4: AIP Meetings

How often does the AIP hold meetings?	**Frequency**	**Percent**
Monthly	45	43.7
Bi-monthly	1	1.0
Quarterly	40	38.8
Bi -annually	11	10.7
Annually	3	2.9
Other (specify)	3	2.9
Total	**103**	**100.0**
Do you attend meetings?		
Yes	84	81.6
No	19	18.4
Total	**103**	**100.0**
If yes, how often?		
Monthly	27	29.1
Bi-monthly	1	1.0
Quarterly	34	35.9
Bi -annually	9	10.7
Annually	2	2.9
Irregular	6	12.6
Only when there are visitors	5	7.8
Total	**84**	**100.0**

Source: Research Data (2019)

From the findings in table 4.4, majority of the respondents as shown by 43.7% indicated that AIPs held meetings monthly. Thirty-nine percent stated that meetings were held quarterly, 10.7% bi-annually, 2.9% annually while 1% of the respondents indicated that AIPs held meetings bi-monthly. Another 2.9% of the respondents indicated that AIPs held meetings only when there were visitors while others indicated that the AIP held meetings on irregular basis. From this result, the study deduced that AIPs held meetings more frequently (monthly) even though majority of the respondents attended the meetings quarterly as shown by 40.5%. This could be attributed to the fact that majority of the respondents were non-farming actors who are likely to be engaged in their respective occupations. Results show that 32.1% of respondents attended the meetings monthly while 7.1% attended on irregular basis. In addition, 10.7% of the respondents indicated that they attended meetings bi-annually, 6.0% attended meetings only when there were visitors, 2.4% of the respondents attended meetings annually while 1.0% attended meetings bi- monthly

4.4 Descriptive Statistics

The tool used to measure and define the agricultural innovation networks, network structure, cultural attributes, network relations, policy context and network resilience is presented. This portion includes a description of the core trends of the sample variables. Respondents were asked to mark whether they agree or disagree with the claims affecting the variables of the sample on a 1-5 scale, where 1 (one) reflected ‘strongly disagree', and 5 (five) ‘strongly agree'. Results for each variable are presented below.

4.4.1 Management Practices

The study sought to determine the effect of management practices on network resilience among agricultural innovation platforms in Central and South western Uganda. Mean score for all the measurements of management practices and their respective standard deviations were as shown in table 4.5.

Table 4.5: Descriptive Statistics for Management Practices

	N	Min.	Max.	Mean	Std. Dev.
Coordination					
This AIP has a functioning structure with positions such as Chairperson, Vice Chairperson.	103	2	5	4.44	.775
AIP leaders have a good relationship with members	103	1	5	4.09	.742
The AIP has a fully functional constitution that outlines the roles and responsibilities	103	1	5	3.81	1.237
The AIP holds interaction meetings once every month.	103	1	5	2.86	1.508
Average				**3.80**	**1.07**
Accountability					
The bank account is transacted by at least two officials	103	1	5	3.60	1.247
The AIP has a bank account.	103	1	5	3.55	1.202
Financial reports of the AIP are openly discussed during annual general meetings	103	1	5	3.13	1.177
The leadership of the AIP periodically prepares financial reports.	103	1	5	3.02	1.120
AIP members participate in the budgetary process, either in preparing or in approving it	103	1	5	3.01	1.159

Average				**3.33**	**1.19**
Monitoring and Evaluation					
The AIP conducts regular monitoring and evaluation to measure the effectiveness	103	1	5	3.34	1.081
The AIP has an annual work plan and budget upon which periodic results are compared for any variations	103	1	5	3.16	1.118
AIP has a standard reporting system used by committees to submit periodic report	103	1	5	2.23	0.962
Average				**2.91**	**1.05**
Aggregate for management practices				**3.35**	**1.10**

Source: Research Data (2019)

Table 4.5 indicates that the average mean for management practices was 3.35 suggesting that management practices were moderately adopted among AIPs in Central and South western regions in Uganda. Results also indicated that coordination was the predominantly practiced aspect of management among AIPs as shown by a mean score of 3.80. These findings are in line with DeFillippi and Sydow (2016) that managing actor interactions, network governance should emphasize coordination of activities among project stakeholders. Similarly, accountability was moderately practiced as indicated by a mean score of 3.33. However, monitoring and evaluation was found to have a mean score of 2.91. This means that monitoring and evaluation was the least embraced management practice in the AIPs as compared to coordination and accountability. Consequently, in an attempt to improve on their management practices, the AIP management should seek to put more effort on the aspect of monitoring and evaluation.

4.4.2 Network Composition

The study sought to determine the effect of network composition on network resilience among agricultural innovation platforms in Central and South western Uganda. Mean and standard deviations score for all the measurements of network composition were as shown in table 4.6.

Table 4.6 : Descriptive Statistics for Network Composition

	N	Min.	Max.	Mean	Std. Dev.
Breadth and depth					
The AIP attracts membership from at least 5 occupations e.g crop growers, cattle keepers, teachers, Medics etc	103	2	5	4.28	0.692
The AIP has a membership of at least 500 members.	103	1	5	2.96	1.236
Average				**3.62**	**0.964**
Closeness/openness					
There are no restrictions to join our AIP in regards to resource base or status	103	2	5	4.21	.762
The AIP always seeks to attract new membership	103	2	5	4.01	.869
All new actors are required to pay membership fees	103	1	5	3.69	1.213
Average				**3.97**	**0.948**
Apparent/Actual interests					
The objectives of the AIP are clearly outlined	103	2	5	4.24	.602
All members know the main objectives for which the AIP was founded	103	1	5	3.77	.931

Members are encouraged to openly discuss individual objectives for joining the A	103	1	5	2.94	1.153
Average				**3.65**	**0.895**
Attraction and Retention					
AIP leadership deliberately makes efforts to obtain feedback from members who leave the IP	103	1	5	3.50	.979
Leadership allows non-members to attend AIP meetings	103	1	5	3.45	1.194
The AIP has following-up programme for new members to help them properly integrate in the AIP	103	2	5	3.39	.854
The AIP has a mechanism of following up to assess whether individual objectives are met	103	1	5	2.55	1.026
Average				**3.22**	**1.013**
Aggregate for network composition				**3.615**	**0.955**

Source: Research Data (2019)

Table 4.6 shows an average mean score of 3.615, which implies that the respondents agreed that network composition was embraced to a great extent among the AIPs. At the same time, the results indicated that respondents did not differ significantly in their opinions about the embracing of network composition among the AIPs in Central and South western Uganda as shown by a low standard deviation of 0.955. These findings are consistent with those of Sariola and Martinsuo (2015) on project networks who concluded that for a network to be resilient and outlive the projects implemented thereon, managers/facilitators must realize and take into account the different (unique) interdependencies (ties) which bring diverse actors together. Work relationship may be actively handled, organized and regulated using workplace processes and tools.

The results further indicated that largely respondents agreed that AIPs were open to new members as shown by a mean score of 3.97. This included the fact that the AIP welcomed new members regardless of their resources or social status. Besides, AIPs were found to actively attract new membership and charge low or no membership fees. The low standard deviation of 0.948 showed limited variation in the observations made by the respondents suggesting general agreement in the responses.

Furthermore, findings indicate that interests of the AIP actors had a mean score of 3.65, which indicated that the leadership accorded reasonable attention to actor interests. Majority of respondents opined that objectives for which the AIPs were formed were well outlined and known to members. On the other hand, members' individual interests were not accorded due importance which could affect morale and continued participation. Results suggest that leadership was prioritizing AIP interests over actors' personal interest. The practice is not necessarily bad but to avoid suppressing personal drive necessary for interaction, it is important that leadership at least knows what those personal interests are. The low standard deviation of 0.895 shows that majority of the respondents generally agreed that actor interest is an important element of network governance.

Besides, the results also indicated that the mean score for breadth and depth was 3.62 meaning that the respondents agreed to large extent that breadth and depth were observed in the AIPs. This implies that diversification in AIP membership was highly regarded as a determinant of network resilience. These results were generally agreed as shown by low standard deviation of 0.964. However, the AIPs moderately observed depth of network composition as shown by a mean score of 2.96.

On the other hand, attraction and retention of members had mean score of 3.22 meaning the respondents agreed to a moderate extent that the AIPs attracted and retained members. This implies that AIP actors believed that attraction and retention affected network resilience to a moderate extent. However, variations were noted in the respondent's opinion about the adoption of attraction and retention elements as indicated by a high standard deviation of 1.013.

The finding that closeness/openness, apparent/actual interests, attraction and retention of members affect network resilience of the AIPs is in line with the conclusion made by Sariola and Martinsuo (2015). Sariola and Martinsuo noted that there is need for network managers to appreciate and take into account unique interdependencies that bring actors together for their networks to be resilient and outlive implemented projects. Further, Martey, Etwire, Wiredu and Dogbe (2014) observed that willingness of the actors to participate in networks is influenced by a number of factors such as platform activities and distance covered. Moreover, Mo, Hayat and Wellman (2015) concluded that collaborative efforts among actors are a necessary condition for network resilience to be realised. Therefore, there is need to deal with practical issues as well as exercising novelty-exploration to motivate network actors.

4.4.3 Cultural Attributes

The study sought to determine the extent to which society values, norms, and power distance affect network resilience among agricultural innovation platforms in Central and South western Uganda. Descriptive analysis results showing the mean and standard deviations score for all the measurements of cultural attributes were as shown in table 4.7.

4.7 : Descriptive Statistics for Cultural Attributes

	N	Min.	Max.	Mean	Std. Dev.
Values					
The AIP has a set of values to be espoused by all members	103	2	5	4.16	.556
AIP values are written, displayed and rehearsed during meetings.	103	2	5	3.70	.765
Average				**3.93**	**0.661**
Norms					
AIP has set of norms to regulate member behaviour amongst themselves and towards	103	2	5	4.12	.530
AIP norms are written, displayed and rehearsed during meetings.	103	2	5	3.70	.712
Average				**3.91**	**0.621**
Power distance					
The AIP has some powerful active members e.g very rich, very politically powerful	103	1	5	4.05	.922
The AIP has a mechanism of regulating such power distance during AIP activities.	103	1	5	3.61	1.059
The AIP has ground rules that regulate meetings to enable all members share views	103	2	5	4.03	.734
Average				**3.897**	**0.905**
Aggregate for cultural attributes				**3.912**	**0.729**

Source: Research Data (2019)

Table 4.7 shows that AIP leadership largely considered cultural attributes as an important element network governance as shown by a mean score of 3.912, and consequently an essential factor to their networks' resilience. A low standard deviation of 0.729 indicates that most of the respondents agreed that AIP adopted cultural

attributes to a large extent. The findings obtained in this study were in line with those reached by Maina (2016) arguing that organizational culture is positively related to firm performance. Similarly, assessing the impact of organizational culture on employee creativity Twumasi-Ankrah (2012) found that employee creativity was positively related to job performance.

AIPS greatly embraced values t as indicated by a mean of 3.93. Results also showed that values had a low standard deviation of 0.661 implying that respondents were in agreement that values were greatly embraced in AIPs. Likewise, results indicated that to a large extent respondent agreed that norms were observed in AIPs as shown by a mean of 3.91. A low standard deviation of 0.621 indicates that respondents were in agreement on the extent to which norms were considered in AIPs. Similar findings were reached by Ojasalo (2016) who noted that behaviour or relation control (norms) is important in protecting network values.

Further, power distance was greatly adopted among AIPs by a mean of 3.897. Results show a low variability in the opinions of the respondents on the adoption of power distance principle as shown by a low standard deviation of 0.905. These findings concurred with those reached by Hofstede, (2011) who asserted that societies with lower power distance consider aspects of equality, power decentralization, , and devolved authority, while societies with large power distances , manifest high centralized management with low regard for interaction among the powerful and less powerful members.

4.4.4 Network Interactions

The study sought to determine the extent to which common understanding, cooperation, trust as well as capacity building and learning were entrenched within AIPs of Central and South western Uganda. Descriptive results showing the mean and standard deviations score for all the measurements of network interactions were as shown in table 4.8

Table 4.8: Descriptive Statistics for Network Interactions

	N	Min.	Max.	Mean	Std. Dev.
Common understanding					
Members are regularly reminded of AIP objectives during AIP meetings.	103	2	5	3.89	.685
AIP leadership and subject experts freely share information to all members	103	2	5	3.89	.655
Average				**3.89**	**0.67**
Cooperation/Collective action					
Members share inputs like labour, seed, fertilizer with fellow AIP members	103	1	5	3.19	1.058
Members participate in AIP social enterprises e.g community savings and loaning schemes	103	1	5	3.91	.887
Members are ready to buy inputs or sell produce collectively with AIP colleagues	103	2	5	4.35	.589
Average				**3.817**	**0.845**
Trust					
This AIP cultivates trust between its actors.	103	1	5	4.03	.845
Actors in this AIP trust their leaders.	103	1	5	3.98	.828

Actors in this AIP trust each other.	103	2	5	4.18	.480
Average				**4.063**	**0.718**
Capacity building and learning					
Participating in AIP activities enables the actor to access knew knowledge (e. g seed and fertilizer)	103	4	5	4.68	.469
Participating in AIP activities enables the actor to visit new places, visit	103	1	5	4.60	.676
Participating in AIP activities enables the actor to learn and use modern ICT devices like mobile phones and apps.	103	3	5	4.43	.636
Participating in AIP activities enables the actor to access knew knowledge	103	4	5	4.68	.469
Average				**4.598**	**0.563**
Aggregate for network interactions				**4.092**	**0.699**

Source: Research Data (2019)

Table 4.8 indicates that AIPs largely network interactions as evidenced by a mean of 4.092. This score implies that AIPs believed to a large extent that network interactions affected network resilience. The results also indicate that there were minimal variations in the opinions of the respondents on the state of network interactions as shown by a low standard deviation of 0.699. The results found in this study concur with (Sariola & Martinsuo, 2015) that network interactions occur at different levels depending on the nature of composition and type of projects implemented. He argued that most managerial activities for strengthening organizational relationships and developing confidence and trust in a network are delegated to individual actors, yet the strength of any relationship is measured by the level of trust among interacting entities.

In addition, results showed that the respondents strongly agreed that Capacity building and learning was employed in the AIPs as evidenced by a mean score of 4.598. This implies that AIPs believed that capacity building and learning affects network resilience to a very large extent. Capacity building and learning had a low standard deviation of 0.563, which means that respondents largely in agreed that there was evidence of capacity building efforts in the AIPsfor their actors.

In addition, it was found that trust was largely embraced among actors in the AIPs. This implies that the AIPs believed that trust affect network resilience to a large extent. Results also indicate that trust had a low standard deviation of 0.718. This indicates that respondents largely agreed that AIPs cultivated trust among its actors.

Moreover, common understanding was largely manifested in the AIPs as shown by a mean score of 3.89. This means that AIPs were convinced that common understanding influenced network resilience to a large extent. Common understanding also had a low standard deviation of 0.67 implying that common understanding was largely considered an important factor in ensuring network resilience among AIPS.

Respondents also agreed that cooperation/collective action was largely adopted in the AIPs given a mean of 3.817. This implies that AIPs believed that cooperation/collective action affect network resilience to a large extent. Largely, respondents believed that cooperation/collective action was exhibited among the AIPs in Central and South western Uganda as indicated by a low standard deviation of 0.845. Nangoli, Ahimbisibwe, Namagembe and Bashir (2013) also found that social network is a significant predictor of project stakeholder commitment. They also noted that network

transitivity is a better significant predictor of project-stakeholder commitment than network degree.

4.4.5 Policy Framework

The study sought to determine the effect of policy framework on network resilience among agricultural innovation platforms in Central and South western Uganda. Descriptive analysis results showing the mean score and standard deviations for all the measurements of policy framework were as shown in table 4.9

Table 4.9: Descriptive Statistics for Policy Framework

	N	Min.	Max.	Mean	Std. Dev.
Local and national government agents (e.g extension agents, trade and cooperative officers) are invited to be actors in the AIP	103	1	5	4.50	.752
Local and national government agents (e.g extension agents, trade and cooperative officers) actively participate in AIP activities	103	1	5	4.35	.737
The AIP aligns their activities to existing policies and by-laws	103	3	5	4.49	.558
Average				**4.447**	**0.682**

Source: Research Data (2019)

Results in table 4.9 show that the average score for policy framework was 4.447, which indicates that respondents strongly agreed that policy framework was a major consideration among AIPs in Central and South western Uganda. Results showed that respondents were largely in agreement that policy framework was adopted among the AIPs given a low standard deviation of 0.682. The findings on this variable were consistent with the findings of Adekunle, Oluwole, Buruchara, & Nyamwaro (2013) that close interaction with policy makers increases civil awareness and empowers

platform members to not only influence the making but implementation of policies at community level. They concluded that AIPs provide a framework for policy makers to influence and educate communities on policy matters.

4.4.6 Resilience of Project Networks

The study sought to determine the effect of governance on network resilience among agricultural innovation platforms in Central and South western Uganda. Descriptive analysis results showing the mean score and their respective standard deviations for all the measurements of network resilience were as shown in table 4.10

Table 4.10: Descriptive Statistics for Resilience of Project Networks

	N	Min.	Max.	Mean	Std. Dev.
Network innovativeness					
AIP members are encouraged to generate and share new ideas.	103	2	5	4.29	.651
This IP is known for generating atleast two new ideas/products per year	103	2	5	4.00	.863
Average				**4.145**	**0.757**
Network sustainability					
This IP has a clear vision and written business plan that signifies staying in o	103	1	5	3.30	1.187
Innovations generated on this AIP (new products, value chains or processes) survive and grow to maturity (for a minimum of 2yrs)	103	1	5	3.63	1.094
Average				**3.465**	**1.141**
Network reproduction					
This AIP encourages replication of similar activities by other farmer groups wit	103	2	5	3.90	1.005
There are at least 2 farmer groups adopting the AIP approach, thus potential of	103	1	5	3.75	1.045
Average				**3.825**	**1.025**
Average for Resilience of Project Networks				**3.812**	**0.974**

Source: Research Data (2019)

Resilience of project networks had a mean score of 3.812 indicating that a good number of the respondents perceived that AIPS had potential for resilience. The results also showed that there were minimal variations on the respondent opinions about resilience of project networks as indicated by a low standard deviation of 0.974. The results obtained on this variable were consistent with those of (Aranda et al, 2012) who stated that when a firm possess inner strength, resourcefulness and has ability to revive after a shock or sustained attacks it is potentially resilient.

Further, the results showed that respondents largely agreed that AIPS had potential for innovativeness as shown by a mean score of 4.145. A low standard deviation of 0.757 shows that majority of respondents agreed to the potential of presence of innovativeness among the AIPs. Additionally, results showed that the mean score for network reproduction was 3.825 meaning that a good number of respondents agreed that AIPs were showing indicators of network reproduction. Respondents however varied in their opinions concerning the capabilities for network reproduction as shown by a high standard deviation of 1.025. Further, majority of the respondents agreed on the indicators of network sustainability in the AIPs as a shown by a mean score of 3.465. There was however a high variation of observations as shown by a high standard deviation of 1.141.

4.5 Diagnostic Tests

In this study, diagnostic tests were conducted before the analysis of data in order to examine assumptions of the multiple regression model. The diagnostic tests used in the study were linearity test, normality test, test for multi-collinearity and test for heteroscedasticity.

4.5.1 Linearity Test Results

The study used Field (2013) recommendations to test for linearity of the study variables. The study also used Pearson correlation coefficient to test for linearity. Pearson's scale of correlation coefficients range between -1 and +1. Results were as presented in table 4.11.

Table 4.11: Linearity Test Correlations

Correlations Analysis Results		Resilience of Project Networks	Management practices	Network Composition	Cultural Attributes	Network Interactions	Policy Framework
Resilience of Project Networks	Pearson Correlation	1	.756**	.606**	.610**	.678**	.370**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	103	103	103	103	103	103

**. Correlation is significant at 0.01 level (2-tailed).
Source: Research Data (2019)

Correlation results indicate that correlation coefficient between resilience of project networks and management practices was 0.756, 0.606 between resilience of project networks and network composition, 0.610 between resilience of project networks and cultural attributes, 0.678 between resilience of project networks and network interactions and 0.370 between resilience of project networks and policy framework. These results imply that there was a positive correlation between the dependent and independent variables of the study. The study also established that all correlation coefficients for the independent and dependent variables were significant with P-values less than 0.05 level of significance. Basing on Field (2013) recommendations that a coefficient between zero and +1 signifies a positive linear relationship, study findings therefore indicate that there was linearity between the study variables.

4.5.2 Normality Test Results

The study conducted a normality test to confirm if the errors in the model were normally distributed and therefore the data was appropriate for regression analysis. The study used Shapiro-Wilk to test for normality and the results are shown in Table 4.12 below.

Table 4.12: Results for Normality tests

	Kolmogorov -Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Management practices	.088	103	.049	.987	103	.409
Network Composition	.090	103	.039	.981	103	.155
Cultural Attributes	.130	103	.000	.980	103	.132
Network Interactions	.094	103	.028	.987	103	.436
Policy Framework	.236	103	.128	.857	103	.162
Resilience of Project Networks	.078	103	.126	.967	103	.051

Source: Research Data (2019)

Results indicate that the Shapiro-Wilk test statistics for management practices, network composition, cultural attributes, network interactions, policy framework, and resilience of project networks had P-values greater than 0.05 at 95% significance level. Following the Field (2013) recommendations that a p-value above 0.05 indicates a normally distributed data, the study found that the error term was normally distributed.

4.5.3 Multi-Collinearity Test Results

To test for multi-collinearity of the study variables, resilience of project networks was regressed on management practices, network composition, cultural attributes, network interactions, and policy framework. Results are presented in table 4.13.

Table 4.13: Multi-Collinearity Statistics Results

	Collinearity Statistics	
	Tolerance	VIF
Management practices	.566	1.766
Network Composition	.565	1.771
Cultural Attributes	.403	2.479
Network interactions	.384	2.604
Policy Framework	.761	1.314

a. Dependent Variable: Resilience of Project Networks

Source: Research Data (2019)

When resilience of project networks was regressed on management practices, network composition, cultural attributes, network interactions and policy framework the VIF values for all the variables were less than three. Following the recommendations by Hair et al., (2010) that a VIF value of below three indicates absence of multi-collinearity, the study therefore established that there was no multi-collinearity between the independent variables.

4.5.4 Heteroscedasticity Test Results

This study used Breush-Pagan test to test for heteroscedasticity as recommended by Warner (2008). The decision was such that if p-value is less than 0.05 it means that there is presence of heteroscedasticity and if p-value is greater than 0.05, therefore do not reject the null hypotheses because there is no presence of heteroscedasticity. Heteroscedasticity results are presented in table 4.14 below.

Table 4.14: Breusch-Pagan and Koenker test statistics and sig-values

	LM	**Sig**
BP	5.101	0.404
Koenker	4.968	0.420

Source: Research Data (2019)

From the results, it was found that Breusch-Pagan had a significance of 0.404 while the Koenker test had a significance of 0.420. These results indicate that both the Breusch-

Pagan and Koenker had significance level greater than 0.05. As stated by Warner (2008), p-value below 0.05 indicates presence of heteroscedasticity while a p-value below 0.05 shows no heteroscedasticity. The study therefore established no presence of heteroscedasticity.

4.6 Inferential Statistics

Inferential statistics were obtained through correlation and regression analysis. The purpose of inferential analysis was to determine the confidence and extent to which study results from AIPs in central and South western Uganda can be inferred to all project networks.

4.6.1 Correlation Results and Interpretation

Correlation analysis was conducted to establish direction and strength of the relationship between study variables. Dancey and Reidy (2004) recommended that correlation coefficient of one shows a perfect correlation while a correlation coefficient of between 0.7- 0.9 shows strong correlation. On the other hand, a correlation coefficient of between 0.4 and 0.6 indicates moderate correlation while a correlation of 0.1-0.3 shows a weak correlation. A zero (0) correlation coefficient indicate no correlation. The results were as shown in Table 4.11.

Correlation results indicate that correlation coefficient was 0.756 between resilience of project networks and management practices, 0.606 between resilience of project networks and network composition, 0.610 between resilience of project networks and cultural attributes, 0.678 between resilience of project networks and network interactions, and 0.370 between resilience of project networks and policy framework.

These results imply that there was a positive correlation between resilience of project networks and all the variables of the study. Results also indicated that management practices and resilience of project networks had the highest correlation followed by network interactions, cultural attributes, network composition and lastly policy framework. The study also established that all correlation coefficients for the study variables were found to be significant with P-values of less than 0.05 level of significance.

These results were consistent with postulations of Gustafsoon et al. (2014) who opined that governance of project networks is a necessary condition to regulating and generating compromise between different interests, sustaining constructive interactions to achieve resilience in project networks. Similarly, Eskerod and Huemann (2013) supported the need for adoption of project management standards in stakeholder management. DeFillippi and Sydow (2016) emphasised on managing actor interactions through network governance.

On their part, Sariola and Martinsuo (2015) emphasised on strengthening third-party relationships in project networks to ensure they are successful. It was concluded that for networks to be resilient and outlive the projects implemented thereon, managers/facilitators must realize and take into account the different interdependencies, which bring diverse actors together. On the other hand, Maina (2016) concluded that organizational culture positively affects performance.

4.6.2 Regression Results and Interpretation

The study conducted a multiple regression analysis by computing the coefficient of determination, R^2, to measure the extent by which the changes in resilience of agricultural innovation platforms are attributable to the changes in management practices, network composition, and cultural attributes.

Multiple regression analysis was conducted at 95 percent confidence level (0.05 level of significance). The multiple regression model tested was as follows;

$$\mathbf{RPN = \beta_0 + \beta_1 MP + \beta_2 NC + \beta_3 CA + \varepsilon}$$

Where:

β0: - intercept

β1: - coefficient of Management practices

β2: - coefficient of Network composition

β3: - coefficient of Cultural Attributes

ε: - Error Term

The results of the multiple regression analysis were as shown in tables 4.15, 4.16, and 4.17

Table 4.15: Model Summary[b] for the Direct Relationship

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.805	.648	.637	.45975

Predictors: (Constant), Management Practices, Network Composition, Cultural Attributes

Source: Research Data (2019)

The model summary results indicate that the correlation coefficient R was 0.805 implying that there is strong positive correlation between the study independent variables (management practices, cultural attributes, and network composition) and

dependent variable (resilience of project networks). The adjusted R-square at 0.637 indicated that the model predicted resilience by 63.7% This means that 63.7% of the variations in resilience of project networks was explained by management practices, network composition, cultural attributes while the remaining 34.8% was attributable to other factors not covered by the study.

In addition, the study sought to determine the fit or suitability of the selected empirical model by conducting Analysis of Variance (ANOVA) and the results are as shown in table 4.16

Table 4.16: ANOVA[a] Results for the Direct Relationship

Model	Sum of Squares	df	Mean Square	F	Sig.
1	38.446	3	12.815	60.631	.000
Regression	20.925	99	.211		
Residual	59.371	102			
Total					

a. Dependent Variable: Resilience of Project Networks
b. Predictors: (Constant), Management Practices, Network Composition, Cultural Attributes

Source: Research Data (2019**)**

The analysis of variance results for management practices, network composition, cultural attributes and resilience of project networks shows a P-value of 0.000, which is less than 0.05 significance level. This implies that the regression relationship was significant in predicting how management practices, network composition, and cultural attributes affect resilience of project networks among agricultural innovation platforms in Central and South western Uganda. In addition, the F statistic at (3, 102) was found to be 60.631 which is greater than the F-critical of 2.694 at (3, 99 degrees of freedom). This shows that the model was adequate and significant in predicting resilience of project networks.

Table 4.17: Regression Coefficients[a] for the Direct Relationship

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.208	.380		.548	.585
Management practices	.542	.076	.540	7.122	.000
Network Composition	.299	.119	.195	2.503	.014
Cultural Attributes	.290	.114	.199	2.539	.013

a. Dependent Variable: Resilience of Project Networks
Source: Research Data (2019)

Given the results in table 4.17, the regression model is summarised as follows;

RPN = 0.208 + 0.542 MP + 0.299NC + 0.290CA

The results indicate that if all factors (management practices, network composition, and cultural attributes) were held constant, resilience of project networks is 0.208. Similarly, if all other factors were held constant, an increase in management practices, increases in resilience of project networks by 54.2%. In addition, if all other factors were held constant, an increase in network composition increases resilience of project networks by 29.9%. Moreover, if all other factors were held constant; an increase in cultural attributes increases resilience of project networks by 29%.

Based on the extent to which each variable affected resilience of project networks, the study finds that management practices had the highest effect on resilience of project networks followed by network composition while cultural attributes had the least effect on resilience of project networks. The study also found that all the independent variables (management practices, network composition and cultural attributes) were significant in predicting resilience of project networks as indicated by their P-values of 0.000< 0.05 and 0.014 < 0.05 and 0.013 < 0.05 respectively.

In line with the results of the current study, Laan, et al. (2011), underscored the relevance of trust, during the initial stages of project network formation. Pant (2012) also showed the importance of optimized recovery process in enhancing performance and resilience of project networks. Further, Sariola and Martinsuo (2015) showed that management of network interaction and relationships within project networks is relevant in ensuring network success. Further, Sterbenz et al. (2013) also established that critical analysis of project networks in terms of their ability to continue providing a desired service is paramount in improving their resilience. Moreover, Colgan (2016) emphasised on the need to adjust internal policies and operating outside the hierarchical structure but with clear lines of control and authority when working within a network in order to gain success.

The study also sought to establish how the different dynamics in the two regions of Uganda affected the extent by which changes in resilience of agricultural innovation platforms are attributable to the changes in independent variables. This was done by regressing dependent variable on the independent variables for both Central and South western regions. The regression coefficient results are as shown in table 4.18

Table 4.18: **Model Summary for Difference between Central and South western regions**

Region	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Central Uganda	1	.822[a]	.676	.654	.43112
South western Uganda	1	.787[b]	.620	.598	.46242

a. Predictors: (Constant), management practices, Network Composition and Cultural Attributes,
Source: Research Data (2019)

Table 4.18 shows that governance predicted 65.4 % of resilience of project networks in Central Uganda and predicted 59.8% of resilience in South western Uganda. This result implies that, governance (management practices, cultural attributes and network composition) was practiced more in the AIPs in Central Uganda as compared to South western Uganda.

Table 4.19: ANOVA[b] for Difference between Central and South western regions

Region	Model		Sum of Squares	df	Mean Square	F	Sig.
Central Uganda	1	Regression	17.054	3	5.685	30.585	.000[b]
		Residual	8.178	44	.186		
		Total	25.232	47			
South western Uganda	1	Regression	17.792	3	5.931	27.735	.000[c]
		Residual	10.906	51	.214		
		Total	28.698	54			

a. Dependent Variable: resilience
b. Predictors: (Constant), Management Practices, Network Composition and Cultural Attributes.
Source: Research Data (2019)

Table 4.19 indicate that governance (management practices, cultural attributes and network composition) was significant in predicting resilience of project networks in both central and South western regions of Uganda. The regression coefficients results are shown in table 4.20

Table 4.20: **Coefficients[a] for Difference between Central and South western regions**

Region	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
Central Uganda	1	(Constant)	-.042	.519		-.081	.936
		Management Practices	.594	.111	.591	5.366	.000
		Network Composition	.112	.227	.074	.492	.625
		Cultural Attributes	.379	.218	.254	1.741	.089
South western Uganda	1	(Constant)	-.176	.537		-.327	.745
		Management Practices	.444	.100	.475	4.433	.000
		Network Composition	.380	.152	.259	2.493	.016
		Cultural attributes	.289	.149	.212	1.941	.058

a. Dependent Variable: Resilience
Source: Research Data (2019)

Basing on the P values of the coefficients presented in table 4.20, management practices were significant in both regions as shown by a P value of 0.00 which is less than 0.05 significance level. This result implies that management practices (coordination, accountability and monitoring and evaluation) were practised in both regions and it was thus considered relevant in achieving resilience of the AIPs. Network composition was found to be significant in South western Uganda but insignificant in Central Uganda . This could be attributed to the fact that Central Uganda is predominantly Peri-Urban, whereby farmers have easier access to markets and agricultural resources. Because farmers in per-urban areas have a higher chance to access markets and resources on their own, they pay lesser attention to whom they network with as opposed to farmers in rural areas. South western Uganda being predominantly rural, farmers in the region do not have easy access to markets and agricultural resources therefore consider it critical to embrace networking with other actors. In addition, cultural attributes were found to be insignificant in both regions. Cultural attributes were more embraced in central than South western region at 0.379 and 0.289 respectively. This can be attributed

to the diversity of actors in peri-urban hence more sensitive to cultural orientations of values, norms and power distance.

Further, the study sought to determine if there was any significant difference between resilience of AIPs in central and South western regions of Uganda. The study conducted analysis of variance for difference in resilience between the two regions. Summary of ANOVA results is presented in table 4.21 below

Table 4.21: ANOVA[c] for Difference in Resilience between Central and South western regions

Resilience	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.217	1	.217	.406	.526
Within Groups	53.930	101	.534		
Total	54.147	102			

Source: Research Data (2019)

P-value between the groups was 0.526 > 0.05 implying that there was a significant difference in resilience of project networks in central and South western Uganda.

4.7 Test of Hypotheses

The study tested the hypotheses of the study using multiple regression analysis. The research hypotheses were tested at 95% confidence interval. Decision on the significance of study variables was based on the p-value for the variable coefficients at 0.05 significance level.

4.7.1 Test of Hypothesis One

The first objective of the study was to determine the effect of management practices on network resilience among agricultural innovation platforms in Central and South western Uganda. The equivalent null hypothesis was that management practices have

no effect on network resilience among agricultural innovation platforms in Central and South western Uganda. The results from table 4.17 shows the unstandardized beta coefficient for management practices had a P-value of 0.000<0.05. The study therefore rejected the null hypothesis because the P value was less than 0.05. This implies that management practices have a positive significant effect in predicting resilience of project networks. The study established that management practices was an important determinant of resilience of project networks in Central and South western Uganda.

The findings on this hypothesis were in line with the demographic information of the study. The demographic information indicated that the respondents in this study were leaders including farmer representatives (18%) and non-farmers forming 82% of all the respondents who in most cases are technocrats in their fields and therefore they attached more value to the role of management practices as a prerequisite to achieving and maintaining resilience. Farmer representatives who were the chairpersons were directly involved in the day-to-day management of the AIPs and therefore appreciated the influence of management practices on resilience of project networks.

The above findings further agree with descriptive statistics given that management practices had average mean score of 3.33, which implies that more than half of the respondents agreed that management practices was a key factor in the governance of AIPs. Except for monitoring and evaluation, which had a low mean score, individual measures for coordination and accountability indicated a reasonable extent of agreement by the respondents regarding the importance and adoption of management practices among AIPs. This finding shows that in order for the AIPs to achieve

resilience of project networks, they should consolidate adoption and practice of coordination and accountability to a great extent.

Monitoring and evaluation, according to the results had not received adequate attention as a factor of management practices with a low mean score of 2.91 meaning that the management had concentrated more on coordination of AIP activities and accountability. As a result, since management practices had a significant effect on resilience of project network the management should invest more on monitoring and evaluation, which will help improving resilience of project network.

Demographic results show majority of respondents (68%) were aged between 36 and 31 years, which implies that most of the respondents were middle aged and therefore had adequate knowledge, and skills. The study also found that the highest number of the respondents (50%) were postgraduate degree holders. This means that the respondents had adequate knowledge and were fully informed on matters to do with governance and resilience of project networks.

The findings on this variable were also consistent with the provisions of systems theory first advanced by Ludwig (1968). The theory provides that for a system to survive there is need for well-facilitated, well-organized and coordinated efforts to sustain its structure and function. This therefore means that good organization, proper facilitation and better coordination practices in the AIP translates to resilience. The findings were also in line with those reached by Provan and Kenis (2018) who asserted that a centralized and externally controlled network structure has a tendency of positively influencing effectiveness. He further stated that the stability of a given system and

availability of resources moderate the relationship between network structure and network effectiveness. Moreover, similar observations were reached by (Gustafsoon et al., 2014) who observed that whereas appropriate governance structures are necessary, to regulate and generate compromise between different interests, sustaining constructive interactions within those structures is a difficult endeavour.

4.7.2 Test of Hypothesis Two

Objective two of the study was to assess the effect of network composition on network resilience among agricultural innovation platforms in Central and South western Uganda. The null hypothesis was that network composition has no effect on network resilience among agricultural innovation platforms in Central and South western Uganda. From the regression coefficient table 4.17, the coefficient for network composition was positive. This means that if management practices and cultural attributes were held constant and network composition increased, resilience of project networks would also increase. Further, the coefficient for network composition had a P-value of 0.014, which was found to be greater than 0.05 significance level indicating that network composition was significant in predicting resilience of project networks. From these findings, the null hypothesis was rejected and concluded that composition significantly affect network resilience among agricultural innovation platforms in Central and South western Uganda.

The results reported on the hypothesis are explained by the fact that there was diversity among respondents in the study drawn from both male and female, different age groups and with different educational backgrounds. It is worth noting that the respondents in the study were representatives of actors in the selected AIPs. As such, they reflected

the status of composition of AIPs at large. It is noted that although majority of respondents were male, there was a significant number of females accounting for 21.4 percent indicting the willingness of AIP to include women in their operations. Further, although post-graduates dominated the actor among the AIPs, there was significant representation of other categories. Similarly majority of the respondents were middle aged who understands the need to incorporate different talents in AIPs aimed at achieving and maintaining their resilience. The findings are consistent with Sariola and Martinsuo (2015) who concluded that for a network to be resilient and outlive the projects implemented thereon, managers/facilitators must realize and take into account the different (unique) interdependencies (ties) which bring diverse actors together. By understanding how to manage, coordinate and control different types of relationships successfully, workflow procedures can be improved and better relationships can be formed at all levels in the networks. Similarly, Reinholt, Pedersen and Foss (2011) stated that an actor's central position in a project network is considered as advantageous, because it provides the actor with direct access to other network members and makes it visible. He further argued that the number of direct ties to other actors, independent access to others and control over another actor provides a measure of network centrality.

Moreover, the findings on this variable were consistent with the postulations of Stakeholder Theory as advanced by (Rowley, 1997). The theory conceptualizes stakeholders in terms of their density and centrality in the network. In this theory, Rawley argues that the higher the density, the higher the influence stakeholders have on the focal organization. The higher the centrality of the focal organization, the higher

the focal organization's ability to resist stakeholder influence. The concept of density and centrality are relevant in understanding the theoretical foundation relating to the constructs of breadth and depth, as well as *closedness* and openness. The study therefore contributes to the body of knowledge as it supports the provisions of stakeholder theory.

4.7.3 Test of Hypothesis Three

In the third objective, the study sought to investigate the effect of cultural attributes on network resilience among agricultural innovation platforms in Central and South western Uganda. The equivalent null hypothesis was that cultural attributes have no effect on network resilience among agricultural innovation platforms in Central and South western Uganda. The results in table 4.17 indicate that the coefficient for cultural attributes was also positive with a 0.013 significance level. This means that if all factors were held constant and cultural attributes increased, resilience of project networks would also increase. In addition, the coefficient had a P-value less than 0.013 implying that cultural attributes were significant in predicting resilience of project networks. The study therefore concluded that cultural attributes has a significant effect on network resilience.

These results were consistent with demographic results which suggested that majority of the respondents are male who are the custodians of African culture (Katundano, 2020) and thus understands the role of cultural attributes on network resilience among agricultural innovation platforms. Similarly, majority of respondents were aged between 36 and 45 and therefore are expected to have full understanding of the cultural dynamics such as values and power relations that have a bearing on network resilience among agricultural innovation platforms. Majority of the respondents had post graduate

qualifications which implies that they are knowledgeable and understand the role of cultural attributes in achieving resilience of agricultural innovation platforms.

The findings from this hypothesis were consistent with the descriptive statistics which indicated that the aggregate mean score for cultural attributes was 3.912 implying that it influenced resilience of project networks to a great extent. Because AIPs adopted cultural attributes to a great extent, its positive significance on resilience of project networks is highly likely. Priem (2010) who indicated that a project network needs to implement a clan culture in order to obtain the highest level of job satisfaction also obtained similar results. Twumasi-Ankrah (2012) assessed the impact of organizational culture on employee creativity and reached similar conclusion that organizational culture has positive significant impact on employee creativity.

Moreover, the provisions of systems theory also tallied with the findings of this study. The theory provides that every system should establish way of running its processes and regulating the different parts to ensure harmony of interactions between parts. For the AIPs, it means that all the actors in the AIPs especially the AIP leaders should manage values, norms, and power distance among actors to sustain harmony of interactions as well as achieve the resilience of their networks.

The findings from this hypothesis were supported by stakeholder theory, which shows that the nature of relations between stakeholders and their position in the network shapes their behaviour and interaction with others. The theory indicates that continuous behaviour will overtime shape network normative and value system. In the same way, the thinking behind dense networks shaping normative and value system is consistent

with the study in understanding how norms, values and power distance influence network resilience.

4.7.4 Test of Hypothesis Four

The study also sought to determine the mediating effect of network interactions on the relationship between governance and network resilience among Agricultural innovation platforms in Central and South western Uganda. The null hypothesis for the study was that network interactions have no mediating effect on the relationship between governance and network resilience among Agricultural innovation platforms in Central and South western Uganda. To test this hypothesis, the study applied the casual steps approach as suggested by (Barony & Kenny, 1986). The approach involves four steps as outlined below:

Step one: Regressing Project Network Resilience on Governance

In the first step, the study sought to test whether there exists a significant relationship between the independent variables and the dependent variable. The results were as shown in table 4.22.

Table 4.22: Model Summary for Project Network Resilience on Governance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.794[a]	.631	.627	.44476

a. Predictors: (Constant), Governance
Source: Research Data (2018)

The adjusted R^2 for the model was 0.627 meaning that governance predicted 62.7% of variations in resilience of project networks. The remaining 37.3% was predicted by other factors not mentioned in the model. The study also conducted an analysis of variance and the results were as shown in Table 4.23

Table 4.23: **ANOVA[d] for Project Network Resilience on Governance**

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	34.168	1	34.168	172.736	.000[b]
	Residual	19.979	101	.198		
	Total	54.147	102			

a. Dependent Variable: Resilience normal
b. Predictors: (Constant), Governance
Source: Research Data (2019)

The ANOVA table indicated that the model has a significance level of 0.00 and F-value of 172.736. The p-value was less than 0.05 significance level and the F-value greater than 3.935 F- critical, indicating that the model was fit for predicting network resilience. The regression coefficient results were as presented in table 4.24.

Table 4.24: Coefficients[a] for Project Network Resilience on Governance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.379	.323		1.173	.244
	Governance	1.163	.088	.794	13.143	.000

a. Dependent Variable: Resilience
Source: Research Data (2019)

Table 4.24 indicates that the coefficient of constant was 0.379 and its corresponding P-value was 0.244. The coefficient for governance was 1.163 and a p-value of 0.00 indicating that if all factors were held constant, an increase in governance would increase resilience of project networks by 116.3%. Basing on these results, the study established that governance was significant in predicting resilience of project networks. The regression model is as follows:

$$RPN = 0.379 + 1.163G$$

Step Two: Regressing Network Interactions against Governance

To test the existence of a significant relationship between independent variables and the hypothesized mediating variable, the study regressed network interactions against the independent variables (governance).

Table 4. 25: Model Summary for Network Interactions on Governance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.715[a]	.511	.506	.24206

a. Predictors: (Constant), Governance
Source: Research Data (2019)

From the model summary, the adjusted R^2 for the model was 0.506 implying that governance predicted 50.6% of the variations in network interactions while the remaining 49.4% was predicted by other factors not mentioned in the study. The study also conducted the analysis of variance and the results are as shown in table 4.26

Table 4. 26: ANOVA[a] for Network Interactions on Governance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.128	1	6.128	104.580	.000[b]
	Residual	5.859	100	.059		
	Total	11.987	101			

a. Dependent Variable: Network Interactions
b. Predictors: (Constant), Governance
Source: Research Data (2019)

The ANOVA table indicates that the F-statistic value was 104.580 while the P-value was 0.00. Since the F statistic is greater than the calculated F-critical of 3.936 and the P-value less than 0.05, the study established that the model was fit for predicting network interactions.

Table 4.27: Coefficients[a] for Network Interactions on Governance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.282	.180		12.696	.000
	Governance	.505	.049	.715	10.226	.000

a. Dependent Variable: Network Interactions
Source: Research Data (2019)

From table 4.27, the beta coefficient for the constant and the corresponding P value was 2.282 and 0.00 respectively. In addition, the coefficient for governance was 0.505 with a P-value of 0.00. This result indicates that holding all the factors constant, an increasing governance would increase resilience of project networks increase by 50.5%. The P-value of 0.000, which is less than 0.05 level of significance, indicates that governance was significant in predicting resilience. The summarised model is as follows:

$$NI = 2.282 + 0.505G$$

Step Three: Regressing Resilience against Governance and Network Interactions

To determine if there exists a significant mediating effect of network interactions on the relationship between resilience of project networks and governance, resilience of project networks was regressed on governance and network interactions. The results were as shown in table 4.28, 4.29, and 4.30.

Table 4.28: **Model Summary for Resilience on Governance and Network Interactions**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.801[a]	.642	.635	.43868

a. Predictors: (Constant), Network Interactions, Governance
Source: Research Data (2019)

From table 4.29 the adjusted R^2 was found to be 0.635, which means that 63.5% of the variation in resilience was predicted, by network interactions and governance while the remaining 36.5% of the variation was predicted by other factors not mentioned in the model.

Table 4.29: **ANOVA[a] for Resilience on Governance and Network Interactions**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.178	2	17.089	88.804	.000[b]
	Residual	19.051	99	.192		
	Total	53.229	101			

a. Dependent Variable: resilience
b. Predictors: (Constant), Network Interactions, Governance
Source: Research Data (2019)

According to the ANOVA table, the F-value was 88.804 and the corresponding P-value was 0.00. This result indicates that the model was fit for predicting resilience of project networks since the F value 88.804 was greater than the F-critical of 3.088 and P-value less than 0.05 significance level.

Table 4.30: Coefficients[a] for Resilience on Governance and Network Interactions

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.279	.526		2.429	.017
	Governance	.991	.128	.666	7.744	.000
	Network interactions	.371	.181	.176	2.047	.043

Dependent Variable: Resilience
Source: Research Data (2019)

From table 4.30, the coefficient for the constant was found to be 1.279; governance had a coefficient of 0.991 while network interactions had 0.371. The results also show that the P-values for governance and network interactions were less than 0.05 indicating that both variables had a significant effect on network resilience of the AIPs. The model was summarised as follows:

$$\boldsymbol{RPN = 1.279 + 0.991G + 0.371NI}$$

The findings show that governance and network interaction were significant in predicting resilience of project networks indicating that the relationship was mediated. In step two, the results also indicate that β_5 (governance) was significant. Moreover, the findings in step three indicate that both B_6 and β_7 (governance and network interactions) were significant but less than β_4.

Governance remained significant in step one, two and three and at the same time, network interaction was significant in step 3. At the same time, the coefficient of governance reduced by (0.172). Following recommendations by Barony & Kenny, (1986) that partial mediation exists where both the independent and the mediating variable remains significant even after the introduction of the mediating variable in the

model, the study rejects the null hypothesis and concludes that the relationship between governance and resilience of project networks was partially mediated by network interactions. The mediation results were summarised as shown in table 4.31

Table 4.31: Summary of regression results for the mediating effect

Parameter	Step 1	P-value	Step 2	P-value	Step 3	P-value	Conclusion
R^2	0.631	-	.511	-	0.642		Null hypothesis is rejected and conclusion made that there exists partial mediation.
Adjusted R^2	0.627	-	.506	-	0.635		
F Value	172.736	0.000	104.580	0.001	88.804	0.008	
β Constant	0.379	0.244	2.282	0.000	1.279	0.017	
β Governance	1.163	0.000	0.505	0.000	0.999	0.000	
β Network interactions	-	-	-	-	0.371	0.043	

Source: Research Data (2019)

4.7.5 Test of Hypothesis Five

In hypothesis five, the study sought to establish the moderating effect of policy framework on the relationship between governance and network resilience among agricultural innovation platforms in Central and South western Uganda. The equivalent null hypothesis was that policy framework has no moderating effect on the relationship between governance and network resilience among agricultural innovation platforms in Central and South western Uganda. In this study, moderation was conducted following (Baron & Kenny, 1986) recommendations and tested using a two-step procedure.

In the first step, resilience of project networks was regressed on governance and Policy Framework as independent variables. The results are as shown in table 4.32

Table 4.32: Model Summary for Resilience on Governance and Policy Framework

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.799[a]	.639	.632	.44218

a. Predictors: (Constant), Policy Framework, Governance
Source: Research Data (2019)

The results in table 4.32 indicate that the adjusted R^2 is 0.632, indicating that policy framework and governance predicted 63.2% of the variation in resilience, while 36.8% was predicted by other factors not mentioned in the model. Table 4.33 presents the ANOVA results

Table 4.33: ANOVA[a] for Resilience on Governance and Policy Framework

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.595	2	17.297	88.466	.000[b]
	Residual	19.553	100	.196		
	Total	54.147	102			

a. Dependent Variable: Resilience
b. Predictors: (Constant), Policy Framework, Governance
Source: Research Data (2019)

From the ANOVA results, the F-value for the model was 88.466 and the corresponding P-value was 0.000. This result indicate that the model was fit in predicting resilience of project networks since the F value was greater than the F-critical of 3.085 and P-Value less than 0.05. The regression coefficient results are shown in table 4.34

Table 4.34: Coefficients[a] for Resilience on Governance and Policy Framework

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.806	.432		1.864	.065
	Governance	1.105	.096	.755	11.504	.000
	Policy Framework	.143	.047	.138	3.043	.004

a. Dependent Variable: Resilience
Source: Research Data (2019)

The results from correlation coefficients table indicate that the constant had a coefficient of 0.806 and a P value of 0.65, governance had a coefficient of 1.105 and a P value of 0.000 while policy framework had a coefficient of 0.143 and a P value of 0.004. From the results, governance and policy framework were found to be significant as indicated by their P value less than 0.05. The model may be summarised as follows:

$$RPN = 0.806 + 1.105G + 0.143PF$$

In step two, the total effect of moderation was evaluated by regressing resilience on governance, policy framework and the interactive term between governance and policy framework. The results were as indicated in table 4.35.

Table 4.35: Model Summary for Resilience on Governance and Interactive Term

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.804[a]	.646	.636	.43980

a. Predictors: (Constant), Governance*Policy Framework, Governance, Policy Framework

Source: Research Data (2019)

From the above model summary, the value for the adjusted R^2 is 0.636 implying that the model predicted 63.6% of the changes in resilience of project networks. This also means that 36.4% of the changes in resilience of project networks were predicted by factors not mentioned in the model. The analysis of variance results is shown in Table 4.36 below.

Table 4.36: **ANOVA[a] for Resilience on Governance and Interactive Term**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.998	3	11.666	60.312	.000[b]
	Residual	19.149	99	.193		
	Total	54.147	102			

a. Dependent Variable: Resilience

b. Predictors: (Constant), Governance*Policy Framework, Policy framework, Governance

Source: Research Data (2019)

The results indicate that the F value for the model is 60.312 with 0.000 significance. Therefore, the model was significant in predicting resilience of project networks as indicated by the F value being greater than the F critical 3.085 and P value less than the 0.05 significance level.

Table 4.37: Coefficients[a] for Resilience on Governance, policy framework and Interactive Term

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.090	1.132		2.730	0.007
	Governance	0.728	0.211	0.619	3.450	0.001
	Policy Framework	0.741	0.125	0.523	5.928	0.000
	Governance*Policy Framework	0.256	0.077	0.158	3.325	0.001

a. Dependent Variable: Resilience
Source: Research Data (2019)

From the results in table 4.37, the study observes that the beta coefficient for the constant was, 3.090, the coefficient for governance was 0.728, the coefficient for policy framework was 0.741 while that of governance*policy framework was 0.256. From this finding, the study observed that governance, policy framework and the interactive term (governance*policy framework) were significant as shown by P values less than 0.05 significance level. The model may be summarised as follows:

$$RPN = 0.151 + 0.892G + 0.248PF + 0.146G * PF$$

From the two regression steps of testing for moderation, it was observed that both governance and policy framework were significant in the first step. In the second step, governance as well as the interactive term Governance*Policy Framework were also significant. Basing on (Baron & Kenny, 1986) recommendations on moderation, policy framework was significant indicating an overall moderate effect. Similarly, the study found that governance, policy framework and the interactive term (governance*policy framework) were significant. Hence, the study rejected the null hypothesis and concluded that policy framework has a significant moderating effect on the relationship between governance and network resilience among agricultural innovation platforms in

Central and South western Uganda. The summary for the moderation effect is as shown in table 4.38.

Table 4. 38: Summary of the Moderated Relationship

Parameter	Step 1	P-value	Step 2	P-value	Conclusion
R^2	0.639	-	0.641	-	Null hypothesis rejected (policy framework has a significant moderating effect on the relationship between governance and network resilience).
Adjusted R^2	0.632	-	0.634	-	
F Value	88.466	0.000	89.368	0.000	
β Constant	0.806	0.065	0.151	0.665	
β Governance	1.105	0.000	0.892	0.000	
β Governance*Policy framework	0.143	0.004	0.146	0.000	

Source: Research Data (2019)

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the study based on the analysis conducted in chapter four. Study conclusions, policy recommendations, contribution to body of knowledge and areas for further research are also presented in this chapter.

5.2 Summary of the Study

In the wake of globalisation and search for sustainable project success, collaboration and networking is inevitable. Consequently, adoption of project networks (innovation platforms) is on a rising trajectory across the globe. Various actors under these project networks come together in search for scarce resources and complementarities. The objective is to make project networks resilient. When networks become resilient, they bring about consistency in project conceptualization and operationalization, relative permanency and reliability of critical governance structures, which together and overtime generate enormous efficiencies necessary for effective project delivery.

AIPs are formed to not only interact and innovate but also navigate development challenges, continue in existence, grow and expand. Resilient AIPS uphold actor interactions, innovate, continue to grow and expand amidst disturbances. Resilience of project networks therefore, calls for a sustained momentum of actor interactions that meet or exceed stakeholder needs and expectations. However, for such endeavours to meet or exceed stakeholder needs and expectations, their interactions must be carefully managed.

The general objective of this study was to investigate the effect of governance on network resilience among agricultural innovation platforms in Central and South western Uganda. Specifically, the study tested the direct relationships between management practices, network composition and cultural attributes on one hand, and network resilience among agricultural innovation platforms in Central and South western Uganda on the other. Moreover, the study tested the mediating effect of network interactions and the moderating effect of policy framework on the relationship between governance and network resilience among agricultural innovation platforms in Central and South western Uganda.

The study was founded on positivist research philosophy and explanatory research design. The target population comprised of 220 AIP actors based in central and south western Uganda. From the population, a sample size of 132 actors was drawn using stratified random sampling technique. A semi-structured researcher-administered questionnaire was used to collect primary data from the target respondents. Computer tablets connected to the cloud computer server were used.

Analysis of collected data was conducted using descriptive statistics and inferential analysis to establish the nature and strength of relationship between governance and resilience of agricultural innovation platforms. Furthermore, the strength of relationship between variables was measured using Pearson Correlation Coefficient. All the hypothesized relationships were tested at 95% confidence interval.

5.2.1 Management Practices and Network Resilience

The first specific objective of the study was to determine the effect of management practices on network resilience among AIPs in central and South western Uganda. The corresponding null hypothesis was that management practices have no effect on network resilience among agricultural innovation platforms in Central and South western Uganda. The findings of the study showed that management practices were adopted to a moderate extent among AIPs in Central and South western regions in Uganda. Results also showed that coordination was the predominantly practiced aspect of management among AIPs adopted to a large extent. Accountability was embraced to a moderate extent with monitoring and evaluation the least embraced practice. The study also established that management practices have a significant effect on resilience of project networks in central and South western Uganda.

5.2.2 Network Composition and Network Resilience

The second objective of this study was to assess the effect of network composition on network resilience among agricultural innovation platforms in central and South western Uganda. The null hypothesis related to this objective was that network composition has no effect on network resilience among agricultural innovation platforms in central and South western Uganda. It was established that network composition was embraced to a great extent among the AIPs in central and South western Uganda. Specifically, results showed that AIPs were largely committed to attracting new members regardless of their resources or social status. AIP actors' interests were largely given due consideration. The study further established that largely AIPs were keen on attracting members from a wider scope (breadth) and variety of

occupations (depth) like farmers, teachers, medics, and traders. On the other hand, the aspect of retaining members was not given due consideration. The study also established that network composition has a significant effect on network resilience among agricultural innovation platforms in Central and South western Uganda.

5.2.3 Cultural Attributes and Network Resilience

The third objective of the study was to investigate the effect of cultural attributes on network resilience among agricultural innovation platforms in central and South western Uganda. The corresponding null hypothesis was that cultural attributes have no effect on network resilience among agricultural innovation platforms in central and South western Uganda. The study established that AIPs in central and South western Uganda adopted cultural attributes to a large extent, and that values, norms, and power distance were practiced to a large extent. Overall, results indicated that cultural attributes have a significant effect on network resilience among AIPs.

5.2.4 Governance, Network Interactions and Network Resilience

In the fourth objective, the study sought to determine the mediating effect of network interactions on the relationship between governance and network resilience among agricultural innovation platforms in central and South western Uganda. The null hypothesis associated with the objective was that network interactions have no mediating effect on the relationship between project network governance and network resilience among agricultural innovation platforms in central and South western Uganda. It was established that both governance (management practices, network composition, and cultural attributes) and network interactions were largely embraced by the AIPs. Individually, capacity building and learning was the most adopted aspect

of network interactions in the AIPs followed by trust, common understanding and cooperation respectively. The findings showed that network interactions has partial mediating effect on the relationship between governance and network resilience among AIPs in central and South western Uganda.

5.2.5 Governance, Policy Framework and Network Resilience

Objective six was to establish the moderating effect of policy framework on the relationship between governance and resilience of project networks among agricultural innovation platforms in Central and South western Uganda. The corresponding null hypothesis for the objective was that policy framework has no moderating effect on the relationship between governance and resilience of project networks among agricultural innovation platforms in Central and South western Uganda. It was observed that both governance and policy frameworks were largely embraced among the AIPs. Results indicated that almost all the AIPs invited local and national government agents (e.g extension agents, trade and cooperative officers) to participate in AIP activities. The study further established that indeed government agents when invited actively participated in AIP activities. Similarly, almost all the AIPs aligned their activities to local and national government policies. Overall, policy framework was found to have a significant moderating effect on the relationship between governance and network resilience.

5.3 Conclusions

From the study findings, it was established that governance is a key predictor of network resilience among AIPs in central and South western Uganda. Specific conclusions in accordance with study objectives are as presented below.

Firstly, management practices were moderately adopted among AIPs in central and South western Uganda. In addition to descriptive findings, inferential analysis established a strong predictive power of management practices on resilience of project networks. Based on the above results, it was therefore concluded that management practices have a significant effect on resilience of project networks among AIPs in Central and South western Uganda.

Secondly, results showed that network composition was embraced to a great extent among the AIPs. There was a positive correlation between resilience of project networks and network composition while regression results showed that network composition was significant in predicting network resilience. Therefore, the study concluded that network composition has a significant effect on network resilience among agricultural innovation platforms in Central and South western Uganda.

Thirdly, the study found that AIPs in South western and Central Uganda largely embraced values, norms, and power distance as key cultural attributes in governance of networks. The study also found a moderate positive correlation between cultural attributes and resilience of project networks. Regression analysis revealed that cultural attributes is a significant predictor of network resilience. Consequently, the study concluded that cultural attributes had a significant effect on network resilience among AIPs in South western and Central Uganda.

Fourthly, the results in the study showed that network interactions (common understanding, cooperation, trust, and capacity building and learning) were highly embraced among the AIPs in South western and Central Uganda. Correlation results

showed that a positive correlation between resilience of project networks and network interactions existed. Regression results showed that both the independent and the mediating variable remained significant even after the introduction of a mediating variable in the model. Therefore, the study concluded that network interactions partially mediated the relationship between governance and resilience of AIPs in central and South western Uganda.

Fifthly, the study found that policy framework was largely embraced among AIPs in central and South western Uganda. When governance was interacted with policy framework in predicting network resilience, results were significant. The study therefore concluded that policy framework significantly moderates the relationship between governance and network resilience.

5.4 Recommendations of the Study

The study recommends that during AIP functioning, leaders should cultivate and enhance good management practices such as coordination, accountability, and monitoring and evaluation. According to the study, these practices are key antecedents to proper project network governance and resilience.

AIP leaders should devise ways of attracting new members while making efforts to retain existing ones. They should also ensure that individual interests of members are accorded due attention. Both common and individual interests motivate actor attraction to AIP activities. Leaders should therefore make efforts to identify and where possible take care of actor individual interests.

AIP leaders should promote the practice of cultural attributes such as network norms, values, and power distance as key components of network governance. Because proper management of these cultural attributes is important in ensuring effective actor interactions that lead to bonding, trust, cooperation, common understanding and collective action.

AIP leaders should also ensure that activities are aligned with government policies, encourage collaboration and access to government resources with a view of establishing sustainable structures. AIPs like all other networks lack solid organizational base to mobilize and control resources therefore, aligning activities of the AIP to government programs and polices is a clear way of ensuring sustainability.

AIP leaders should constantly elaborate network mission, goals and objectives to enhance common understanding and a coherent direction. Likewise, AIP leaders should encourage sharing of resources and participation in social activities in order to generate cooperation and trust among members.

The government of the republic of Uganda should deliberately encourage its agents at different levels to participate and channel resources towards AIP activities. Government should facilitate designing and adoption of favourable policies geared towards encouraging formation, operationalization, functioning and reproduction of AIPs. Resilient AIPs provide reliable fora that ensure cheaper and faster implementation of government programmes

5.5 Contribution to the body of Knowledge

Based on the results discussed in the preceding chapter, the study makes the following contributions to the project management body of knowledge.

From the reviewed literature, majority of studies about formation, functioning and operationalization of AIPs were conducted by biophysical scientists and to a smaller extent by social scientists. Few of the reviewed studies investigated the coordination of such collaborative efforts from a management perspective. This study contributed to the body of knowledge by developing an empirical model that articulates clear management pathways, which facilitate systematic governance of AIPs and ensure resilience. The model presents a management approach that is able to navigate challenges while at the same time taking advantage of potentialities that abide in the dynamism and complexity of project networks.

The study noted that majority of studies on project networks were based in non-agricultural contexts such as ICT, construction, supply chains, and multinational development projects. This study not only introduces soft management approaches (like facilitation, coordination, transparency and cultural attributes) into governance of project networks, but also crystalizes project network concepts into agricultural innovation platforms (AIPs). This broadens the body of knowledge about project networks within the agricultural sector.

Reviewed literature established that elements of governance individually influence resilience of project networks. However, none of the studies combined the different components of governance in interrogating their composite effect on resilience of

project networks. Therefore, by demonstrating the interplay of various management practices (such as coordination, accountability, and monitoring and evaluation), network composition, cultural attributes, network interactions and policy framework, the study contributes to the body of knowledge by showing their combined effect on resilience of project networks.

From reviewed literature, most scholars anchored their studies on systems theory, stakeholder theory, and social network theory but in different study contexts. In this study, variables were anchored on the same theories and results supported their provisions albeit in a unique context of AIPs. Therefore, the study contributes to the body of knowledge by highlighting and validating applicability of postulations of systems theory, stakeholder theory, and social network theory in agricultural networks like AIPs.

5.6 Limitations of the Study

The focus of the study was on governance measured through management practices, network composition and cultural attributes and therefore the results can only be true to the extent that governance is as operationalized in this study. In addition, resilience of innovation platforms was measured through innovativeness, sustainability, and reproduction. Since resilience can be operationalized in many other ways, the result of the study can only be generalised to the extent that the variables are measured as in this study.

The study covered AIPs that existed for a period of up to 10 years hence the findings can only be inferred for a similar period and longer-term relationships. The study

focused on innovation platforms in agricultural sector, leaving innovation platforms in other sectors such as information technology, entertainment, construction, and service sector. The results are therefore only true for networks based in the agricultural sector and may not be generalised to other sectors of the economy.

Finally, the study examined AIPs from central and South western Uganda only and thus the results may not necessarily apply to the rest of the country in case the dynamics differ. A survey of all the AIPs in Uganda could be of great importance in curbing this limitation.

5.7 Areas for Further Research

The study established that more than half of the variations in resilience of project networks was explained by management practices, network composition and cultural attributes while the remaining part is attributable to factors not included in the study. Hence there is need to carry out further research to establish those factors.

The study deployed cross-sectional techniques of data collection and data was collected for a period of 10 years. Therefore, the study findings can only be inferred for the ten year covered and not on longitudinal studies to make long-term projections on the relationship existing between the variables. Therefore, there is need for another longitudinal study to be conducted to establish if the same relationship would be obtained.

Secondly, the study examined AIPs from Central and South western Uganda only. Therefore, the results of the study were limited to this geographical area leaving the rest of the country and Africa to statistical generalization. For this reason, the study

proposes that other studies be conducted in the whole country and in other countries to validate generalizability of results.

Moreover, the findings of the study were based on innovation platforms in agricultural sector, which may not be generalised to innovation platforms in other sectors like manufacturing, entertainment, construction for further research. There is therefore need for further research to determine whether similar findings would be obtained from other sectors.

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APPENDICES

Appendix I: Transmittal Letter

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: kubps@yahoo.com
dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: D86EA/32516/15 **Date:** 1st July, 2019

The Director General,
National Commission for Science, Technology & Innovation,
P.O. Box 30623-00100,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MR. YOSAMU MUGARURA - REG.NO. D86EA/32516/15

I write to introduce Mr. Mugarura who is a Postgraduate Student of this University. He is registered for a Ph.D. degree programme in the **Department of Management Science in the School of Business.**

Mr. Mugarura intends to conduct research for Ph.D. thesis entitled, **"Governance and Resilience of Project Networks among Agricultural Innovation Platforms in Central and South Western Uganda".**

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL

RM/cao

Appendix II: Research Questionnaire

This questionnaire has been designed to collect data on **governance, Network Interactions, Policy Framework and resilience of agricultural innovation platforms in Central and south western Uganda.** The data collected via this questionnaire will be used strictly for academic purposes and not for any other purpose. All responses will be given utmost confidentiality. Please do not write any personal identification information on the questionnaire. You are kindly requested to answer it as truthfully as possible.

Reference:

Name of the AIP	
Reference:	

Region in which the AIP is situated (1=Central Uganda, 2=South western Uganda)

Region	1	2

Date of the interview;

D	D	M	M	Y	Y	Y	Y

Interviewer name.....

Instructions:

1) ***Please fill in the blank spaces where provided***
2) ***Please tick only one box where provided***
3) ***Please note that AIP stands for Innovation Platform***

SECTION A: BACKGROUND INFORMATION/COMPOSITION

1. Role of the respondent in the AIP

   1=Chairperson [ ]

   2=Processors [ ]

   3=Researchers [ ]

   4=Extension agents [ ]

   5=Government agents [ ]

   6=NGO representatives [ ]

2. Gender of respondent: 1= Male [ ] 2 = Female [ ]

3. Please tick a bracket relevant to your age. (Where 1= 0 – 25; 2 = 26 – 35; 3 = 36 – 45; 4 = 46-55; 5 = Over 50)

   0 - 25 [ ]

   26 - 35 [ ]

   36 - 45 [ ]

   46-55 [ ]

   Over 50 [ ]

4. Highest level of education attained by respondent

Level	**Rank**	**Tick**	**Level**	**Rank**	**Tick**
Post-graduate	6		O-level	3	
Bachelors/Tertiary	5		PLE	2	
A-level	4		Pre-PLE	1	

5. When did you join the AIP?

D	D	M	M	Y	Y	Y	Y

6. How often does the AIP hold meetings

   1=Weekly [ ] 2= Bi-monthly [ ]

   3=Monthly [ ] 4= Quarterly [ ]

5=Bi -annually [ ] 6= annually [ ]

7 = Other, specify …….

7. (a) Do you attend IP meetings? 1 = Yes [ ] 2 = No [ ]

(b) If yes, how often?

Level	**Rank**	**Tick**	**Level**	**Rank**	**Tick**
Annually	6		Monthly	3	
Bi-annually	5		Bi-monthly	2	
Quarterly	4		Weekly	1	

SECTION B: MANAGEMENT PRACTICES

In the following sections, please indicate the extent to which you agree/disagree with the following statements. Use the scale below to guide you in your answer.

Strongly disagree	Disagree	No Opinion	Agree	Strongly agree
1	2	3	4	5

	Coordination	**1**	**2**	**3**	**4**	**5**
MP1	This AIP has a functioning structure with positions such as Chairperson, Vice Chairperson, Secretary, and Treasurer.					
MP2	The AIP has a fully functional constitution that outlines the roles and responsibilities of each member					
MP3	The AIP holds interaction meetings once every month.					
MP4	AIP leaders have a good relationship with members					
	Accountability					
MP6	The leadership of the AIP periodically prepares financial reports.					

MP7	Financial reports of the AIP are openly discussed during annual general meetings.					
MP8	AIP members participate in the budgetary process, either in preparing or in approving it.					
MP9	The AIP has a bank account.					
MP10	The bank account is transacted by at least two officials					
	Monitoring and Evaluation					
MP11	The AIP conducts regular monitoring and evaluation to measure the effectiveness of programmes (quarterly = regular, less = very regular)					
MP12	The AIP has an annual work plan and budget upon which periodic results are compared for any variations					
MP13	AIP has a standard reporting system used by committees to submit periodic reports.					

SECTION C: NETWORK COMPOSITION

Strongly disagree	Disagree	No opinion	Agree	Strongly agree
1	2	3	4	5

	Breadth and depth	**1**	**2**	**3**	**4**	**5**
NC1	The AIP has a membership of at least 500 members.					
NC2	The AIP attracts membership from at least 5 occupations e.g crop growers, cattle keepers, traders, teachers, medics, engineers, politicians etc					
	Closeness/openness					
NC3	All new actors are required to pay membership fees					
NC4	The AIP always seeks to attract new membership					
NC5	There are no restrictions to join our AIP in regards to resource base or status					

	Apparent/Actual interests					
NC6	The objectives of the AIP are clearly outlined					
NC7	All members know the main objectives for which the AIP was founded					
NC8	Members are encouraged to openly discuss individual objectives for joining the AIP					
	Attraction and Retention					
NC9	Leadership allows non-members to attend AIP meetings					
NC10	The AIP has following-up programme for new members to help them properly integrate.					
NC11	The AIP has a mechanism of following up to assess whether individual objectives are being achieved?					
NC12	AIP leadership deliberately makes efforts to obtain feedback from members who leave the AIP and attempt to resolve their issues.					

SECTION D: CULTURAL ATTRIBUTES

Strongly Disagree	Disagree	No opinion	Agree	Strongly agree				
1	2	3	4	5				
				1	**2**	**3**	**4**	**5**
	Values							
CA1.	The AIP has a set of values to be espoused by all members							
CA2.	AIP values are written, displayed and rehearsed during meetings.							
	Norms							

CA3	The AIP has a set of norms to regulate members' behaviour amongst themselves and towards the public.					
CA4	AIP norms are written, displayed and rehearsed during meetings.					
	Power distance					
CA5	The AIP has some powerful active members e.g very rich, very politically powerful, and academically powerful.					
CA6	The AIP has a mechanism of regulating such power distance during AIP activities.					
CA7	The AIP has ground rules that regulate meetings to enable all members share views equally					

SECTION E: NETWORK INTERACTIONS

Strongly Disagree	Disagree	No opinion	Agree	Strongly agree
1	2	3	4	5

		1	**2**	**3**	**4**	**5**
	Common understanding					
NI1	Members are regularly reminded of AIP objectives during AIP meetings.					
NI2	AIP leadership and subject experts freely share information to all members					
	Cooperation/Collective action					
NI4	Members share inputs like labour, seed, fertilizer with fellow AIP members					
NI5	Members participate in AIP social enterprises e.g community savings and loaning schemes.					
NI6	Members are ready to buy inputs or sell produce collectively with AIP colleagues for better market prices					
	Trust					

NI7	This AIP cultivates trust between its actors.					
NI8	Actors in this AIP trust their leaders.					
NI9	Actors in this AIP trust each other.					
	Capacity building and learning					
NI10	Participating in AIP activities enables the actor to access knew knowledge (e.g new farming methods) through trainings and AIP meetings					
NI11	Participating in AIP activities enables the actor to visit new places, visit other AIPs hence become more exposed to the world around them.					
NI12	Participating in AIP activities enables the actor to learn and use modern ICT devices like mobile phones and apps e.g whatsapp					

SECTION F: POLICY FRAMEWORK

In the following section, please indicate the extent to which you agree/disagree with the following statements. Use the scale below to guide you in your answer.

Strongly Disagree	Disagree	No opinion	Agree	Strongly agree
1	2	3	4	5

		1	**2**	**3**	**4**	**5**
PF1	Local and national government agents (e.g extension agents, trade and cooperative officers) are invited to be actors in the AIP					
PF2	Local and national government agents (e.g extension agents, trade and cooperative officers) actively participate in AIP activities					
PF3	The AIP aligns their activities to existing policies and by-laws					

SECTION G: RESILIENCE OF PROJECT NETWORKS

For questions in this section, insert the number, which in your opinion represents your choice based on the following six categories.

Strongly Disagree	Disagree	No opinion	Agree	Strongly agree
1	2	3	4	5

	Network innovativeness	**1**	**2**	**3**	**4**	**5**
RPN1.	AIP members are encouraged to generate and share new ideas.					
RPN2.	This AIP is known for generating at least two new ideas/products per year.					
	Network sustainability					
RPN3.	This IP has a clear vision and written business plan that signifies staying in operation into the foreseeable future					
RPN4	Innovations generated on this AIP (new products, value chains or processes) survive and grow to maturity (for a minimum of 2yrs)					
	Network reproduction					
RPN5	This AIP encourages replication of similar activities by other farmer groups with a view of helping them adopt AIP approach.					
RPN6	There are at least 2 farmer groups adopting the AIP approach, thus potential of new AIPs being born out of this one.					

Please feel free to give any other suggestion/comment about this AIP

1.....

3.....

4.....

Thank you so much for your cooperation.

Appendix III: List of AIPs in Central and South western Uganda

NATIONAL AGRICULTURAL RESEARCH ORGANISATION (NARO)

STATUS-QUO OF DOCUMENTED MSIPS AND INVENTORY IN UGANDA AGRICULURAL SECTOR 2018

Most Ips are governed by farmers representatives averaging 5 per IP.

Actor particpation is largely characterised by farmers, traders/processor (private sector), government, extension agents, NGOs, research.

	Name of the IP	**Commodity**	**Location**					**When formed**	**Functionality status**
			Parish	**Sub county**	**District**	**Contacts**			
						Name	**Telephone**		
1.	Bubaare IP	Sorghum, Potato, Beans, Apiary, Goats,	Bubaare	Bubaare	Rubanda	Atuheire Julius	0782450537	2008/2009	Functional
2.	Bufundi IP	Potato, Beans, Apiary, Sorghum, Saving and credit	Kacerere	Bufundi	Rubanda	Kaboroga Apollo	0773067011 0702067011	2008/2009	Functional

3.	Chahi IP	Potato, Beans, Maize credit and savings	Chahi	Rutare	Kisoro	Serutokye Silver	0773259394	2008/2009	Functional
4.	Lake Bunyonyi IP	Fish	Mwendo	Kitumba	Kabale	Katungi Stephen	0757038026	2015/2016	Functional.
5.	Kabale Apple IP	Apples, Goats, Dairy	Mukarangye	Katuna T/c	Kabale	Mbarara Eric	0782343581	2014/2015	Functional
6	Rubuguri IP	Dairy, Apiary	Rubuguri	Rubuguri T/c	Kisoro			2014/2015	Functional
7	South western Dairy Multi-stakeholder IP	Diary	13 districts	-	-	Steven Aikiriza	0754675904	2014	Functional
8	South western Banana Multi-stakeholder IP	Banana	10 Districts	-	-	Mugizi Asaph	0702592454	2012	Functional
9	South – Western Seed Multi-stakeholder IP	Seed	8 Districts	-	-	Tindyebwa Johnson	0752764733	2012	Functional

10	Ntungamo Pineapple IP	Pineapples	One district		Ntungamo	Ronald Mugizi	0704321256	2008/2009	Functional
11	Kashekuro Banana Innovation Platform	Bananas	Kashekuro	Kitagata	Sheema	Vicent Twikirize	0782381643	2010	Functional
12	KACE	Pineapples	Kangulumira		Kayunga	Nalumansi Harriet		2007	Functional
13	Kangulumira Pineapple MSIP	Pineapples, Coffee, Banana, Maize	Kangulumira		Kayunga	Ssemakula Alex		2013	Functional
14	Kayunga IP	Beans	Kangulumira		Kayunga	Kyeyune Hussein		2014	Functional
15	Kayunga Pineapple Cluster	Pineapples	Kangulumira		Kayunga	Yahana Wafana		2007	Functional
16	Kitimbwa Coffee Farmers	Coffee	Kitimbwa		Kayunga	Sseruwu Badru		2012	Functional
17	Kyelime Coffee Farmers	Coffee, Bananas	Kyelime		Kayunga	Katende Fred		2014	Functional
18	Agali Awamu	Beans	Kyananvula		Masaka	Vicent Bwanika		2016	Functional
19	Kyanajula IP	Beans, Coffee, Cassava,	Kyanajula		Masaka	Kaliisa Fransis		2014	Functional

Source: NARO (2018)

		Groundnuts, Mangoes							
20	World Ahead Uganda Group 1	Beans And Maize	Buwunde		Masaka	Namatove Jesca		2014	Functional
21	Mukono-Wakiso Innovation Platform	Vegetable, Livestock, Agroforestry System	Mukono		Mukono	Perez Bwanika		2014	Functional
22	Mukono-Wakiso Innovation Platform	Horticulture (Vegetables)	Mukono		Mukono	Mujuni Bosco		2014	Functional

Appendix IV: Approval of Research Proposal

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: kubps@yahoo.com
dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 57530

Internal Memo

FROM: Dean, Graduate School

DATE: 1st July, 2019

TO: Mr. Yosamu Mugarura
C/o Department of Management Science
KENYATTA UNIVERSITY

REF: D86EA/32516/15

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that the Graduate School Board at its meeting 26th June, 2019 approved your Ph.D. Research Proposal **entitled "Governance and Resilience of Project Networks among Agricultural Innovation Platforms in Central and South Western Uganda".**

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology & Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed supervision Tracking Forms per semester. The form has been developed to replace the progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

By copy of this letter, the Registrar (Academic) is hereby requested to grant you substantive registration for your Ph.D. studies.

Thank you.

REUBEN MURIUKI
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Department of Management Science
Registrar (Academic) Att; Mrs Lucy Njenga
Supervisors:

1. Dr. Paul Sang
   C/o Department of Management Science
   KENYATTA UNIVERSITY
2. Dr. James Maingi
   C/o Department of Applied Economics
   KENYATTA UNIVERSITY

RM/cao

Appendix V: Research Permit from UNCST

Uganda National Council for Science and Technology
(Established by Act of Parliament of the Republic of Uganda)

Our Ref: SS 5084 **16th September 2019**

Mr. Mugarura Yosamu
Principal Investigator
C/o National Agricultural Research Organization
Kampala

Dear Mr. Yosamu,

Re: Research Approval: Governance and Resilience of Project Networks among Agricultural Innovation Platforms in Central and South Western Uganda

I am pleased to inform you that on **27/08/2019**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **27/08/2019** to **27/08/2020.**

Your research registration number with the UNCST is **SS 5084.** Please, cite this number in all your future correspondences with UNCST in respect of the above research project.

As Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the research protocol or the consent form (where applicable) must be submitted to the designated Research Ethics Committee (REC) or Lead Agency for re-review and approval **prior** to the activation of the changes. UNCST must be notified of the approved changes within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local IRC for review with copies to the National Drug Authority.
4. Unanticipated problems involving risks to research subjects/participants or other must be reported promptly to the UNCST. New information that becomes available which could change the risk/benefit ratio must be submitted promptly for UNCST notification after review by the REC.
5. Only approved study procedures are to be implemented. The UNCST may conduct impromptu audits of all study records.

LOCATION/CORRESPONDENCE
Plot 6 Kimera Road, Ntinda
P.O.Box 6884
KAMPALA, UGANDA

COMMUNICATION
TEL: (256) 414 705500
FAX: (256) 414-234579
EMAIL: info@uncst.go.ug
WEBSITE: http://www.uncst.go.ug