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Networks Composition, a Relevant Factor to Their Resilience: Insights from Agricultural Innovation Platforms in Uganda

Yosamu Mugarura[1]

[1] Kenyatta University, Kenya. Email: y.mugarura@cgiar.org

Abstract
Management of project networks involves understanding the characterization of membership, in terms of breadth, depth, and motivations for joining. This study sought to assess the effect of network composition on resilience of project networks among agricultural innovation platforms (AIPs) in Central and South Western Uganda. Like any network, having the right number and value of members is critical in the formation and functioning of an innovation platform. The study was anchored on social network theory adopting explanatory research design grounded on positivistic research philosophy. The study population comprised of 220 actors with a stratified sample of 132 actors in the 22 AIPs in Central and South Western Uganda. Out of the 132 sampled actors, 103 were interviewed representing 78% response rate generally considered adequate for further data analysis. The study used SPSS to analyse data through descriptive and inferential statistics. All study variables were tested at a confidence level of 95%. Results revealed that network composition was moderately embraced among the AIPs but has a significant effect on resilience of project networks. Based on these conclusions, the study recommends that AIP leaders should put in place appropriate mechanisms, which encourage attraction and retention of members while according due attention to their individual interests. The study contributes to the body of knowledge by providing an empirical model, which can be easily adopted by AIPs as well as validating tenets of the theoretical framework by anchoring the study among agricultural based project networks.

Key words: Agricultural Innovation Platforms, Network composition, Project Networks, Resilience

1. Introduction

Globalization and search for sustainable project success has driven actors away from individualistic tendencies towards collaboration and networking (Adekunle, Oluwole, Buruchara, & Nyamwaro, 2013). This shift has led to formation of project networks in various configurations. As a unique development on a rising trajectory, project networks are attracting critical interest from an array of stakeholders (especially scholars) given the temporary nature of projects and the bureaucratic environments of organizations that sometimes house such endeavours (Burström & Jacobsson, 2012). A project network is as an arrangement consisting of nodes ordinarily occupied by strategic business units, households, firms, trade associations, and other types of organizations. Links (relationships) between nodes are manifested through interaction between actors (Kilelu, Laurens, & Cees, 2013).

Ensuring success of projects executed through networks involves putting in place systems that manage and support innovation processes and collaboration among actors (Gustafsoon, Larson and Svensson, 2014). As such, companies and project implementers join collaborative innovation networks to navigate increased complexity in science and technology, higher uncertainty and ever-increasing costs of implementing projects, scarcity of resources, as well as shortened life cycles of innovations (Kilelu, Laurens, & Cees, 2013). However, successful governance of project networks is constrained by their dynamic nature and difficulty in sustainably drawing actors together. Dynamics not well managed and interactions not sustained, make project networks vulnerable and non-resilient.

Resilience of a project network refers to its 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 trouble. 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.

Their trajectory rising and importance in project management increasing, project networks continue to face numerous challenges such as unmet stakeholder expectations, low-level or collapsed innovations, corruption, resignation of leaders as well as conflict between actors (Provan & Kenis, 2018). To mitigate these challenges, it is imperative to have proper structures that can ensure resilience of networks and sustainability of projects implemented thereon (Muller, 2017). Achieving this objective calls for finding different ways of facilitating dense interaction amongst network actors so that they are deeply embedded in their interconnectedness. Facilitation of effective interaction and project success on these networks involves putting in place systems that manage and support innovation processes and collaboration (Larson and Svensson, 2014).

Agricultural project networks in the recent past take the form of Agricultural Innovation Platforms (AIPs). Like project networks, AIPs constitute of actors each with different interests that guide the relationships between them (Provan & Kenis, 2018). According to Adekunle (2013), AIPs are intermediary arrangements that bring different actors together in an innovation system with an aim of creating effective and sustainable change as well as to facilitate interactions and learning among stakeholders.

These AIPs provide "a forum in which multiple actors facing a common issue collaborate in identification of problems, share and develop new ideas to better solve those problems, and implement creative solutions to improve livelihoods" (Mulema, 2012). For this reason, they 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.

2. Network Composition and Resilience of Project Networks

Network composition refers to configuration and 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. 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. Having the right number and value of members is critical in the formation and functioning of innovation platforms (Nederlof & Pyburn, 2012). Understanding the characterization of membership, in terms of size (breadth), value (depth), and motivation (apparent and actual interests) is therefore a key antecedent to successful management of any innovation platform.

Diverse network ties are more likely to acquire diverse knowledge, because pursuing various types of ties affects innovation differently. Feng (2016) opined that diverse (open) networks create weak ties, which are sources of new knowledge and resources as these weak ties bridge gaps between individuals and their social environment. On the other hand, dense (close) networks create strong ties, which are important for positive interaction. However, for such relationships to add value in project networks, there needs to be proper matching between actor positions.

In network formation and management, understanding diverse network actors' interests is key to successful management of collaborations hence resilience. This is because actor motivation to participate in a network influences the nature and outcome of collaborative efforts (Mo, Hayat, & Wellman, 2015). Moreover, literature advances that pursuing strong and long-term relationships with key actors is imperative to avoiding problems associated with discontinuities between projects (Sariola & Martinsuo 2015). It is further advanced that the number of network participants (breadth) has a positive influence on network resilience (Teirlinck & Spithoven 2015).

To understand and establish the relationship existing between network composition and resilience of project networks, the study hinged on the social network theory, which explains a network in terms of nodes and ties whereby nodes are the individual actors within networks and ties are the relationships between actors (Wasserman & Faust, 1994). A social network is therefore a collection of all nodes interconnected by related ties among them. 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 (Granovetter, 1983). 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.

Characterizing network composition can be by size (breadth) and quality of membership (depth) as propagated by (Laursen & Salter, 2006). In their study, they measured breadth as the size of network membership in terms of number of actors; how many members a given network has irrespective of their contribution towards network objectives. On the other hand, network depth was measured as the extent to which different actors influence one another and direction of the network towards achieving common goals.

Teirlinck and Spithoven (2015) studied how network characteristics influence outcomes of publicly funded university research initiatives and 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. In addition, Sariola and Martinsuo (2015) used a conceptual approach to investigate project networks in a construction industry to appreciate strengthening of third party relationships. The study systematically reviewed empirical literature on project networks, third-party relationships and their strength. Results indicated 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.

In the study by Mo, Hayat and Wellman (2015) on motivation for collaboration in scholarly networks it was concluded that 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. For example, the study established that three types of motivation, that is, practical issues, novelty-exploration, and networking drive scholars to network. Results further revealed that showing interests in networking opportunities does not necessarily translate into actual interactions, until there is active involvement of all network stakeholders to enhance their collaborative ties.

Hao and Feng (2016) in their study on insights to understand how heterogeneity in the content of network ties affects radical innovation relied on existing empirical literature to develop a theoretical framework for analysing relationships between network and radical innovation. The study evaluated three types of ties (buyer-supplier, peer collaboration, and equity ties) to demonstrate that network ties can be effective sources of knowledge leading to radical innovation. Thus, the more the network ties a firm has, the more ability it has to acquire diverse knowledge, and pursuing different ties results in different effects on radical innovation. Particularly, buyer-supplier ties and peer collaboration ties contribute to radical innovation by providing a direct path to heterogeneous knowledge (direct effect), while equity ties spur radical innovation in an indirect way (moderating effect). The study further established that diverse (open) networks create weak ties while dense (close) networks create strong ties, important for positive interaction.

However, although there exists vast literature on network composition, 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 revealed 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. The study found that there existed conceptual, empirical, and methodological gaps in the literature and hence sought to investigate the effect of network composition on resilience of AIPs.

3. Methodology

The study adopted a positivist research philosophy, which 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). The study also used explanatory research design in order to characterize and understand study subjects, while explaining casual relationships between variables as advised by Saunders, Lewis, & Thornhill, (2009). The target population was drawn from actors who participate in Agricultural Innovation Platforms located in Central and South Western Uganda. 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. Six (6) respondents, each one representing the different categories of actors, were selected from each of the 22 AIPs making a total of 132 respondents.

Data was collected using a semi-structured questionnaire. This enabled the investigator to get informed responses from the respondents while allowing them to provide further insights beyond structured questions. The questionnaire was designed to collect background information of the respondents as well as their opinions on network composition and resilience of project networks among agricultural innovation platforms in central and southwestern Uganda. 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. The data collection exercise used online software installed on computer tablets and linked to a cloud server. The independent variable of the study was network composition while resilience of agricultural innovation platforms was the dependent variable. Network composition was operationalized through; breadth & depth, apparent and real interest while resilience of project networks was operationalized through; innovativeness, sustainability and reproduction.

Analysis of data was conducted using both descriptive and inferential techniques. In order to characterize variables of interest in the study, descriptive statistics such as mean scores, standard deviation, percentages, and frequency distribution was computed. The study also applied inferential statistics to establish the nature and strength of relationship between network composition and resilience of project networks among agricultural innovation platforms. The direction and strength of relationship between variables was measured using Pearson Correlation Coefficient. In addition, the coefficient of determination, R^2, was computed to measure the extent by which the changes in resilience of project networks are attributable to changes in network composition. The study also carried out the Analysis of Variance (ANOVA) test to confirm whether 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. The adopted model was summarised as follows:

$$\mathbf{RAIP = \beta0 + \beta1\ BD + \beta2CO + \beta3AA + \beta4AR + \varepsilon}$$

Where:

RAIP: - Resilience of project networks among the AIPs
β0: - intercept
β1: - coefficient of breadth and depth
β2: - coefficient of closeness and openness
β3: - coefficient of apparent actual interest
β3: - coefficient of attraction and retention

ε: - Error Term

4. Results and Discussions

4.1 Reliability of the Research Instruments

The study sought to determine the validity and reliability of the research instrument. Face validity and content validity were tested through research experts. The examination of the instrument confirmed their completeness, understand-ability and plausibility of the research items. Further, the constructs had a validity index greater than 0.5 suggesting that the instrument questions were valid in measuring the constructs. Reliability of the research instrument was tested via internal consistency using Cronbach's alpha. The results of the analysis were as shown in Table 1.

Table 1: Summary of Reliability Statistics

Variable	Cronbach's Alpha
Breadth/ depth	.826
Closeness/ openness	.814
Apparent/ Actual interests	.838
Attraction and Retention	.792
Resilience of project networks	.863
Overall	.827

Source: Research Data (2019)

The results in Table 1 indicate that the overall reliability coefficient was equal to 0.827. Specifically, the Cronbach's alpha coefficient for Breadth/ depth was 0.826 that of closeness / openness was 0.814, apparent / actual interests 0.838, attraction, and retention was 0.792 while that of resilience of project networks was 0.863. According to Field (2013), a Cronbach's alpha greater or equal to 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 concluded that the research instrument was reliable.

4.2 Descriptive Results

The study sought to determine the effect of network composition on network resilience among agricultural innovation platforms in Central and South Western Uganda. The respondents were asked to show the extent to which they agreed on statements concerning variables of the study on a 1-5 likert scale in which 1 represented 'strongly disagree, while 5 represented 'strongly agree'. The study sought to determine the effect of network composition on network resilience among agricultural innovation platforms in Central and South Western Uganda.

4.2.1 Descriptive statistics for Network Composition

Table 2 below presents a summary of the characteristics of network composition through means and standard deviation.

Table 1: 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 2 shows an average mean score of 3.615, which implies that the respondents agreed that network composition was embraced to a great extent among AIPs. At the same time, results indicated that respondents did not differ significantly in their opinions about embracing network composition among the AIPs 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. By understanding how to manage, coordinate and control different types of relationships successfully, workflow procedures can be improved and better relationships formed at all levels in the network.

Largely, respondents agreed that AIPs were open to new members as shown by a mean score of 3.97. This included the fact that AIPs welcomed new members regardless of their resources or social status. Besides, AIPs actively attracted new membership and charged 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.

AIP actors' interests had a mean score of 3.65 indicating that respondents largely agreed that actor interests were being given due consideration. Majority of respondents opined that objectives for forming the AIPs 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 interests. The practice is not necessarily bad but to avoid suppressing personal drive, which is 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 the respondents agreed that actor interest is an important element of network governance.

Mean score for breadth and depth was 3.62 meaning that respondents largely agreed that AIPs observed breadth and depth in their operations. This implies that size and diversification in AIP membership was highly regarded as a determinant for network resilience. Majority of respondents had a common view on breadth and depth as shown by low standard deviation of 0.964. Most AIPs observed depth as shown by a mean score of 4.28 and a low standard deviation of 0.692. However, AIPs moderately observed breadth of network composition as shown by a mean score of 2.96.

Attraction and retention of members had mean score of 3.22 meaning that respondents agreed to a moderate extent that AIPs attracted and retained members. This implies that AIP actors believed that attraction and retention affected network resilience to a moderate extent. However, respondent's opinion about the adoption of elements for attraction and retention varied 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 AIPs is in line with the conclusion by Sariola and Martinsuo (2015) that managers should appreciate and take into account unique interdependencies, which bring actors together for their networks to be resilient and outlive implemented projects. Further, Martey, Etwire, Wiredu and Dogbe (2014) observed that willingness of actors to participate in networks is influenced by a number of factors such as platform activities and distance covered. For these reasons, we find that composition greatly affect network resilience. Moreover, Mo, Hayat and Wellman (2015) concluded that collaborative efforts among actors are a necessary condition for network resilience. Therefore, there is need to deal with practical issues such as giving attention to interests of individual members in the AIPs, minimizing restrictions for joining AIPs, making efforts to obtain feedback from members, as well as exercising novelty-exploration to motivate network actors.

4.2.2 Descriptive statistics for resilience of project networks.

Table 3 below shows presents a summary of the characteristics of resilience of project networks through means and standard deviation.

Table 2: 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 AIP is known for generating at least 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 operation into a foreseeable future	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)

The findings show that resilience of project networks had a mean score of 3.812 indicating that a good number of the respondents agreed on the presence of resilience among the AIPs. 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. These results are consistent with those of (Aranda et al, 2012) who stated that a firm's inner strength or resourcefulness reinforces its ability to bounce back after a shock or sustained attack.
Further, respondents generally agreed that AIPS practised network innovativeness as shown by a mean score of 4.145. A low standard deviation of 0.757 shows that majority of the respondents agreed that network innovativeness plays a major role in achieving network resilience. Additionally, results showed a mean score of 3.825 for network reproduction meaning that a good number of respondents agreed that AIPs were showing indicators of network reproduction. Respondents however varied in their opinions concerning capabilities for network reproduction as shown by a high standard deviation of 1.025. Moreover, majority of respondents agreed on the potential achievement of network sustainability in the AIPs as shown by a mean score of 3.465. This implies that AIPs were showing considerable signs of network sustainability. There was however a high variation of observations as shown by a high standard deviation of 1.141.

4.3 Correlation Analysis

The study conducted correlation analysis to establish direction and strength of the relationship between study variables. Dancey and Reidy (2004) recommend that correlation coefficient of one (1) shows a perfect correlation while a coefficient of between 0.7 and 0.9 shows strong correlation. On the other hand, a coefficient of between 0.4 and 0.6 indicates moderate correlation while a coefficient of between 0.1and 0.3 shows a weak correlation. A zero (0) coefficient indicates no correlation. The results were as shown in table 4 below.

Table 3: Correlation coefficients for Network Composition

		Resilience	Breadth /depth	Closeness/ openness	Apparent/ Actual interests	Attraction and Retention
Resilience	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	103				
Breadth/ depth	Pearson Correlation	.324**	1			
	Sig. (2-tailed)	.001				
	N	103	103			
Closeness/ openness	Pearson Correlation	.411**	.202*	1		

	Sig. (2-tailed)	.000	.040			
	N	103	103	103		
Apparent/ Actual interests	Pearson Correlation	.568**	.335**	.384**	1	
	Sig. (2-tailed)	.000	.001	.000		
	N	103	103	103	103	
Attraction and Retention	Pearson Correlation	.446**	.250*	.386**	.490**	1
	Sig. (2-tailed)	.000	.011	.000	.000	
	N	103	103	103	103	103

**. Correlation is significant at the 0.01 level (2-tailed).

The results in Table 4 show that correlation coefficient between Resilience and Breadth & depth was 0.324, which indicates a weak positive correlation. The results also showed that correlation coefficient between resilience and closeness and openness was 0.411, which indicates a moderate positive correlation. Resilience and apparent actual interests had a correlation of 0.568, which indicates a strong positive correlation. In addition, attraction and retention had a positive moderate correlation with resilience as indicated by a coefficient of 0.446. All the coefficients had a p-value of less than 0.05 implying that the variables were significant.

4.4 Regression Analysis Results

Multiple regression analysis was conducted at 95 percent confidence level (0.05 level of significance). The model summary results were as shown in Table 5.

Table 4: Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.633[a]	.400	.376	.57566

a. Predictors: (Constant), Attraction & Retention, Breadth and depth, Closeness & openness, Apparent Actual interests
Source: Research Data (2019)

The results in table 5 show that the correlation coefficient (R) was 0.633 implying that there was a strong relationship between network composition and resilience. In addition, the results indicated that the coefficient of determination adjusted R Square (R^2) was 0.376 implying that network composition (attraction & retention, breadth and depth, closeness & openness, apparent actual interests) predicted 37.6% of the variations in resilience of project networks among the AIPs. These results imply that 62.4% of the variations in resilience of project networks was predicted by factors outside the model.
To establish the Fitness of the model in predicting resilience of AIPs in south western Uganda, the study conducted an Analysis of Variance (ANOVA) and the findings are as indicated in Table 6

Table 5: ANOVA[a]

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
	Regression	21.671	4	5.418	16.349	.000[b]
1	Residual	32.476	98	.331		
	Total	54.147	102			

a. Dependent Variable: resilience
b. Predictors: (Constant), Attraction & Retention, Breadth and depth, Closeness & openness, Apparent Actual interests
Source: Research Data (2019)

From the results in table 6, the F statistic for the model was 16.349, greater than the F critical of 2.464 implying that the model was fit to predict resilience of project networks. Moreover, the P value was found to be 0.000, less than the 0.05 level of significance indicating that the model was significant in predicting resilience of project networks among AIPs in central and south western Uganda.

To determine the significance of the model coefficient and the constant, the study conducted a t-test for the study coefficients and the findings are as indicated in Table 7.

Table 6: Coefficients[a]

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	.539	.436		1.235	.220
Breadth and depth	.120	.084	.120	1.432	.155
Closeness openness	.196	.096	.179	2.046	.043
Apparent/Actual interests	.421	.105	.380	3.999	.000
Attraction and Retention	.168	.097	.161	1.732	.086

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

Table 7 indicates a constant coefficient of 0.539 meaning that all factors held constant at zero, resilience of project networks would be equal to 0.539. Breadth and depth had a coefficient of 0.120 implying that all factors held constant, and breadth and depth increased by one unit, resilience of project networks would increase by 0.120. In addition, the coefficient for closeness and openness was 0.196. This means that all factors held constant and openness and closeness increased by one unit, resilience of project networks would increase by 0.196. Apparent/actual interest had a coefficient of 0.421 implying that holding all the factors constant and increasing apparent actual interest by one unit, resilience of project networks would increase by 0.421. Moreover, attraction and retention had a coefficient of 0.168 implying that all factors held constant and attraction and retention increased by one unit, resilience of project networks among the AIPs would increase by 0.168. Based on these findings, the study finds that apparent actual interests had the highest effect on project resilience (42.1%) followed by closeness and openness (19.6%), attraction and retention (16.8%), while breadth and depth had the least effect (12%) on resilience of project networks.

The results also indicated that breadth and depth had t-value of 1.432, closeness/openness 2.046; apparent/actual interests 3.999 while attraction and retention had 1.732. All the variables other than breadth and depth had t-values greater than the critical of 1.661 at 0.05 level of significance implying that apparent/actual interests, attraction and retention, and, closeness and openness significantly affected resilience of project networks. Breadth and depth had no significant effect on resilience of project networks. Summarized model is as follows;
RAIP = 0.539 + 0.120 Breadth and Depth +0.196 Closeness and Openness + 0.421 Apparent/Actual interest +0.168 Attraction and Retention

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. Uniqueness of ties is characterized by diversity of apparent and actual interests that define the direction of relationships between actors. Similarly, Reinholt, Pedersen and Foss (2011) found out 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. Literature showed that centrally positioned (widely and deeply connected) network actors are deemed beneficial, because their central positions allow direct access to other network members and enhance network visibility to the outside space. More diverse network ties lead to acquisition of diverse knowledge and information sharing which eventually lead to resilience of AIPs. This study makes a conceptual contribution by showing the influence of actor apparent and real interest on resilience of project networks, not given prominent consideration by previous scholars. The study also empirically shows the relationship existing between network composition and resilience of AIPs. Although conducted in Central and South Western Uganda, the empirical rigor makes the study results generalizable to other contexts.

5. Conclusion

The study sought to assess the effect of network composition on network resilience among agricultural innovation platforms in Central and South Western Uganda. Results showed that although some AIPs required new actors to pay membership fees, majority of them were largely committed to attracting new members irrespective of their resource base and status. It was also established that AIPs in central and South-western Uganda adopted breadth and depth of AIP membership to a large extent. On the other hand, attraction and retention of AIP members was embraced to a moderate extent. Apparent/Actual interests were found to bear the greatest impact on resilience of AIPs. Regression results also showed that network composition was significant in predicting network resilience. Based on these results, the study concluded that network composition has a significant effect on network resilience among agricultural innovation platforms in Central and South-western Uganda.

6. Recommendation

The study established that network composition, measured using breadth and depth closeness and openness, apparent and actual interests as well as attraction and retention, was largely embraced among the AIPs. It was also concluded that network composition was significant in predicting network resilience. For this reason, the study recommends that leaders should put in place appropriate mechanisms which encourage attraction and retention of members. Leaders should balance closing and opening of the network to new members in order to ensure enough width (breadth) to attract many members and enough depth to attract centrally positioned actors. They can make targeted collaboration invitations or waive membership fees where necessary. Leaders should ensure that individual interests of members are accorded due attention. This is because both common and individual interests alike motivate actor attraction towards AIP activities. Where individual interests are disregarded, actors become disappointed and lose interest in AIP activities. Leaders should therefore make efforts to identify and as much as possible take care of actor individual interests.

7. Contribution to the Body of Knowledge

The study contributes to the body of knowledge by providing an empirical model, which AIPs can adopt for their networks composition aimed at achieving resilience. The study also contributes to the body of knowledge by validating tenets of the theoretical framework used in the context of agricultural based project networks.

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