



Investigation on Entrepreneurial Viability of Indigenous Innovations in Kenya. A Survey of Baringo and Nakuru Counties on *Mursik* Milk

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Abstract

Indigenous innovations can aid developing nations embark on a cumulative path of positive growth. *Mursik* is a traditional milk preservation technology among Kalenjin community in the Great Rift Valley in Kenya. However, its success and commercial performance or future potential has remained unknown. This study was aimed at investigating on entrepreneurial viability of *Mursik* commercialization. Data was obtained using semi-structured questionnaires administered on a snow-balled sample of 59 accessed enterprises. The findings obtained indicated that there was huge supply of milk in the proximal catchment area but suppliers preferred delivering their milk to large milk processors who unfortunately had not yet adopted *Mursik* product line. Good news was that the innovation possessed necessary characteristics for potential massive adoption. The researcher therefore recommends further research on rapid production techniques that could conserve the quality of the original *Mursik*, deliver value packaging, and establish promotion and distribution beyond the traditional *Mursik* users.

Keywords: Indigenous innovations, Entrepreneurship, *Mursik*.

1. Introduction

Indigenous innovations can aid developing nations embark on a cumulative path of positive growth; thereby helping them join the ranks of the more advanced nations. Local challenges and opportunities that are as varied as the individual communities themselves, provide great opportunities to stimulate economic growth by capitalizing on the local knowledge and resources residing in the communities (Mehta & Mokashi-Punekar, 2008). According to Matthew (2017) in a study on “Understanding Indigenous Innovation in Rural West Africa”, the missing piece in driving local innovations is the lack of understanding on indigenous or pre-existing systems of innovation as a legitimate aspect for propelling innovations at the community level. The African indigenous knowledge systems, beliefs and practices present African people’s ecological conservation methods for agricultural produce, creation of cultural artefacts such as sculptures, basketry, pottery and even medical practice. Unfortunately this African people’s indigenous knowledge systems have been misunderstood as barbaric and savagery (Gudhlanga & Makaudze, 2012).

Mursik is sour milk with a sharp almost bitter taste popular among the Kalenjin community. The fermenting gourds (called sotet) are first cleaned and left to dry in the sun for a few days. The cleaning is done using bow shaped branches of palm trees called “sosiot” whose edges have been pounded until they become brush-like. During the cleaning the inner linings of new gourds and the coating of previous milk stored in old gourds are removed to prevent passing bitter taste to *Mursik*. The gourd is then treated by smoking it with *Cassia didymobotrya* (acacia) or sertwet to impart some preservative and aromatic effect to milk. Burning embers of sticks from the sertwet tree branches are inserted into the gourd and processed into charcoal powder to which freshly boiled cool milk is added. It is argued that sertwet charcoal is herbal with undisclosed medicinal



value and it also helps to quicken the fermentation. Unlike in the olden days today the milk is pasteurized first, by boiling and then covered to avoid contamination until it cool before pouring into the treated gourd. The gourd is then corked tightly with a treated lid and stored in a cool place for three days and up to one week for it to ferment (Network F. A., 2000).

For the longest, the name Mursik is synonymous with Kenyan athletics especially after they return from international athletics fete - which the Kalenjin community are popular for world over. Their medalists, as set by tradition, the milk so important that it is transported hundreds of kilometers to welcome these national heroes in the Kalenjin style of celebrating a hero. One then wonders, what is magical about this Mursik? Kalenjins are highland Nilotes who are found in Kenya but recently have immigrated to many parts of the world, especially as sports immigrants. In Kenya, the Kalenjins occupy the expansive Great Rift Valley that is very fertile and productive in crops and livestock. It is here that Mursik technology originates from as a staple diet. The community developed the unique milk preservation technology using indigenous tree species about 300 years ago and the technology has evolved over the years a practice to avoid wastage of milk by preserving and storing excess milk for use during low supply such as during drought or dry season. The technology compares with “chekha mwaka” milk preservation by the Pokot (who are close relatives of Kalenjins); a technique used to treat milk that can be stored for over one year without going bad (Kipsang, 2010). One wonders, has Mursik gained economically exploitable popularity due to the large prominent sports ambassadors from the community who use it to celebrate international athletic success? Does it have mythical attribution to this success or is it just sentimental? What can be done to improve acceptance and use – is it the quality, flavour, smell, colour and palatability of stored milk?

2. The problem

Every community will often times have its cultural wealth of unique indigenous innovative products (Stenou, 2002). The extent to which these cultural products can be commercially viable is not always known. They may remain of great sentimental value with underutilized commercial exploitation yet these communities may be wallowing in poverty while their intellectual property lay in ruin and decay. Worrisome is the fact that such communal asset is a unique cultural preserve possibly not duplicated anywhere else thus potentially under threat of extinction is not developed. The prolonged in-activation of such cultural innovative products often end up “stolen” by foreigners who perceive their value, and patent and commercialize them (Huaman & Sriraman, 2015). Unfortunately, regardless of the wide acceptance and use of *Mursik* among the expanse Kalenjin community and the gradual adoption of the product by other communities in the modern times, the indigenous Kalenjin community is yet to substantially reap commercial this community asset (Kipsang, 2010). This study therefore aimed at investigating on entrepreneurial viability of indigenous innovations in Kenya with specific focus on *Mursik*. The study determined the sufficiency of supply side factors, demand side factors, innovation characteristics, and the moderating effect of innovation promoters. Data was collected using semi-structured questionnaires which were administered by the researcher to 59 businesses’ senior management representatives or owner entrepreneurs selected through snow-balling technique. Data was analysed and summarized using descriptive and inferential statistics and conclusions made on the research objectives.

3. Objectives



The main objective of the study was to investigate on entrepreneurial viability of indigenous innovations in Kenya using the case of *Mursik* in the Kalenjin community. Further, the specific objectives of the study were:

- i. To determine the effect of supply side characteristics for viability of an indigenous innovation.
- ii. To evaluate how demand side characteristics effected much viability of an indigenous innovation.
- iii. To determine the relationship between characteristics of an innovation and the viability of an indigenous innovation.
- iv. To assess the moderating effect of the innovation promoters on the viability of the indigenous innovation.

4. Literature Review

4.1 Theoretical review

An innovation can break an economy from its static mode and put it into a dynamic path of fits and starts. Enactment of new innovations has been found to be the greatest means to creating new industries (Braunerhjelm, 2010). While engaging with the natural world, science, and local knowledge systems communities should reconsider the danger of indigenous people pursuing western modern science at the expense of their own local knowledge, and indigenous innovations (Huaman & Sriraman, 2015). The study was based on theory of innovation by Schumpeter (1934), demand and supply theory by Adam Smith (1776), Diffusion of Innovation Theory by Everett Rogers (2003).

Based on theory of innovation by Joseph Alois Schumpeter, innovations create new combinations and cause creative destruction (Schumpeter, 1934). Joseph Schumpeter defined six different types of innovative activity: new products, new services, new methods of production, opening new markets, new sources of supply, and new ways of organization. Although indigenous innovations like *Mursik* are not new combinations in their bedrock of invention, the activity of generating commercial value that transcends their cultural value qualifies for an innovation. The resultant successful commercialization would help move them to new markets and introduce new processes of production, packaging and distribution.

In his first book, "The Theory of Moral Sentiments," Adam Smith proposed the idea of the invisible hand - the tendency of free markets to regulate themselves by means of competition, supply and demand, and self-interest. Further in 1776 his book, "An Inquiry into the Nature and Causes of the Wealth of Nations", observed that by selling products that people want to buy, the butcher, brewer, and baker hope to make money. If they are effective in meeting the needs of their customers, they will enjoy the financial rewards (Smith, 1776). Even though Schumpeter (1934) does not agree with economic theory about equilibrium, the economic theory of demand and supply has remained fundamental in explaining how markets establish their prices and instil favourable responses to supply goods and meet demand. According to European Commission (2015), "Annexes of First Policy Brief on Supply and Demand Side Innovation Policies", successful commercialization of innovation must have profound evaluation of supply and demand side in view of drivers, barriers and challenges for activating an innovation.



Rogers (2003) defined an innovation as an idea, practice, or project that is perceived as new by an individual or other unit of adoption”. Further, he noted that favourable attributes of innovations includes five characteristics: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. About these five characteristics he observed that “individuals’ perceptions of these characteristics predict the rate of adoption of innovations”. However, there was a lack of research on the effects of the perceived characteristics of innovations on the rate of adoption (Rogers, 2003).

Hauschildt (1999) designed a model on innovation promoters. He argued that, “managing innovation requires a careful division of labour between a number of champions (or promoters), who commit to the new product, service, process or business model innovation.” Four types of innovation promoters were described as: the technology, process, power and relations promoter. The paper explored the moderating effect of innovation promoters in supporting and championing success of these innovation from entrepreneur’s passion about the product, social cultural promoters, institutional promoters, and regulatory environment. These were identified as unique variables that could be injected into the innovation space to catalyse its successful outcome.

4.2 Empirical review

Innovation climates in developing countries are, by nature, problematic, characterized by poor business and governance conditions, low educational levels, and mediocre infrastructure and this raises particular challenges for the promotion of innovation (Aubert, 2005). China has made concerted efforts to reconcile its primary objective of strengthening indigenous innovation with its leading role in international trade and deep integration into global corporate networks of production and innovation (Ernst, 2011). Further, Ernst (2011) recommended that China needed to find its own institutional and legal approaches to develop a standards system that could both foster indigenous innovation and cope with the challenge of globalization and rising complexity. Lazonick and Mass (1995) found that a central determinant of Japan's phenomenal economic success during the 20th century was indigenous innovations. However, Sanginga, Waters-Bayer, Kaaria, Wettasinha, and Njuki (2009) in their book entitled “Innovation Africa: Enriching Farmers' Livelihoods”, opined that understanding the existing innovation process and learning how to support them will be key to the success of individuals and organizations involved in agricultural research and development. They regretted that the extent to which colonialism ignored indigenous wit, technology and knowledge and thus recommended deliberate focus on indigenous innovation as key to unlocking agricultural economic exploitations in Africa.

4.3 Conceptual framework

On account of the research objectives and the reviewed literature the conceptual framework below summarizes the conceptual view of the study variables.

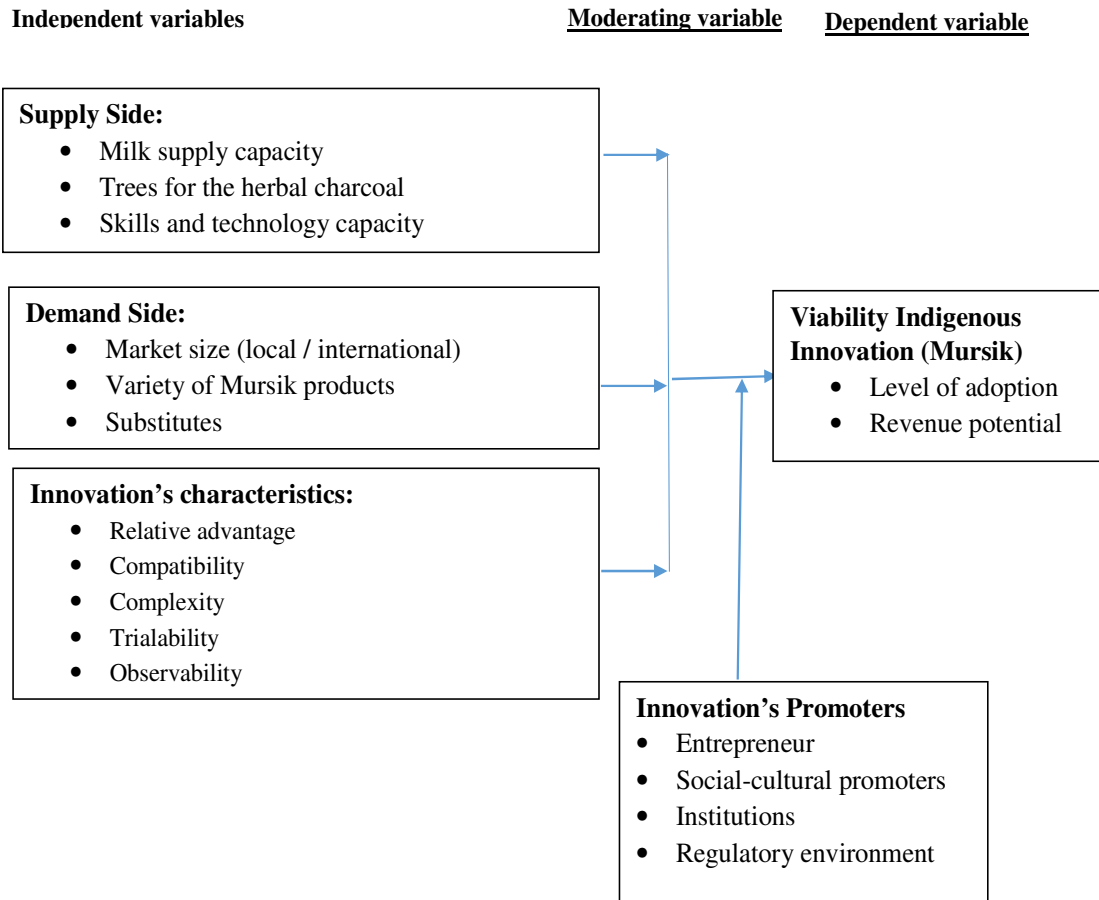


Figure 1: Conceptual framework

5. Methodology

5.1 Research design

The research was based on interpretivist research philosophy. Interpretivist contend that only through the subjective interpretation and intervention can reality be fully understood Goldkuhl (2012). The study research design was exploratory design. Data was be collected and analyzed using quantitative research methods and descriptive statistics. Exploratory Research is suitable where a problem has not been studied more clearly before and establishes priorities, develops operational definitions and improves the final research design. Quantitative research on the other hand emphasizes objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques (Kothari, 2004).

5.2 Target population

The study targeted enterprises in Nakuru and Baringo Counties in Kenya that produced or sold *Mursik*. Nakuru and Baringo counties were chosen for their proximity to the researcher and that they are both home to the Kalenjin community. Nakuru County constitutes eleven



sub-counties: Nakuru Town East, Nakuru Town West, Rongai, Kuresoi North, Kuresoi South, Subukia, Bahati, Gilgil, Naivasha, Njoro and Molo. On the other hand Baringo County constitutes five sub counties: Mogotio, Eldama Ravine, Tiaty, Baringo Central, Baringo and South Baringo North. Both counties had a total of sixteen counties out of which five counties were selected based on accessibility and prevalence of the study group. These were Nakuru Town East, Nakuru Town West, Rongai, Mogotio, and Eldama Ravine. Within these counties data was collected from relevant enterprises where *Mursik* was likely to be sold. They included caterers, hotels, foods outlets and food processors.

5.3 Sampling technique and sample size

The sample size included 59 enterprises selected by snowballing technique starting from several enterprises that were initially identified as selling *Mursik* around Kabarak University then extended field data collection to Baringo and Nakuru sub-counties where other target enterprises were found. However, only 35 of those enterprises completed the data collection adequately for analysis. Each provided one respondent who was the senior manager or owner entrepreneur of the enterprise.

5.4 Data collection instruments

Data was obtained using semi-structured questionnaires administered on the purposively selected 59 enterprises. The questionnaires comprised of close ended and open ended questions grouped into items comprising of general data about the enterprise, supply side characteristics and demand side characteristics of *Mursik*, its innovation diffusion characteristics, and entrepreneur’s characteristics in the sampled enterprises. The questionnaires were self-administered by the researcher after they were piloted on 5 hotels in Rongai and Nakuru West sub counties. These 5 hotels were not included in the final data analysis. During the data collection, the researcher used a self-introduction letter backed with university identification card. The respondents would be informed of their right to respond or not to respond to any of the questions in the questionnaire or to opt out any time in the process of the data collection. Questionnaires from any respondent who opted out were destroyed and were not analyzed. The questionnaires were administered at the respondent’s office or at a service area desk where the respondent preferred and felt comfortable.

6. Results

3.5.1 Distribution of the enterprises sampled

Data about the sampled businesses has been summarized in Table 1.

Table 1: Correlation of characteristics of the enterprises in relation to *Mursik*

		Size of enterprise	No 1	No 2	No 3	No 4	No 5
Size of enterprise	Pearson Correlation Sig. (2-tailed)	1					



	N	35					
No 1	Pearson Correlation	-0.039	1				
	Sig. (2-tailed)	0.822					
	N	35	35				
No 2	Pearson Correlation	-0.231	.731**	1			
	Sig. (2-tailed)	0.182	0				
	N	35	35	35			
No 3	Pearson Correlation	0.252	.567**	0.289	1		
	Sig. (2-tailed)	0.144	0	0.092			
	N	35	35	35	35		
No 4	Pearson Correlation	.485**	.367*	0.162	0.208	1	
	Sig. (2-tailed)	0.003	0.03	0.352	0.23		
	N	35	35	35	35	35	
No 5	Pearson Correlation	0.009	0.162	0.154	0.029	0.161	1
	Sig. (2-tailed)	0.961	0.352	0.377	0.87	0.355	
	N	35	35	35	35	35	35

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

* . Correlation is significant at the 0.05 level (2-tailed).

Enterprise characteristics measured:

1. Selling *Mursik*
2. Makes *Mursik* in-house
3. Have a problem getting adequate milk for *Mursik* is big given demand for raw milk for other products
4. Have a problem of getting the other inputs for processing *Mursik*, such as herbal charcoal and suitable packaging
5. Have difficulties in getting an expert who can make quality *Mursik*

According to the correlations presented in Table 1 as the size of the enterprise increased it was found that apart from Milk other inputs needed for production of *Mursik* became more and more problematic including suitable packaging ($r=0.485$, $p=0.003$). This means that although obtaining milk which is the primary ingredient for producing *Mursik* was not a significant problem to the larger enterprises, these enterprises had a problem adopting production and selling *Mursik* for lack of reliable supply and suitable packaging for *Mursik*. There was a significant positive correlation between enterprises that made their *Mursik* in-house and whether an enterprise sold *Mursik* or not ($r=0.731$, $p<0.001$). These means those enterprises that were finding it easy to sell *Mursik* were those that had capacity to produce it in-house rather than buy ready-made *Mursik*. Majority of the enterprises that sold *Mursik* also agreed that to them there



was a problem of getting adequate supply of Milk compared to the demand of raw milk for other products ($r=0.567$, $p<0.001$). However, the significance of the problem of other inputs needed for production of *Mursik* apart from Milk among enterprises selling *Mursik* was not significant in two tailed Pearson Correlation. This is further illustrated by Table 2 where the problem of getting adequate milk for *Mursik* to the demand of raw milk for other products and size of the enterprise was tabulated. It indicated that regardless of the size of the enterprise, 23 out of 35 firms indicated the problem was fairly small.

Table 2: Cross-tabulation of “How big is the problem of getting adequate milk for *Mursik*?”

		Size of enterprise				Total
		Micro enterprise	Small enterprise	Medium enterprise	Large enterprise	
How big is the problem of getting adequate milk for <i>Mursik</i> ?	Very Small to Fairly Small	11	9	4	1	25
	Fairly High to Very High	3	4	2	1	11
	Total	14	13	6	2	35

According to Table 2 the problem of getting adequate milk for *Mursik* was very small to fairly small to over 71% (25/35) businesses. Therefore, failure to sell *Mursik* in the sampled business could not be directly attributed to lack of adequate Milk supply. However, fewer Micro and Small enterprises 25% (7/27) as compared to Medium and Large enterprises 38% (3/8) indicated that they had a big problem of getting milk for *Mursik*. So a larger number of medium and large enterprises that were not offering *Mursik* was failed to offer it due to supply problems as compared to the micro and small enterprises.



Table 3: Correlation of research variables

		Supply	Demand	Innovation characteristics	Innovation Promoters	Innovation viability
Supply	Pearson Correlation	1	-.538**	-.355*	.411*	.483**
	Sig. (2-tailed)		0.001	0.036	0.014	0.003
	N	35	35	35	35	35
Demand	Pearson Correlation	-.538**	1	.523**	0.002	-.785**
	Sig. (2-tailed)	0.001		0.001	0.99	0
	N	35	35	35	35	35
Innovation characteristics	Pearson Correlation	-.355*	.523**	1	-0.038	-.362*
	Sig. (2-tailed)	0.036	0.001		0.829	0.033
	N	35	35	35	35	35
Innovation Promoters	Pearson Correlation	.411*	0.002	-0.038	1	0.16
	Sig. (2-tailed)	0.014	0.99	0.829		0.36
	N	35	35	35	35	35
Innovation viability	Pearson Correlation	.483**	-.785**	-.362*	0.16	1
	Sig. (2-tailed)	0.003	0	0.033	0.36	
	N	35	35	35	35	35

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

* . Correlation is significant at the 0.05 level (2-tailed).

According to Table 3, the correlation of the research variables indicate that there was significant positive correlation for all the three independent variables of Supply, Demand, and Innovation Characteristics to the dependent variable of Innovation Viability ($p = 0.05$) . However, there was no significant correlation between the moderating variable of Innovation Promoters and the dependent variable Innovation Viability. Further, the observed correlations did not indicate sufficient evidence of multicollinearity. The correlation between Supply and Demand is negative. This fits into the theory of demand and supply where the two have an inverse relationship. The moderating variable Innovation Promoters does not have a significant



correlation with the three independent variables and the dependent variable as well. Therefore the aggregate contribution of Innovation Promoters does not necessarily amount to increase or decrease of the other variables, apart from Supply. This outcome is perplexing and the specific types of Innovation Promoters were evaluated separately to drill down for the segregated contribution to Innovation Viability. The findings are presented in Table 4.

Table 4: Multiple Linear Regression of Innovation Promoters to Innovation Viability

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.439	.799		1.801	.082
Entrepreneur_Promoter	.696	.084	1.040	8.281	.000
Socialcultural_Promoter	.071	.100	-.059	-.706	.048
Institutional_Promoter	.135	.139	.114	.970	.340
Regulatory_Promoters	.102	.153	.095	.666	.510

Dependent Variable: Innovation Viability

According to the table above Entrepreneur Promoter (Entrepreneur_Promoter) and Social Cultural Promoters (Socialcultural_Promoter) had significant effect in the independent variables' contribution on Innovation viability (Innovation Viability) (0.696, $p < 0.01$, 0.071, $p = 0.048$, respectively). However, the other two evaluated parameters Institutional promoters and regulatory promoters were not significant. This means having strong entrepreneurial drive can enhance the posture of viability of an indigenous innovation such as *Mursik*. Further, where the business owner leveraged on Social Cultural image of an indigenous innovation, it enhanced the viability of that innovation. Nonetheless institutional promoters and regulatory interventions were not enhancing viability of *Mursik* as an indigenous innovation. Perhaps because of the minimal intensity of such interventions as noted in the survey.

The conceptual view of the study variables was summarized using a multiple linear regression model that is presented in Table 5.



Table 5: Summary Multiple Linear Regression Models

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.566	1.232		4.519	0
	Supply	0.149	0.21	0.093	0.707	0.485
	Demand	0.896	0.166	0.776	-5.403	0
	Innovation Characteristics	0.111	0.186	0.077	0.597	0.055
2	(Constant)	4.722	1.371		3.445	0.002
	Supply	0.006	0.238	0.004	0.027	0.979
	Demand	0.956	0.17	0.828	5.63	0
	Innovation Characteristics	0.11	0.184	0.077	0.598	0.054
	Innovation Promoters	0.419	0.314	0.166	1.336	0.092

Dependent Variable: Innovation Viability

According to model 1 in Table 5, Demand, and Innovation characteristics, (Innovation Characteristics) had significant contribution on Innovation Viability (Innovation Viability) at $p < 0.05$. Further, when the model was loaded with a moderating variable of Innovation Promoters (Innovation Promoters) represented in model 2 in Table 5, the same independent variables remained significant to the multiple linear regression. Further, the added moderating variable of Innovation Promoters (Innovation Promoters) was also significant ($p = 0.092$). However, Supply was not significant in the model ($p = 0.979$). Therefore the moderated conceptual model can be summarized as:

$$Y = 4.722 + 0.956 X_1 + 0.11X_2 + 0.419X_3$$

Where Y = Indigenous innovation viability

X_1 = Demand

X_2 = Innovation characteristics

X_3 = Innovation promoters

This means regardless of the supply capacity of input resources entrepreneurs in indigenous innovations were able to carry out their entrepreneurial undertakings under the drivers of Demand capacity, the innovations characteristics and the moderation of innovation promoters, specifically the entrepreneur's characteristics and social cultural promoters. Therefore, the national and devolved Governments in Kenya should intervene to market their indigenous innovations so as to create demand irrespective of any perceived raw material supply challenges since entrepreneurs were able to surmount such a challenge. However, in order to an indigenous innovation to be viable it also required to possess certain characteristics.



According to Rogers (1986), the four major factors that influence diffusion process include; innovation itself, communication, time and nature of the social system into which the technology is being introduced (Rogers, 1983). It also agrees with Rogers (1995) that someone adopts a product or service if it has characteristics of relative advantage, compatibility, complexity, trialability, and observability which were the parameters used in measuring Innovation Characteristics.

7. Conclusion

The study found that (1) whereas there was huge supply of milk in the proximal catchment area the supply was not consistent and suppliers preferred delivering it to large milk processors who had not yet adopted *Mursik* as part of their line of products. Nevertheless, this was not a significant factor in affecting the indigenous innovation viability. (2) It was noted that demand for *Mursik* was dominated by local community and majority preferred home brewed Murisk for better quality and its social associations. However, this variable was found to be a significant contributor to an indigenous innovation viability. There is therefore a strong case to advocate for interventions that can enhance demand where there is an interest in growing innovation viability for indigenous innovations. (3) It was found that possession of necessary characteristics for potential of massive adoption of an innovation had a positive significant effect on the viability of that indigenous innovation. (4) The moderating role of innovation promoters had mixed effect. Whereas entrepreneur, and social cultural promoters were enhancing the innovation viability, institutional and regulatory interventions had not created any significant effect on enhancing the innovation viability of *Mursik* indigenous innovation. However, the extent to which these parameters of institutional and regulatory interventions could remain indifferent to the moderated regression model was not established. Possibly with heightened application of these interventions they might have some favorable contribution and this can be a subject for another study.

8. Recommendations and Areas for further study

Arising from this study the following are the recommendations. First, necessary strategies for promotion and distribution of *Mursik* beyond the traditional users should be encouraged through social cultural promoters such as sports ambassadors, hosting of cultural events, tourism cuisine seasonal promotions, and so forth. Further research should also be conducted to determine whether variations in institutional and regulatory interventions may eventual have some significant effect on making *Mursik* as an indigenous innovation more viable. This could include operationalization of specification for fermented (cultured) milks standards DKS 05-941 (Kenya Bureau of Standards, 2013) and inclusion of *Mursik* production funding by trade departments in the National and Devolved Governments.

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