



# Micro, Small, and Medium-Sized Enterprises (MSMEs) and Open Collaborative Innovation in Botswana

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## Abstract

This study explores the adoption, by micro, small, and medium-sized enterprises (MSMEs) in Botswana, of open collaborative innovation modalities aimed at enhancing and scaling up of their businesses. The study found that only 27.2% of the 206 enterprises studied belonged to networks, and only 18.9% had engaged in open collaborative innovation. The main reasons given for not getting involved in open collaborative innovation included: problems with long cycle times and slow decision-making by enterprises (87.4%); not knowing how to initiate a partnership (87.4%); inability of enterprises to find reciprocal interests to work with (86.8%); and lack of trust (86.2%). An exploratory factor analysis identified four factors as challenges to the adoption of open collaborative innovation, namely: lack of networking; lack of financial support; low market demands; and poor previous innovation experiences. These factors were found to explain 68.9% of the total variation in the original variables.

The benefits of open collaborative innovation included increased number of skilled employees (56.4%), new products and services developed (51.3%), and communication effectiveness (51.3%). A reasonable percentage (37%) of the businesses was disappointed with the unwillingness of businesses to provide good advice to each other, preferring rather to steal ideas and convert them to appear to be their own. An overwhelming percentage of the enterprises (over 93%) indicated they have never received any assistance from institutions such as the Citizen Entrepreneurial Development Agency (CEDA), the Local Enterprise Authority (LEA) or the Innovation Hub, in the areas of knowledge governance, or any encouragement to participate in open collaborative innovations. A majority of the businesses involved in open collaborative innovations (89.5%) had never experienced any intellectual property (IP) violations except in customer relations management (50%) and in long-term labour contracts (50%). The study recommends that the Government of Botswana and institutions charged with assisting MSMEs should: raise awareness in MSMEs of the benefits and mechanisms of open collaboration; train MSMEs on how to forge partnerships between enterprises in an open innovation environment, and improve the business environment, access to finance, competition, and trade openness; and provide dedicated

innovation policies, which would target all innovation actors, namely MSMEs, research institutions, and researchers, and which would enhance the linkages among them.

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## Keywords

Open collaborative innovation, micro, small, and medium-sized enterprises (MSMEs); challenges, scale-up, businesses, Botswana

## I. Introduction

In an age where technology is growing exponentially and new business models continue to emerge, the use of skill knowledge has led to the expansion of businesses and consequently to competition for available markets. Businesses have come to rely on sharing knowledge as a way to further improve outputs and competitiveness. However, small firms still lack the required internal financial resources and technical capabilities to compete with larger firms for new markets, visibility, enhancement of publicity, and enhancement of reputation. It is our assumption that micro, small, and medium-sized enterprises (MSMEs) must therefore collaborate openly with larger and external partners in order to innovate successfully, to develop new sources of income, and to reach more profitable positions in the competitive landscape. This open collaborative innovation is, in our view, a logical step for many MSMEs to take.

The research we conducted, as described in this Working Paper, sought to explore our assumptions regarding the value of open collaborative innovation between MSMEs and larger firms in the context of Botswana, through examination of a sample of 206 of the country's MSMEs. This study explored the degree of adoption, by a stratified sample of 206 MSMEs in Botswana, of open collaborative innovation modalities as a process or step aimed at enhancing and scaling-up their businesses. The study also explored the legal and regulatory constraints—including intellectual property (IP) violations that MSMEs face in the operation of their businesses, and how the adoption of open collaborative innovation is affected by the status of MSMEs.

Our study was grounded on the assumption that, as a strategy for MSMEs to enhance and scale-up their businesses, open collaborative innovations among themselves and with larger and established enterprises could be of value. Through collaborations, such newer enterprises can access a variety of financial and organisational resources from the larger and established enterprises or firms, while the established firms seeking to improve their external innovation capabilities can take advantage of the different perspectives, approaches, and risk outlooks of new firms (World Economic Forum, 2015). The study also seeks to provide information on collaboration between MSMEs themselves (informal with formal, formal with formal, and informal with informal).

## II. Study Context

### A. The MSME Sector

In both developed and developing countries, there has been an increasing focus on MSMEs as potential providers of employment to growing populations, especially the youth. MSMEs represent the majority of business in both the developing and developed world. Among the countries of the developed world and the Organisation for Economic Co-operation and Development (OECD), MSMEs were estimated in 2010 to account for approximately 99% of all enterprises and two-thirds of employment (OECD, 2010a). MSMEs are argued to promote inclusive growth through the creation of employment opportunities for the poor, especially women (Daniels, 1999; Lin & Lin, 2001; Mead, 1994; Wohlmuth et al., 2009). MSMEs are the key to a country's economic growth and their success can help reduce poverty, improve the health of families and communities, raise literacy and educational levels, and empower women (Lin & Lin, 2001; Wohlmuth et al., 2009).

Some existing research has found that MSMEs, despite widespread adoption of open innovation modalities, struggle with open innovation implementation due to their relatively low levels of absorptive capacity, policy and financial constraints, and perceived management challenges (Saguy, 2011; Van de Vrande, De Jong, Vanhaverbeke & De Rochemont, 2009).

### B. The Position of MSMEs in Botswana

In Botswana, the government's MSME policy identifies three different categories of enterprises: micro enterprises, small enterprises, and medium-sized enterprises (Government of Botswana, 1999). Micro enterprises are defined by the policy as those having fewer than six (1–5) workers,

including the owner, and an annual turnover of less than P60,000 (USD7,500). A small enterprise is defined as one employing fewer than 25 (6–24) paid employees, with an annual turnover of between P60,000 and P1,500,000 (USD7,500 and USD187,500). A medium-sized enterprise is defined as one employing fewer than 100 (25–99) paid employees, with an annual turnover of between P1,500,000 and P8,000,000 (USD187,500 and USD1,000,000).

In Botswana, MSMEs are generally owned by Botswana citizens, whereas larger firms are predominantly foreign-owned (Jefferis, 1998). Therefore, for this sector to grow, Botswana citizens have to be economically empowered. MSMEs in Botswana account for 50% of private sector employment, 32% of all employment in Botswana (micro 14%; small 14%; and medium 4%), and 15–20% of the GDP (Jefferis, 1998).

The main constraints on the growth of MSMEs have been identified as including: lack of entrepreneurial and management skills and experience; problems of accessing finance; restrictive regulations; lack of market access; poor-quality products; lack of commitment by promoters of their business; lack of qualified mentors to oversee projects; shortage of business premises, especially for small enterprises (BIDPA, 2007; LEA, 2007; Modisane, n.d.); and lack of technology, innovation and expertise (Lal & Peedoly, 2006).

In research conducted in the South Africa's Eastern Cape Province, Chimucheka and Mandipaka (2015) identified lack of networking opportunities and lack of government support as some of the impediments to the establishment, survival, and growth of MSMEs. A study in Botswana by Sentsho Maiketso, Sengwaketse, Ndzinge-Anderson and Kayawe (2007), identified the following as key challenges for the country's SMEs (i.e., MSMEs):

- Lack of information on SME [i.e., MSME] programmes due to inadequate publicity of available SME programmes;
- Lack of effective implementation of programmes that are meant to support SME activities;
- Inadequate institutional support such as the administrative bottlenecks SMEs' encounter when they register as companies, the need for SMEs to come to Gaborone for registration, and the general high cost of factory shells for business operations;
- The limited commercial bank financial support for SMEs which makes them solely dependant of government for support;
- The inherent government procurement policy bias towards large firms limits SMEs opportunities for business development;  
SME lack of access to reliable and bigger markets which is due to their inability to produce larger output and thus satisfy large domestic and foreign markets unless they are organised into clusters. (Sentsho et al., 2007, pp. 11-12)

Because of the importance attached to the MSME sector, the Government of Botswana instituted a policy to encourage entrepreneurship and support MSME start-ups. According to Sentsho et al. (2007), the principles behind the policy are:

- Creating an enabling environment within which SMMEs [i.e., MSMEs] will flourish and grow;
- Providing an integrated approach to SMME development that ensures cohesion and linkages between the various programmes;
- Ensuring that the SMME policy is implemented effectively and assessed against measurable objectives; and
- Discouraging dependency upon government. (Sentsho et al., 2007, p. 44)

Specific objectives of the government's policy are to foster citizen entrepreneurship and empowerment; achieve economic diversification; promote exports; encourage the development of a competitive and sustainable MSME community; create sustainable employment opportunities; promote linkages between MSMEs and primary industries in agriculture, mining, and tourism; and improve efficiency in the delivery of services to businesses.

To achieve the above objectives, a number of public sector institutions have been established to support MSME development and growth in Botswana. The **Citizen Entrepreneurial Development Agency (CEDA)** provides subsidised credit, along with monitoring, mentoring, business advisory services and training, to selected citizen entrepreneurs (CEDA, n.d.).

The **Local Enterprise Authority (LEA)** is a coordinated and focused "one-stop shop" authority that provides development and support services to the local industry needs of MSMEs, encompassing training, mentoring, business plan finalisation, market access facilitation, and facilitation of technology adaptation and adoption (LEA, 2008).

The **Youth Development Fund (YDF)** is aimed at empowering youth to own businesses and to create sustainable employment opportunities for young people through the development of sustainable projects. Funding from the Youth Development Fund (YDF) is 50% grant and 50% interest-free loan of the total approved amount. It caters for out-of-school youth, marginalised youth, unemployed youth and underemployed youth (working youth earning less than P600 monthly) who are citizens of Botswana aged between 18 and 29 years (Molelu, 2010).

The **Young Farmers Fund (YFF)** provides funding to all young people (aged between 18 and 35 years) who are citizens of Botswana, and to wholly citizen-owned companies wishing to start or expand agricultural projects (Ministry of Finance and Development Planning, 2006).

The **Botswana Textile and Small Business Owners Association (BOTSBOA)** was established to create a voice for small and micro citizen enterprises from various sectors of the economy. Its principal functions include: the development of business linkages between the MSMEs and larger enterprises; to coordinate linkages between businesses and the government; and to facilitate the purchase of raw materials that would have been difficult for the small businesses to acquire and to



supply them to the MSMEs at reduced prices. Membership to BOTSBOA is open to small and medium-scale entrepreneurs of all sectors, i.e. small business owners (Government of Botswana, n.d.).

The **Botswana Innovation Hub (BIH)** is based on four main principles: orientation to high-tech customers; flexibility; ample common-use premises/shared facilities; and the use of environmentally friendly technologies. One principal area of support of BIH to businesses is in the acquisition of business space particularly to small businesses. The BIH management services include: advanced telecommunications infrastructure and services; modern and fully equipped meeting and conference facilities; human resources services; reception and help desk; professional facilities management; security and access control; telephone; cleaning; mail; cafeteria; and catering. Other services are: furniture leasing; removal services; travel services; transportation; shipping agency; courier services; and short-term legal advisory services (Government of Botswana, n.d.).

The BIH operates a science and technology park to aid in diversifying the economy and transforming Botswana into a knowledge-economy, promoting research, development, education and innovation, supporting start-ups and existing companies, and attracting companies, universities, research institutes and advanced training institutes to join BIH (BITC, n.d.). But it is not clear to what extent the BIH has been of help to MSMEs.

In addition, there are private sector institutions which support MSME development—including commercial banks and micro-finance institutions—and also non-government organisations (NGOs) such as the Women in Business Association (WIBA) Botswana. Sentsho et al. (2007) recommend that the government should intervene by putting in place policies and legislation that can promote a developmental relationship between big businesses (and relevant private sector MSME support institutions) and MSMEs.

Despite the support given to MSMEs by the government, private sector institutions, and NGOs, the MSME sector in Botswana is weak. It is estimated that 80% of small enterprises in Botswana cease trading within five years of start-up (Jefferis, 1998; Modisane, n.d.), while the average lifespan of most small businesses is 6.7 years (Okurut, Ama & Mokoodi, 2015).

### **C. MSMEs and Open Collaborative Innovation**

Innovation has been defined by the World Economic Forum (2015) as the successful commercialisation of novel ideas, including the products, services, processes and business models which are a critical component of economic growth. It drives growth in two ways: through the introduction of new or improved products or services that tap into existing or latent demand in the market, thereby creating additional value for enterprises and consumers; and by increasing the productivity of firms employing such innovations. Through open innovations businesses are able to cut production costs, as well as improve their products and be able to access new markets that would have been difficult for them to reach (Sørensen & Torfing, 2012).



According to Chesbrough, Vanhaverbeke and West (2006), open innovation is “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation” (p. 1). This means that with open innovation, all knowledge (internal knowledge as well as external knowledge) can find its way to commercialisation for existing or new markets by crossing a firm’s boundary (Ahn, Minshall & Mortara, 2015). Chesbrough et al. (2006) also point out that open innovation is “a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology” (p. 1). They also state that “Open innovation combines internal and external ideas into architectures and systems whose requirements are defined by a business model” (p.1).

Friedman and Angelus (n.d.) define collaborative innovation as an open innovation strategy that enables consumer packaged goods manufacturers and retailers to partner for profit, and provide shoppers and consumers with more innovative offerings. Successful open innovation partnerships can enable the discovery of new and meaningful ways to satisfy the customer and consumer in a way that builds bottom line results for all value chain partners. The Kalypso White Paper (Friedman & Angelus, n.d.) states that, while many companies are claiming to innovate collaboratively, the correct initiatives are not in place, and the right degree of due diligence is often missing.

Open collaborative innovation, according to Ramírez’s (2016) conceptualisation, allows for the utilisation of external ideas from different inter-institutional and transdisciplinary entities, and looks towards the common goal of providing practical solutions to business challenges that arise in a globalised world. It has been suggested that MSME difficulties can be overcome by open collaborative innovation whereby the young businesses and bigger firms complement one another for mutual benefit through openness in business dealings—such as the sharing of information about a project, tasks to be done, how the work and responsibilities are to be divided between different sites, and expected quality (World Economic Forum, 2015). Such collaborative interactions can facilitate trust-based circulation and cross-fertilisation of new and creative ideas, and will ensure a broad-based assessment of potential risks, the benefits accruable and the selection of the most promising ones (Sørensen & Torfing, 2012). On the entrepreneurs’ side, Bannerjee, Bielli and Haley (2016) found that three-quarters of the start-ups and scale-ups of MSMEs which had collaborated with corporates reported their experience to be beneficial. It is also clear that in many start-ups and scale-ups, those running the MSMEs hope not only to have large firms as customers but also to gain through them other benefits, including visibility and enhanced publicity and reputation, business development (entering new markets or gaining new customers), and gaining market knowledge or access to key contacts (Bannerjee et al., 2016).

#### **i. Types of Collaborative Innovation**

Clarkson (2014) has identified four types of MSME collaborative innovation: innovation community; innovation mall; elite circle; and consortium.

An **innovation community** is an open, flat mode of collaboration. It represents a community in which individuals identify problems, solutions are individually provided, and decisions are taken on

which of the solutions to develop. One of the best examples of this is Linux open source software, where a community of people discusses problems and solutions and develops software to fix the problems.

As the name implies, an **innovation mall** is open and hierarchical. In this type of collaboration, the openness comes from individuals or participants being given a chance to participate in providing solutions to a problem that a company has identified and posted. The hierarchical nature of the collaboration is that it is the company that makes the final decision about which ideas to develop. A good example of this is InnoCentive.com, where companies can crowdsource innovation solutions to business, social, policy, scientific and technical challenges (Clarkson, 2014).

The **elite circle** mode of collaboration is closed and hierarchical. The collaboration is usually between a company and a select group of participants who work on a problem defined by the company. However, the final solution is chosen by the company. An example of this is Alessi's handpicked group of 200 design experts who developed new home products for the brand (Clarkson, 2014).

The **consortium** is a closed, flat collaboration. The closed nature of this collaboration type arises from the fact that the problems to be solved are selected by a group of participants jointly. The group also decides on the modalities to use to work on the problems, and collectively decides on the appropriate solutions. IBM's partnerships with select companies to jointly develop semiconductor technologies are good examples of the consortium (Clarkson, 2014).

## ii. Knowledge-Sharing in Open Collaborative Innovation

Knowledge-sharing can be considered a main driver of successful collaborative innovation. Collaborative innovation combines knowledge inflows and outflows and is thus at the core of open innovation. The various businesses/individuals that collaborate are able to gain new knowledge and insights which they can use in transforming their current businesses to achieve competitive advantage (Moustaghfir & Schiuma, 2013). Boer (2005) defines knowledge-sharing as the "collective understanding as well as the ability to transform this understanding into actions and skills" (p. 1). Boer identified a set of possible reasons for the lack of knowledge-sharing as:

characteristics of knowledge such as its tacitness; characteristics of the sender such as the workload of the sender; characteristics of the receiver such as one's absorptive capacity; characteristics of their relationship such as the level of trust, and characteristics of the organisational context such as the communication infrastructure and the media richness of the information and communication technologies. (Boer, 2005, p. 4; see also Karlsson & Rodriguez, 2015)

## iii. Networks

Networks play a significant role in the acquisition of resources in any organisation and have the potential to allow resource flow between resource-rich and resource-poor environments. Part of government support to MSMEs should be in encouraging networking among themselves at the early stages of the operation of the businesses through the provision of correct information and

raising awareness about networking opportunities and benefits, and even facilitate the search for partnerships. Once networks are in place, an additional role of governments should be to make sure that such networks remain open to new participants and that they do not distort markets (OECD, 2004).

#### **iv. Issues and Challenges in Open Collaborative Innovation**

MSMEs have continued to rely on their internal ability and resources to be innovative and to sustain their competitive advantage. However, it has been found that the average success rate of these innovative efforts tends to be much lower than desirable because of high risk level, complexity and uncertainties (Parida, Westerberg & Frishammar, 2012). The importance of collaboration between MSMEs and other organisations in an open innovation model, in order to promote innovation processes, has been emphasised by a number of authors and policymakers (Chesbrough, 2010; Rahman & Ramos, 2010; 2014).

One essential ingredient in the open innovation environment is trust among the collaborative partners (Graser & Jansson, 2005; Grudzewski, Hejduk & Sankowska, 2008). To trust is to have faith in the honesty, integrity, reliability, and competence of the others in the partnership (Ciesielska & Iskoujina, 2012; Lin, 2011; Ratnasingam, 2013). Other challenges faced by firms when developing open collaborative innovation relationships are:

- the ability to identify appropriate knowledge sources;
- the exploration and choice of collaborating partners who will create value for the firm (Naqshbandi & Kaur, 2011);
- questions about intellectual property (IP) and IP ownership, and the fact that large organisations typically want to own more of the value chain, particularly with regard to R&D;
- sufficient motivation for organisations to opt for collaborative relationships; and
- the complex agreements and the number of people involved from participating organisations—which might, for example, include R&D teams and legal and financial experts from various geographically dispersed locations (INOVA, n.d.).

Saunière, Leroyer, Boudin and Jean (2013) have identified a number of key IP-related challenges for partners involved in collaborative innovation, as follows:

- How to define the scope of collaboration?
- How to manage IP rights and know-how existing prior to the project?
- How to attribute IP created through collaborative work to partners?
- How to distribute the ownership and use of the IP generated?
- How to manage the strategic issues that differ according to the nature of the stakeholders?
- How to put a value on the contributions of partners?
- What is the right moment to determine the value of these contributions?
- How to manage the future value of the results of the collaborative work and distribute the potential gains? (Saunière et al., 2013, p. 8)

## III. The Study

As stated above, our study therefore explored how MSMEs in Botswana have been able to enhance and scale-up their enterprises through open collaborative innovation modalities.

### A. Research Objectives

The specific objectives of the study were to:

- explore the extent to which MSMEs in Botswana have engaged in open collaborative innovation as a means to enhance and scale-up their businesses;
- determine the challenges faced by the MSMEs in embracing open collaborative innovations;
- determine the types of networks the MSMEs engage in for the purposes of open collaborative innovation;
- determine the extent to which institutional policies and operational procedures have enhanced or constrained open collaborative innovation and scale-up of MSMEs;
- explore how the adoption of open collaborative innovation is influenced by the status of MSMEs (in terms of size of enterprise, legal status of the enterprise, membership of networks, period when enterprises were started, and number of years of existence of the business); and
- examine how the application of IP rights impacts on open collaborative innovation and scaling-up of the MSMEs.

### B. Research Methodology

#### i. Coverage

Three cities in Botswana, namely Gaborone, Francistown and Lobatse, and their environs were selected for the study. These three cities and their environs represent the busiest areas, in terms of formal and informal businesses, and include the various types of firms (small, micro, and medium-sized enterprises) involved in the study.

The distinction between formal and informal businesses in this work is in terms of their legal status. Thus, while formal businesses are registered and have operating licences, informal businesses are unregistered. The study focused on three possible types of open collaborative innovation: between formal and informal enterprises; between formal and formal; and between informal businesses.

#### ii. Sampling Design and Sample Size

Raosoftware (2004), a sample-size calculator, shows that a statistically appropriate sample size for a population of over 56,450 MSMEs at 95% confidence interval and allowing an error margin of 5%, would be 382. The firms studied consisted of 50,000 micro enterprises, 6,000 small enterprises and 450 medium-size enterprises, totalling 56,450. However, because of the limited budget and short duration of the study, the sample size was reduced to 200. The study used cross-sectional design and employed stratified random sampling in selecting a sample of 100 micro-scale enterprises, 75 small-scale enterprises and 25 medium-scale enterprises for the study.

Included in the interviews were key informants from some of the institutions (in both the public and private sectors) that were engaged in the promotion of development and growth of MSMEs in Botswana, such as: the Local Enterprise Authority (LEA); the Department of Industrial Affairs (DIA); the Department of Vocational Education and Training (DVET); the Botswana Bureau of Standards (BOBS); the Botswana Chamber of Commerce Industry and Mines (BOCCIM); Women in Business Associations (WIBA); and the Youth Development Fund (YDF). The sampling of MSMEs in the survey took into account the ownership structure (female-owned or male-owned), and the main sector of each enterprise (trade, services, agriculture, manufacturing). A simple random sampling technique was used to draw the enterprises to be studied within each of the enterprise types.

### **iii. Data Sources**

Four types of data source were used, namely: documentary review; MSME survey data; key informant interviews; and focus group discussions.

The documentary review focused on key documents from institutions—documents such as annual operational reports, business plans, and their strategies to enhance collaborative innovations among enterprises. The specific objectives of the documentary review and institutional survey were to: establish which open collaborative innovations these institutions have adopted; the challenges they faced in helping enterprises implement open collaborative innovations; the benefits to the enterprises emanating from the open collaborative innovations; what should be done to enhance open collaborative innovations among enterprises; and measures to protect intellectual property rights in the collaborative innovations. These issues were pursued further through key informant interviews and focus group discussions with the representatives of the institutions, using an interview guide.

The next data source was the survey of enterprises (micro, small, and medium), in both formal and informal sectors, using structured questionnaires. The key issues captured from the interviews included:

- interviewees' perceptions about open collaborative innovations;
- their experiences with open collaborative innovation initiatives (e.g., number of years in collaboration, form of collaborations—formal with informal or formal with formal);
- the benefits of collaborative innovations to the enterprises (in terms of scaling-up the businesses, e.g., number and type of people employed, hiring process used to find the best professionals to take the business to the next level, motivation of staff, communication effectiveness, recognition and reward of achievement, provision of tools and training to staff, creation of strategic plans—including strengths, weaknesses, opportunities and threats to the business, company core-values and mission, setting goals for each quarter and year, relationship with experts in scaling-up, and profit);
- the cost of these collaborative innovations to the enterprises;
- what should be done to enhance collaborative innovations; and
- any intellectual property violations in the open collaborative innovations adopted.

These same issues were also covered in the focus group discussions with selected enterprise owners.

#### **iv. Data Collection**

Trained research assistants administered the questionnaires to the owners or managers of the enterprises in their offices. They explained the purpose of the study to the participants, assured them of confidentiality of information supplied and anonymity of participating individuals. The participants were further informed that participation in the study was voluntary, that there would be no payment for participation, and that they could leave the study anytime they desired. Those who agreed to participate were requested to sign a consent form before the interviews were started. One focus group discussion was conducted in Gaborone where 10 key informant interviews were conducted, using a semi-structured interview guide.

The questionnaire was developed with the help of the Oslo Manual (OECD & Eurostat, 2005). At the end of the data collection, 206 fully completed questionnaires were returned—six more than the proposed sample size of 200.

#### **v. Data Analysis**

The qualitative information was transcribed and analysed thematically, using content analysis. Triangulation of the data arising from the documentary evidence and the quantitative data was conducted—so that a research report could be written on the role played by institutions in promoting open collaborative innovations in the development and growth of the MSMEs. Triangulation is the mixing of data types or methods so that diverse viewpoints or standpoints can cast light onto the topics. When a study involves the use of both quantitative and qualitative methods, the analyses of the qualitative and quantitative components have to be integrated to explain the results of the study (Oslen, 2004). The quantitative data were analysed using the SPSS statistical software. It made use of descriptive statistics—for example, percentages, means and correlation coefficients—as well as inferential statistics, such as t-tests of significance of the reasons given for not adopting open collaborative innovation. A logistic regression model was fitted to show how participation in open collaborative innovations is influenced by the status of enterprises, namely size of the enterprise, legal status of the enterprise, membership of networks, and years of existence of businesses.

#### **C. Ethical Issues**

Before execution, the study was approved by the University of Botswana Institutional Review Board (IRB) and the Ministry of Trade and Industry research committee.

#### **D. Stakeholders**

The stakeholders were comprised mainly of institutions that support the development of MSMEs in Botswana, such as the Local Enterprise Authority (LEA); the Citizen Entrepreneurial Development Agency (CEDA); the Youth Development Fund (YDF); and the Young Farmers Fund (YFF); as well as commercial banks; microfinance institutions; and NGOs—the Women in Business Association Botswana (WIBA) and the Botswana Innovation Hub (BIH).



## IV. Findings and Analysis

### A. Characteristics of the Enterprises

Table 1 shows the characteristics of the sampled respondents from the different businesses. Males constituted just under half of the respondents (49%). The level of education attained by the highest number of respondents was secondary school (31.6%), followed by undergraduate degree (19.4%), vocational/technical (18.4%), and postgraduate degree (13.1%). Professional qualifications accounted for 5.8%, while 8.7% had primary education, and 2.9% had no formal education. Over half of the respondents (54.9%) were owner managers, and 17.5% were managing directors, while 13.1% were owners of businesses. A little less than half the respondents (44.7%) were single (never married), with other categories being, married (37.4%), separated (4.4%), divorced (5.3%), widowed (1.9%), and cohabiting (6.3%).

*Table 1: Characteristics of the MSMEs (see, also, Ama and Okurut (2017))*

Characteristics of respondent		Number	%
Sex of respondent	Male	101	49.0
	Female	105	51.0
Highest level of education	Primary level	18	8.7
	Secondary level	65	31.6
	Undergraduate degree	40	19.4
	Postgraduate degree	27	13.1
	Vocational/Technical	38	18.4
	Professional qualification	12	5.8
	Non-formal education	6	2.9
Position/role in the enterprise	Owner-manager	113	54.9
	Owner	27	13.1
	Managing director	36	17.5
	Other	30	14.5
Marital status of respondent	Single	92	44.7
	Married	77	37.4
	Separated	9	4.4
	Widowed	4	1.9
	Divorced	11	5.3
	Cohabiting	13	6.3
Year the business started	1980–1989	3	1.5
	1990–1999	9	4.4
	2000–2009	58	28.2
	2010–2017	136	66
District	Gaborone	90	43.7
	Lobatse	45	21.8
	Francistown	71	34.5



Physical location of enterprise	Backyard	9	4.4
	Premises subsidised by government/public agencies	9	4.4
	Own premises	37	18.0
	Rented premises from private sector	108	52.4
	Free premises offered by friend/relative	8	3.9
	Open market	23	11.2
	Industrial site	8	3.9
	Mobile	4	1.9
Legal status of registered business entity	Sole proprietorship	97	47.1
	Partnership	25	12.1
	Cooperative	2	1.0
	Limited private company	26	12.6
	Society/Group	5	2.4
	Other	51	24.8
Best description of the sector in which business operates	Manufacturing	18	8.7
	Transport and communication	8	3.9
	Construction services	15	7.3
	Wholesale/Retail trade	85	41.3
	Agriculture	72	35.0
	Other	8	3.9
How business originated	Linkage to an existing business	30	14.6
	Inherited family business	26	12.6
	Bought an existing business	19	9.2
	Managers buying the business	15	7.3
	Completely new start-up	116	56.3
Classification of business growth	Business in seed stage	10	4.9
	Business in start-up stage	50	24.3
	Business in growth stage	94	45.6
	Business in maturity stage	36	17.5
	Business in decline stage	16	7.8

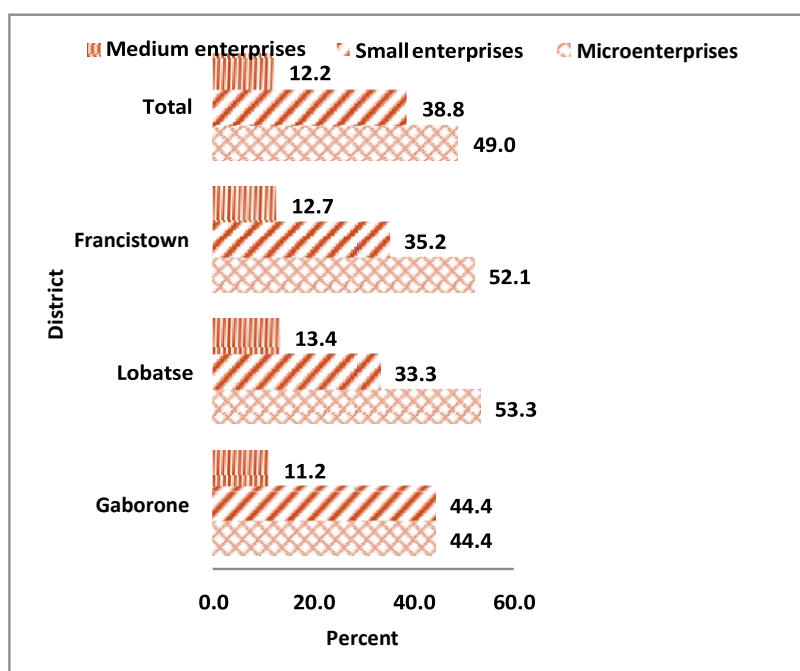
As seen in Table 1, the majority of the businesses (66%) had started between the years 2010 and 2016, while 28.2% had started between the years 2000 and 2009, and the rest (5.9%) began between 1980 and 1999. More than half the businesses (52.4%) were located in premises rented from the private sector. Others were located in their own premises (18%), in an open market (11.2%), in “backyard” premises (4.4%), in premises subsidised by government or public agencies (4.4%), at an industrial site (3.9%), or in free premises offered by friend or relative (3.9%). Close to half of the businesses (47.1%) were sole proprietorship, with others being limited private company (12.6%), partnership (12.1%), and an unclassified remainder of 24.8%. The descriptions of the sectors in which the businesses operate were: wholesale or retail trade (41.3%), agriculture (35%), manufacturing (8.7%), construction (7.3%), and transport and communication (3.9%). A majority of

the businesses (56.3%) were start-ups. Others originated as linkage to an existing business (14.6%), inherited family business (12.6%), buying an existing business (9.2%), or managers buying the business (7.3%). Most of the businesses could be classified as in the growth stage (45.6%), followed by those in the start-up stage (24.3%), and those in the maturity stage (17.5%).

## B. Distribution of Studied Enterprises by Districts

Figure 1 shows that 49% of the studied businesses were micro enterprises, while 38.8% were small enterprises and only 12.2% were medium enterprises. Of the enterprises studied in Gaborone, 44.4% were either micro or small enterprises, while 11.2% were medium. In Lobatse district, a little more than half (53.3%) were micro enterprises, while 33.3% were small and 13.4% medium enterprises. A similar distribution of enterprises was found in Francistown, namely micro 52.1%, small 35.2% and medium enterprises 12.7%.

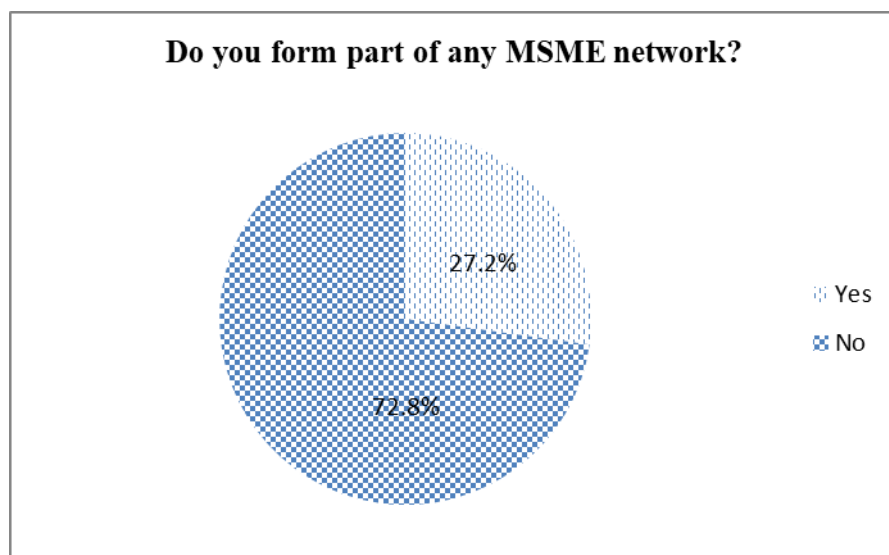
Figure 1: Distribution of Enterprises by Districts



## C. Enterprises' Membership in Networks

In this study, the enterprise respondents were asked whether they belonged to any networks. The responses shown in Figure 2 reveal that only 27.2% (n = 56) belonged to networks, while 72.8% (n = 150) did not belong to any network.

Figure 2: Enterprises' Participation in Networks



#### i. Reasons for Not Belonging to a Network

The main reasons given (aggregating “strongly agree” and “agree”) by the respondents for their enterprise not belonging to any network were that they were not aware of any MSME-business networks which represented their interests (48.7%), and that there were no MSME-business networks that could represent their enterprise (44.6%). Yet others felt that services provided by networks do not suit their needs (38.6%) (Table 2).

Table 2: Reasons for Not Belonging to a Network

Reasons for not belonging to a network	Strongly disagree		Disagree		Neither agree nor disagree		Agree		Strongly agree	
	Number	%	Number	%	Number	%	Number	%	Number	%
There is no MSME/business network that can represent the enterprise	14	9.3	15	10	54	36.0	32	21.3	35	23.3
Services provided by MSME/business network do not suit our needs	28	18.7	19	12.7	45	30.0	29	19.3	29	19.3
Low effectiveness of the MSME/business network in providing benefits to its members	11	7.3	13	8.7	71	47.3	31	20.7	24	16.0

Not aware of any MSME/business networks which represent my/our interests	13	8.7	35	23.3	29	19.3	28	18.7	45	30.0
It makes no difference for us/me to be or not to be part of any business networks	28	18.7	19	12.7	47	31.3	24	16.0	32	21.3
High membership fee	15	10.1	13	8.8	91	61.5	18	12.2	11	7.4

## ii. Reasons for Belonging to a Network

Respondents whose enterprises did belong to a network gave their main reasons (aggregating “strongly agree” and “agree”) for this as being: to gain access to marketing platform/networking (87.7%); to get advice from the networks (87.7%); to obtain information on available facilities (87.7%); and to get information on changing legislations (82.5%). To influence or lobby policymakers was rather less important (66.6%) (Table 3).

*Table 3: Reasons for Belonging to a Network*

Reasons for belonging to a network	Very unimportant		Not important		Neutral		Important		Very important	
	Number	%	Number	%	Number	%	Number	%	Number	%
To get information on changing legislation	4	7.0	2	3.5	4	7.0	29	50.9	18	31.6
To obtain information on available facilities	2	3.5	1	1.8	6	10.5	13	22.8	35	61.4
To get advice provision	2	3.5	3	5.3	2	3.5	11	19.3	39	68.4
To access marketing platform/networking	2	3.5	1	1.8	4	7.0	11	19.3	39	68.4
To get accreditation or kudos acquired through membership	3	5.3	4	7.0	9	15.8	14	24.6	27	47.4
To access available social opportunities	3	5.3	5	8.8	16	28.1	12	21.1	21	36.8

To access available network/experience and expertise sharing among members	2	3.5	4	7.0	10	17.5	12	21.1	29	50.9
To influence policymakers/lobbying	4	7.0	5	8.8	10	17.5	17	29.8	21	36.8
To benefit from technical assistance	2	3.5	5	8.8	5	8.8	24	42.1	21	36.8

### iii. Satisfaction with Networks and Utility of Networks to MSMEs

Among the respondents with enterprises that had participated in networks, the areas they were most satisfied with (“strongly satisfied” or “satisfied”) were the advice provided by the network (79%), and market platform and services (70.2%). The majority of the respondents were satisfied that their personal networks had been useful in the development of their enterprise (80%); helped a lot in the establishment of the MSMEs (76.4%); and felt their personal (informal) networks were more efficient than institutional networks (76.3%). However, they were dissatisfied with the accreditation acquired through their membership (42.8%), and with policy advocacy and lobbying (42.1%) (Table 4).

Table 4: Satisfaction with Networks and Utility of Networks to MSMEs

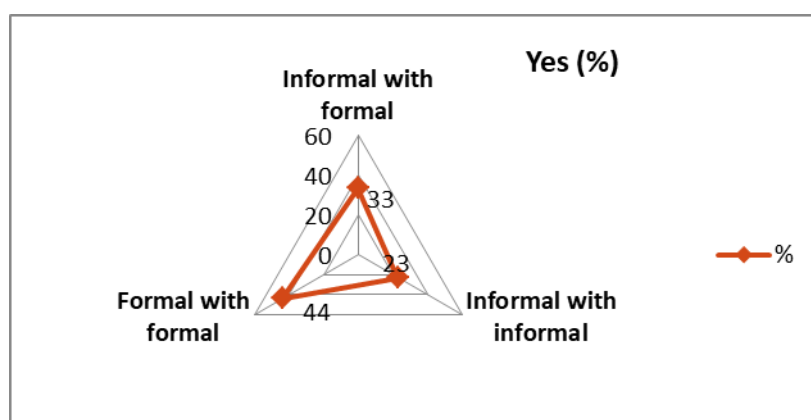
Satisfaction with networks and utility of networks to MSMEs	Strongly dissatisfied		Dissatisfied		Neither satisfied nor dissatisfied		Satisfied		Strongly satisfied	
	Number	%	Number	%	Number	%	Number	%	Number	%
Information on changing legislation	3	5.3	6	10.5	24	42.1	17	29.8	7	12.3
Information on available facilities	2	3.5	5	8.8	24	42.1	13	22.8	13	22.8
Advice provision	3	5.3	1	1.8	8	14	36	63.2	9	15.8
Marketing platform/services	3	5.3	3	5.3	11	19.3	29	50.9	11	19.3
Accreditation or kudos acquired through membership	5	8.9	19	33.9	10	17.9	18	32.1	4	7.1
Availability of social opportunities	2	3.5	4	7	24	42.1	18	31.6	9	15.8
Availability of network/experience and expertise sharing among members	3	5.3	4	7.0	22	38.6	18	31.6	10	17.5
Policy advocacy/lobbying	5	8.8	19	33.3	6	10.5	17	29.8	10	17.5
Technical assistance	6	10.5	3	5.3	22	38.6	15	26.3	11	19.3
My personal networks have helped a lot in the establishment of the MSME	4	7.3	4	7.3	5	9.1	9	16.4	33	60
My personal networks have helped a lot in the development of the MSME	4	7.3	2	3.6	5	9.1	25	45.5	19	34.5

My personal networks have helped a lot in addressing problems that I have faced in the MSME development cycle	4	7.3	9	16.4	3	5.5	27	49.1	12	21.8
Personal (informal) networks are more efficient than institutional networks	3	5.5	3	5.5	7	12.7	29	52.7	13	23.6
I make use of personal networks because formal/institutional ones are too bureaucratic	4	7.3	17	30.9	11	20	12	21.8	11	20

#### D. Open Collaborative Innovation

Regarding the question of whether the enterprises had ever been engaged in any form of open collaborative innovation, only 18.9% (n = 39) of the answers were in the affirmative, while 81.1% (n = 167) had never engaged in open collaborative innovation. Of the 39 enterprises that had entered into open collaborative innovation, 44% were formal enterprises collaborating with other formal enterprises; 33% were informal enterprises collaborating with formal enterprises; and 23% were informal enterprises collaborating with other informal enterprises (Figure 3).

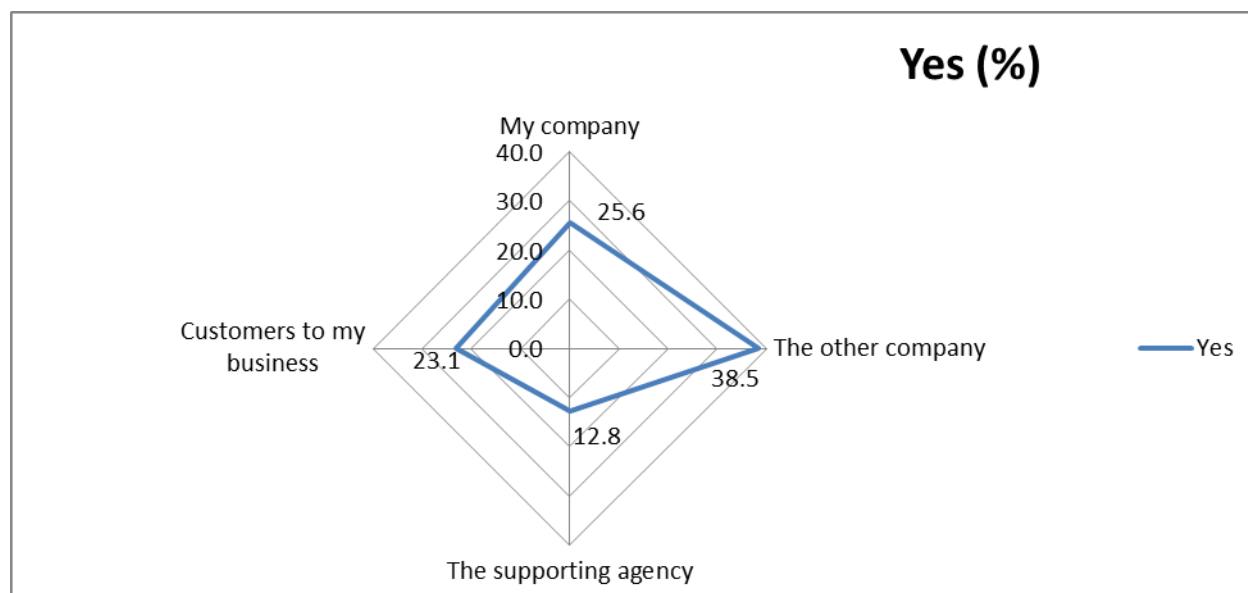
Figure 3: Forms of Open Collaborative Innovation



Source: Ama and Okurut (2017, p. 94)

Figure 4 shows that about a quarter (25.6%) of the open collaborative innovation projects were initiated by the respondents' companies, and 23.1% of them were initiated by customers to the business, with figures of 38.5% for "the other company" and only 12.8% for supporting agencies.

Figure 4: Initiation of Collaborative Projects



#### i. Types of Open Collaborative Innovation

The enterprises were asked what type of open collaborative innovations they were engaged in. The responses show that 60% were engaged in product (goods and services) innovation, while 22% constituted a consortium, with lower figures for innovation community (16%), innovation mall (8%), elite circle (5%), and process innovation (3%) (Figure 5).

Figure 5: Types of Open Collaborative Innovations Engaged in (n = 37)

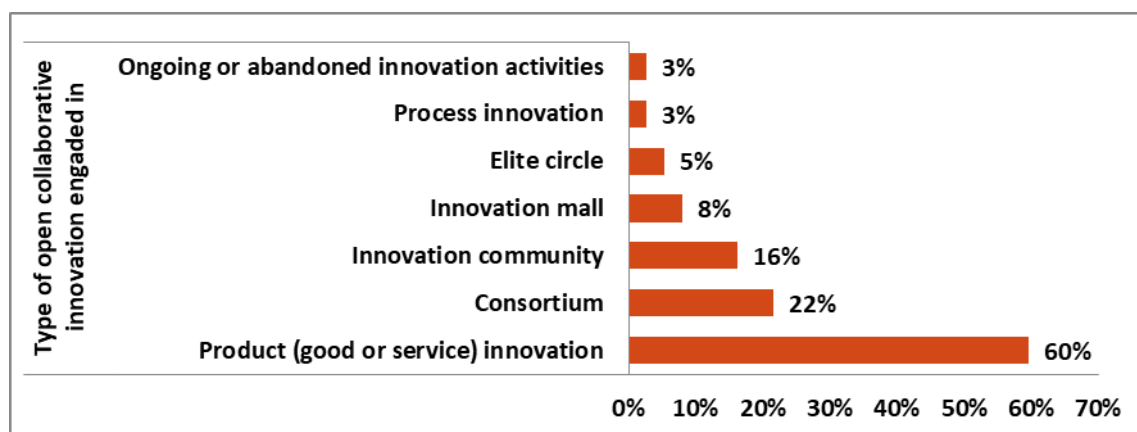
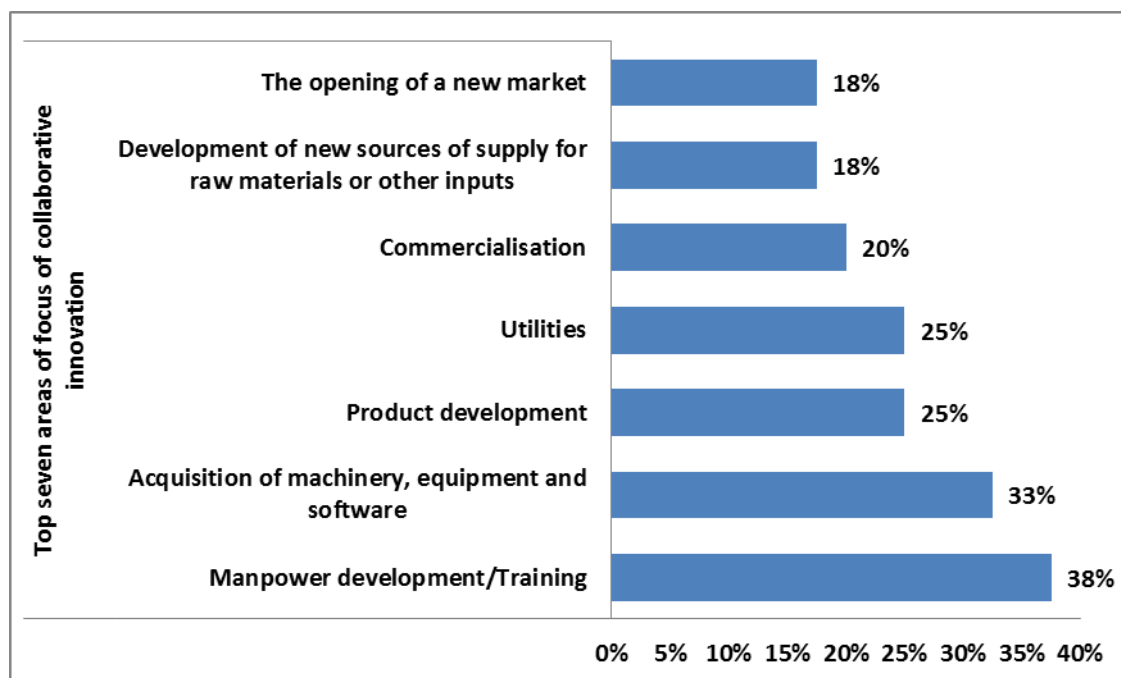


Figure 6 shows the top seven areas of focus of the open collaborative innovation (innovation activities) engaged in by the MSMEs. Manpower development and training (38%) topped the list; followed by acquisition of machinery, equipment and software (33%); product development (25%); utilities (25%); and commercialisation (20%). Development of new sources of supply of raw materials or other outputs (18%) and the opening of a new market (also 18%), were of less importance.



Figure 6: Top Seven Areas of Collaborative Innovations (n = 39)



A closer look into different industry sectors indicates that open collaborative innovation was most widely adopted in wholesale and retail trade (35.9%); followed by agriculture (23.1%); manufacturing (15.4%); construction (12.8%); and transport (5.1%) (Figure 7).

Figure 7: Adoption of Open Collaborative Innovation across Enterprises (n = 39)

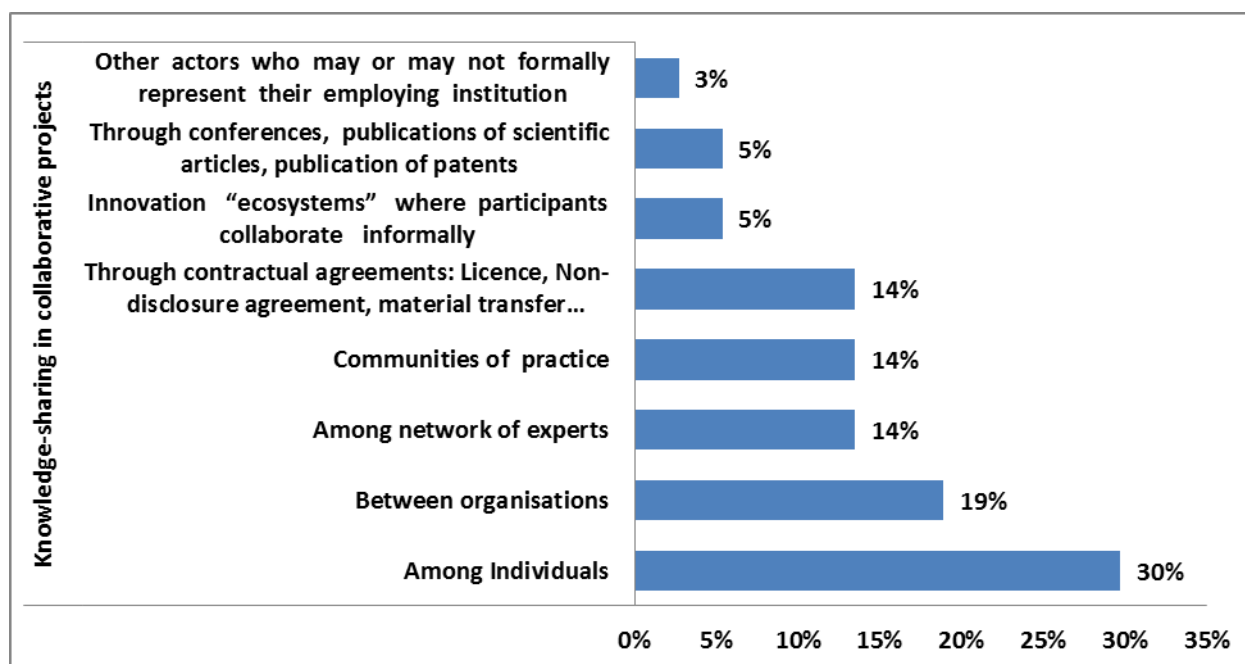


## ii. Knowledge-Sharing in Open Collaborative Innovation

The respondents were asked what methods they used in knowledge-sharing in the open collaborative innovation projects. The results, shown in Figure 8 reveal that knowledge-sharing between individuals within the projects topped the list at 30%; followed by sharing knowledge

between organisations (19%); among a network of experts (14%); within a community of practice (14%); and through contractual agreements (14%).

Figure 8: Knowledge-Sharing in Collaborative Projects



### E. Challenges Faced by MSMEs in Embracing Collaborative Innovations

The respondents were asked to state how important certain defined variables were to them in terms of hampering their innovation activities, using the following scale: 1 = Not important; 2 = Important; and 3 = Very important. To underscore the significant factors hindering the embracing of collaborative innovation, the factors listed as “important” and “very important” were aggregated and those with a combined percentage above 50% were deemed to be the critical challenges. It was found that the cost, market and knowledge factors significantly affected the adoption of collaborative innovations. The cost factors included: lack of internal funds within the enterprise; lack of finance from sources outside the enterprise; high cost of collaborative innovations to the enterprises; and “free-rider” effects. The knowledge factors included: lack of qualified personnel; lack of information on technology; lack of information on markets; and difficulty in finding cooperation partners for innovation. The market factors included: markets dominated by established enterprises; and uncertain demand for innovative goods or services.

An exploratory factor analysis was also carried out, and four factors were identified as challenges to open collaborative innovations, namely: (1) networking; (2) financial support; (3) market demands; and (4) previous innovation experiences (see, also, Ama and Okurut (2017)).

### i. Networking (F1)

Networking involved six variables. The first was difficulty in finding cooperation partners for innovation, with a factor loading of 0.785, which represented the strength of the relationship between the variable and the factor (construct or component). Other variables were: lack of information on technology (0.716); violation of intellectual property rights (0.636); high cost of these collaborative innovations (0.597); free-rider effects (0.577); and lack of qualified personnel (0.517). Together, these variables accounted for 38.02% of the total variance.

### ii. Financial Support (F2)

This involved three variables: lack of finance from other sources outside the enterprise, with a factor loading of 0.876; lack of funds within the enterprise or group (0.820); and lack of information on markets (0.638). Together, these variables accounted for 11.95% of the total variance.

### iii. Market Demands (F3)

This factor (construct) involved two variables: market dominated by established enterprises, with a factor loading of 0.825; and uncertain demand for innovative goods or services (0.763). Together, these variables accounted for 10.34% of the total variance.

### iv. Previous Innovation Experiences (F4)

This factor involved two variables: “No need” because there are no demands for innovation, with a factor loading of 0.864; and “No need” due to prior innovations (0.669). Together, these variables accounted for 8.57% of the total variance.

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy with a value of approximately 0.7 (good) shows that we can be confident that the sample size is adequate for factor analysis. The Bartlett’s measure tests the null hypothesis that the original correlation matrix is an identity matrix against the alternative that it is not an identity matrix. There are some relationships between the variables that are in the analysis. The Bartlett Test is significant ( $p < 0.01$ ), showing that the variables are highly correlated, lending themselves as suitable for factor analysis.

The four factors (constructs) accounted for 68.88% of the total variance.

*Table 5: Factor Analysis of Factors Acting as Challenges to Open Innovation (see, also, Ama and Okurut (2017))*

Variables	Factors			
	Networking (F1)	Financial support (F2)	Market demands (F3)	Previous innovation experience (F4)
Difficulty in finding cooperation partners for innovation	0.785			
Lack of information on technology	0.716			
Violation of intellectual property rights	0.636			
High cost of these collaborative innovations to the enterprises	0.597			
Free-rider effects	0.577			
Lack of qualified personnel	0.517			
Lack of finance from sources outside your		0.876		

enterprise				
Lack of funds within your enterprise or group		0.820		
Lack of information on markets		0.638		
Market dominated by established enterprises			0.825	
Uncertain demand for innovative goods or services			0.763	
No need because of no demands for innovation				0.864
No need due to prior innovations				0.669
% variance accounted for	38.02	11.95	10.34	8.57
Kaiser-Meyer-Olkin Measure of Sampling Adequacy			0.7	
Bartlett's Test of Sphericity			df = 78	sig. = 0.000

Table 6 shows the models for the four constructs (factors).

$$\text{Networking } (F_1) = -0.195X_1 - 0.101X_2 + 0.232X_3 + 0.163X_4 + 0.142X_5 + 0.251X_6 + \dots + 0.282X_{13} \quad (1)$$

$$\text{Financial support } (F_2) = 0.349X_1 + 0.414X_2 + 0.119X_3 + 0.089X_4 + 0.082X_5 + 0.058X_6 + \dots - 0.306X_{13} \quad (2)$$

$$\text{Market demands } (F_3) = 0.074X_1 - 0.086X_2 - 0.251X_3 - 0.101X_4 + 0.016X_5 - 0.024X_6 + \dots + 0.169X_{13} \quad (3)$$

$$\text{Previous innovation experience } (F_4) = 0.105X_1 - 0.088X_2 - 0.015X_3 + 0.114X_4 - 0.026X_5 - 0.105X_6 + \dots + 0.086X_{13} \quad (4)$$

The factor score or beta coefficient indicates the level of relationship between a factor (construct) and the various variables. Thus in equation 1, the networking factor has a negative relationship with both lack of funds within the enterprise ( $X_1$ ) and lack of finance from sources outside the enterprise ( $X_2$ ) and positive relationship with high cost of collaborative innovations to the enterprises.

*Table 6: Models for the Different Constructs (see, also, Ama and Okurut (2017))*

Variables	Factors				
	Networking	Financial support	Market demands	Previous innovation experience	Variable names
Lack of funds within the enterprise or group	-0.195	0.349	0.074	0.105	$X_1$
Lack of finance from sources outside the enterprise	-0.101	0.414	-0.086	-0.088	$X_2$
High cost of collaborative innovations to the enterprises	0.232	0.119	-0.251	-0.015	$X_3$
Free-rider effects	0.163	0.089	-0.101	0.114	$X_4$
Lack of qualified personnel	0.142	0.082	0.016	-0.026	$X_5$
Lack of information on technology	0.251	0.058	-0.024	-0.105	$X_6$
Lack of information on markets	0.051	0.197	0.109	-0.122	$X_7$
Difficulty in finding cooperation partners for innovation	0.373	-0.187	0.057	-0.167	$X_8$
Market dominated by established enterprises	-0.081	-0.059	0.5	0.01	$X_9$
Uncertain demand for innovative goods or services	-0.043	-0.029	0.464	-0.107	$X_{10}$
No need due to prior innovations	0.104	0.031	-0.274	0.497	$X_{11}$
No need because of no demands for innovation	-0.171	-0.079	0.101	0.683	$X_{12}$
Violation of intellectual property rights	0.282	-0.306	0.169	0.086	$X_{13}$

## F. Reasons for Not Being Involved in Open Collaborative Innovations

The respondents from enterprises that had never been involved in open collaborative innovations were asked for the reasons for not being involved, and the responses were coded: 1 = Not important; 2 = Important; 3 = Very important; and 4 = Of great importance. When the mean responses to the original coding were calculated and tested for significance, the top six reasons given (Table 7 below), based on the mean responses, were:

- problems with slow decision-making on the corporate side (mean 2.491; with standard error 0.055);
- lack of appropriate structure, organisational culture or internal processes (mean 2.461; standard error 0.057);
- lack of awareness of the potential advantages arising from win-win collaborations (mean 2.446; standard error 0.057);

- lack of related appropriate strategy (mean 2.443; standard error 0.059);
- difficulties arising from poor communication, changing contact points, or unclear processes (mean 2.437; standard error 0.059);
- did not know how to initiate a relationship (mean 2.431; standard error 0.055); and
- unable to find reciprocal interest (mean 2.419; standard error 0.055).

The tests showed that the means were significantly greater than 2 ( $p < 0.05$ ), implying that the respondents considered those reasons as either important or very important deterring factors to open collaborative innovation.

*Table 7: Reasons for Not Being Involved in Open Collaborative Innovation*

Variables	N	Mean	Std. error m	t	df	sig
Lack of mutual interest	167	2.299	0.061	4.91	166	0.00
Lack of trust	167	2.413	0.056	7.40	166	0.00
Imbalance of power	167	2.371	0.058	6.41	166	0.00
Lack of related appropriate strategy	167	2.443	0.059	7.48	166	0.00
Lack of appropriate structure, organisational culture or internal processes	167	2.461	0.057	8.12	166	0.00
Problems with long cycle times and slow decision-making on the corporate side	167	2.491	0.055	8.93	166	0.00
Difficulties arising from poor communication, changing contact points, or unclear processes	167	2.437	0.059	7.46	166	0.00
Cultural problems and contractual issues (including protracted negotiation of terms and conditions)	167	2.353	0.060	5.88	166	0.00
Unclear decision-making model	167	2.365	0.059	6.18	166	0.00
Non-transparent information flows	167	2.389	0.059	6.62	166	0.00
Lack of knowledge of how to initiate a relationship	167	2.431	0.055	7.88	166	0.00
Unable to find reciprocal interest	167	2.419	0.055	7.59	166	0.00
Lack of awareness of potential advantages arising from win-win collaborations	166	2.446	0.057	7.82	165	0.00

## G. Benefits of Open Collaborative Innovation

The benefits of open collaborative innovation to the enterprises involved in this study were assessed by whether the respondents disagreed with, agreed with, or were neutral towards suggested options of possible benefits in terms of scaling-up their businesses.

The responses summarised in Table 8 show that a little over half of the enterprises that had been involved in open collaborative innovations had scaled-up their businesses through an increased number of skilled employees (56.4%), while 51.3% had scaled via new products and services developed, 51.3% via communication effectiveness, and 48.7% through motivation of their staff. Close to one out of every three enterprises was unsure as to what the outcome benefits of open collaborative innovations were to their enterprises. Almost half of the enterprises (48.7%) disagreed with the statement that their enterprises had increased their revenue base, with other “disagree” findings being increase in shareholder value (41%), relationship with experts in scaling-up (41%), and increased valuation (41%).

*Table 8: Benefits of Open Collaborative Innovation (see also Ama and Okurut (2017))*

Benefits of open collaborative innovation	Disagree		Neutral		Agree	
	Number	%	Number	%	Number	%
New products and services	5	12.8	14	35.9	20	51.3
Increased number of skilled employees	6	15.4	11	28.2	22	56.4
Improved hiring process to find best professionals to take the business to next level	8	20.5	13	33.3	18	46.2
Motivation of staff	7	17.9	13	33.3	19	48.7
Communication effectiveness	10	25.6	9	23.1	20	51.3
Recognition and reward of achievement	9	23.1	13	33.3	17	43.6
Provision of tools and training to staff	10	25.6	15	38.5	14	35.9
Creation of strategic plans	13	33.3	12	30.8	14	35.9
Increase in shareholder value	16	41.0	9	23.1	14	35.9
Relationship with experts in scaling-up businesses	16	41.0	9	23.1	14	35.9
Increased profit	14	36.8	9	23.7	15	39.5
Improved strategy on markets	13	33.3	11	28.2	15	38.5
Alliances with other firms or with universities	16	41.0	9	23.1	14	35.9
Visibility and enhanced publicity or reputation	15	38.5	8	20.5	16	41.0
Access to new markets	13	33.3	12	30.8	14	35.9
Gaining market knowledge	12	30.8	11	28.2	16	41.0
Business development (entering new markets or gaining new customers)	13	33.3	8	20.5	18	46.2
Start-ups may bring fresh thinking to help solve core business problems	10	25.6	11	28.2	18	46.2
Access to key contacts	11	28.2	10	25.6	18	46.2



Investment	15	38.5	7	17.9	17	43.6
Financial (e.g. increased valuation)	16	41.0	5	12.8	18	46.2
Business (increased revenue )	19	48.7	5	12.8	15	38.5
Agility to adapt more quickly to market changes	15	38.5	8	20.5	16	41.0

## H. Challenges to Scaling-Up Businesses in Spite of Collaboration

The main challenges faced by enterprises that engaged in open collaborative innovation in scaling-up their businesses were found to be: the lack of systems and structures (physical and organisational) to handle the complexities in communication and decisions that come with growth (cited by 54%); failure to address the increased competitive pressures that build (and erode margins) as you scale-up businesses (53.1%); and limited resources (38%) (Table 9).

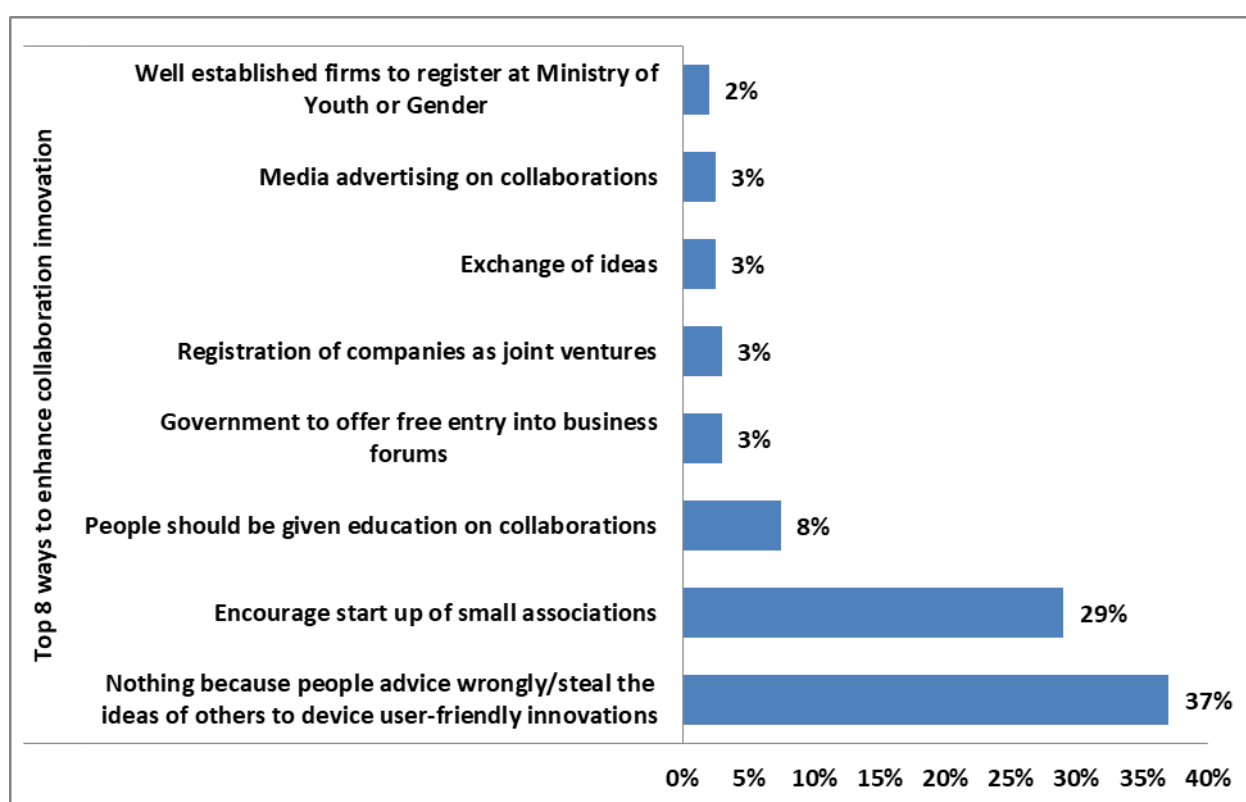
*Table 9: Challenges to Scaling-Up Business in Spite of Collaboration*

	Disagree		Neutral		Agree	
	Number	%	Number	%	Number	%
Failure to address the increased competitive pressures that build (and erode margins) during scaling	10	20.4	13	26.5	26	53.1
Leadership: the inability to staff/grow enough leaders throughout the organisation with the capability to delegate and predict	14	28.0	21	42.0	15	30.0
Scalable infrastructure: the lack of systems and structures (physical and organisational) to handle the complexities in communication and the decisions that come with growth	10	20.0	13	26.0	27	54.0
Limited resources	20	40.0	11	22.0	19	38.0
Inexperience	29	58.0	10	20.0	11	22.0
Misconception of corporates	24	49.0	16	32.7	9	18.4
Rigid hierarchy	17	35.4	19	39.6	12	25.0
Lack of transparency by institutions that are set up to assist MSMEs	1	25.0	2	50.0	1	25.0

## I. Ways to Enhance Open Collaborative Innovation

Many of the respondents (37%) felt that there were no ways of enhancing open collaborative innovation—especially since people are seen as advising wrongly and stealing the ideas of others, and using those ideas to derive user-friendly innovations. However, 29% of the respondents still felt strongly that start-up businesses needed to be encouraged. A further 8% were concerned about people/businesses being provided education on the utility of collaborations; 3% felt that the government should offer free entry into business forums; and 3% felt that businesses should be registered as joint ventures (3%) (Figure 9).

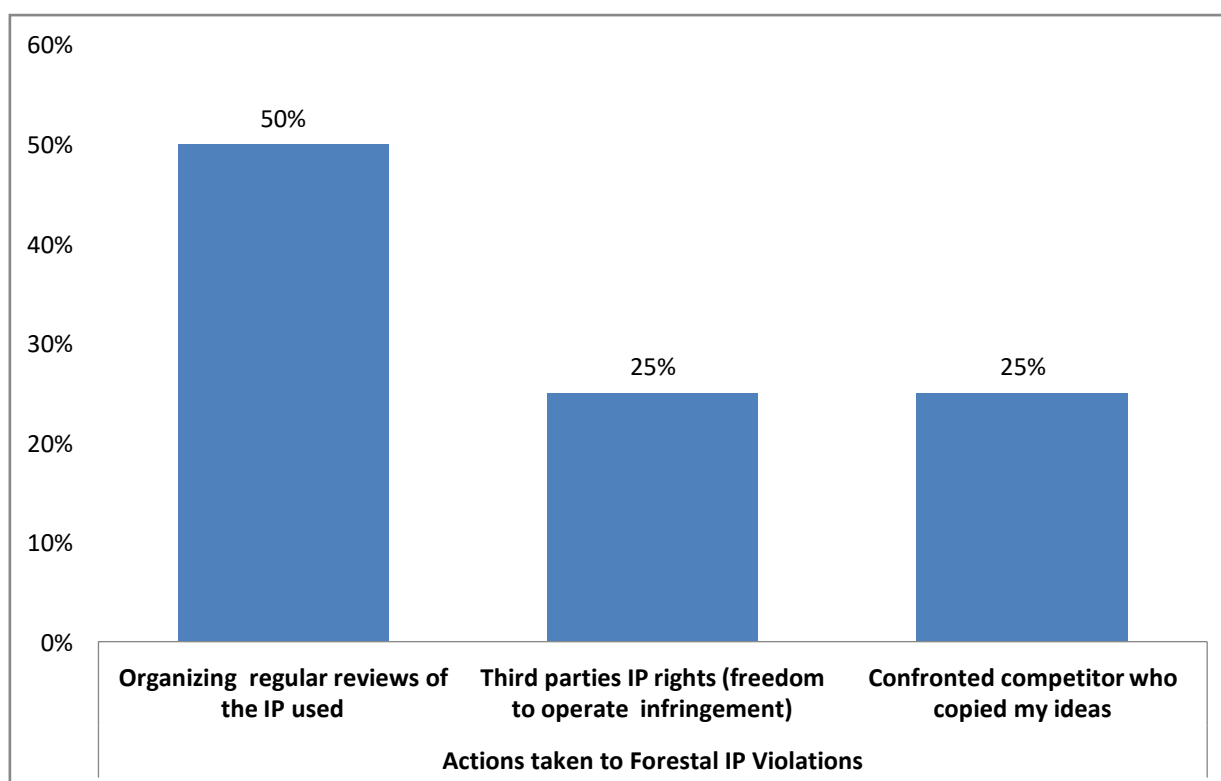
Figure 9: What to Do to Enhance Open Collaborative Innovations (n = 200)



## J. Intellectual Property Violations

Management of the intellectual property (IP) rights of collaborating innovators is crucial to the survival of open collaborative innovations. In the study, the enterprises that were involved in open collaborative innovations (n = 38) were asked if there were any IP violations in the partnerships. An overwhelming majority (89.5%) (n = 34) responded “No”, with the remaining 10.5% (n = 4) responding “Yes”. The types of IP violations cited were in the areas of customer relations management (50%) and long-term labour contracts (50%). In order to forestall the negative impact of these IP violations on the businesses, 50% of the enterprises organised regular reviews of the existing IP, while 25% of them had explored third party IP rights (freedom to operate infringement). Another 25% confronted competitors who were seen as having copied their ideas (Figure 10,).

Figure 10: Actions Taken to Forestall IP Violations (n = 8)



### K. Products and Services Provided by Relevant Institutions

Respondents were asked about products and/or services provided by institutions charged with assisting MSMEs—CEDA, LEA and the Botswana Innovation Hub—in enhancing open collaborative innovations and knowledge governance.

An overwhelming majority of respondents (95%) indicated that they had not received any services from the institutions to enhance open collaborative innovations, while 2% and 1% cited that they had received products and/or services from the organisation of farmers' fairs and business forums, respectively.

In the area of knowledge governance, 93% of respondents stated they had not received any services from the institutions. However, 3% stated that they had received assistance through short courses and books; 1% from mentors; and 1% from research articles.

### L. How Adoption of Open Collaborative Innovation Is Affected by Status of MSMEs

In order to determine how the adoption of open collaborative innovations is influenced by the status of an enterprise, a multivariate binary logistic regression model was fitted with the logarithms of the odds of participation in open collaborative innovation as dependent variable; and size of enterprise, legal status of the enterprise, membership of networks, and years of existence of business as independent variables. The results of the analysis are shown in the Appendix.

The results reveal that the number of years since the business started was negatively correlated ( $B < 0$ ) with adoption of open collaborative innovation. Thus, businesses which started in the 1980s or 1990s were found to be less likely to engage in open collaborative innovation than those which started from 2010 to date (Odds Ratio  $< 1$ ). Similar findings were obtained with the number of employees in the enterprise (size of enterprise) being a significant predictor ( $p < 0.05$ ) of adoption of open collaborative innovation. Enterprises with a smaller number of employees (micro and small enterprises) were less likely to adopt open collaborative innovation than those with more employees (medium enterprises). The sole proprietor, partnership, cooperative, limited liability companies and society/group businesses were 3.3 times, 15.6 times, 8.9 times, 1.6 times and 21.3 times, respectively, more likely to engage in open collaborative innovation than registered businesses. There was a positive relationship ( $B > 0$ ) between the legal status of a business and adoption of open collaborative innovation. Enterprises in the manufacturing sector were 1.8 times more likely to engage in open collaborative innovation than those in agriculture, while those in wholesale or retail were as likely to engage in open collaborative innovation as those in the agricultural sector (OR = 1.05).

The study also revealed that enterprises that were 6–10 years old, 11–15 and 16–20 years old were, respectively, 1.9 times, 6.2 times and 2.9 times more likely to adopt open collaborative innovation than businesses over 20 years old. Belonging to an MSME network was found to be a highly significant predictor of adoption of open collaborative innovation ( $p < 0.01$ ). The results show that enterprises that belonged to some networks were about 6.2 times more likely to engage in open collaborative innovation than those that did not belong to any network.

## V. Discussion

The study showed that only about 19% of the studied enterprises had adopted open collaborative innovations. This percentage indicates a very low level of participation and interest in open collaborative innovation among MSMEs in Botswana—judging from the relative importance of this model in enhancing growth of enterprises. Friedman and Angelus (n.d.) note that today's industry leaders are competing to win with open innovation, working with many partners—including universities and even companies from other industries—by opening up to external partnerships, increasing reliance on collaborative idea generation, and becoming less protective of their intellectual property.

We see successful open collaborative innovation partnerships as enabling the discovery of new and meaningful ways to satisfy the customer and consumer in a way that builds bottom line results for all value chain partners. In the study by Saunière et al. (2013) 63% of the people interviewed invested between zero and 25% of their total R&D expenditure on collaborative innovations, while 26% invested between 25% and 50% of their global R&D budget, and 45% believe that they will reach this level of investment within the next five years. A similar study conducted by Chesbrough and Brunswicker (2013) on the adoption of open innovation by larger firms, however, showed a contradictory result in that 78% of respondents (firms) reported practising open innovation, with only 22% reporting that they did not practice open innovation.

Our study clearly shows the desire of respondents to engage with external partners in collaborative projects. It appears likely, from the results of this study, that most MSMEs in Botswana still rely on their internal ability and resources to be innovative and to sustain competitive advantage—rather than seeing collaborative innovations as an open innovation strategy to partnerships, which could enable the discovery of new and meaningful ways to meet the needs of customers and consumers in a way that would build bottom line results for all value chain partners (Nafi, Yusoff, Sam & Saad, 2015).

The benefits derived by those enterprises engaged in open collaborative innovations included scaling-up businesses through an increased number of skilled employees, new products and services, developed communication effectiveness, and improved motivation of the staff. These results are in line with those identified by Saunière et al. (2013) which include the multiplicity of knowledge and skills required, the internationalisation of markets, and the growing necessity to adapt services to local use.

On the challenges facing MSMEs in embracing open collaborative innovation, four factors were identified from the study, namely networking; financial support; market demands; and previous innovation experiences. The respondents complained of: having difficulty in finding cooperation partners for innovation; lack of information on adequate technology; lack of finance from external sources; a market dominated by established enterprises; and a breach of intellectual property. These findings are line with those of Nafi et al. (2015), which showed that the average success rate of the innovative efforts of small and medium enterprises tends to be much lower than desirable— due to high risk level, complexity, and various uncertainties (Parida et al., 2012). We believe that trust between collaborating partners is key to successful collaborative innovation, in line with the findings of Ciesielska and Iskoujina (2012) and Lin (2011) that collaborating partners must have faith in each other's honesty, integrity, reliability, and competence. Some of these results are also in line with Narula (2004), who identified insufficient marketing capacity as the main driver of open innovation adoption in small and medium enterprises.

Most of the businesses taking part in this study did not embrace open collaborative innovation due to: lack of appropriate structure, organisational culture or internal processes; lack of awareness of the potential advantages arising from win-win collaborations; difficulties arising from poor communication, changing contact points, or unclear processes; and inability of businesses to initiate a relationship. The results of a study carried by Del Pilar, Salazar, and Pérez-Urbe (2017) show that communication and creativity are the main variables when it comes to the successful leading of an open innovation collaborative project. Li, Mei and Gu (2011) point out that factors affecting the open innovation of MSMEs are resources availability—including human, financial, material, technological and information resources—in addition to the absorption capacity of MSMEs to integrate innovation resources (Chen, 2009).

The Government of Botswana has put in place structures and policies to assist MSMEs obtain financial resources and training to enhance their growth. For instance, the role of CEDA is to provide highly subsidised credits to MSMEs; LEA is to provide training and technological development; the Youth Development Fund (YDF) is to provide loans to youths to open up businesses, and the Young Farmers Fund (YFF) provides funding for youths to start or expand agricultural projects.

What appears to be missing, however, is the link of the various enterprises to shared visions in the expansion of their businesses, even though the MSME policy includes promotion of linkages between MSMEs and primary industries in agriculture, mining, and tourism. Open collaboration between businesses with the aim of innovating seems to be missing. One of the objectives behind the MSME policy in Botswana is to promote linkages between MSMEs and primary industries in agriculture, mining and tourism. But, the low level of adoption of MSMEs in open collaborative innovation therefore points to lapses or gaps in the implementation of the policies and in the creation of awareness of the potential advantages of collaboration between the enterprises, and a gap in an innovation culture within the enterprises.

This study revealed that an overwhelming percentage (over 93%) of the MSMEs had not received any services from institutions such as LEA, CEDA and the Botswana Innovation Hub in the areas of enhancement of open collaborative innovations or knowledge governance to enhance or scale-up their businesses. One of the identified problems of MSMEs in Botswana has been the lack of business acumen (Modisane, n.d.) and technical know-how to make these businesses succeed. Although organisations like LEA have been mandated to address such issues through their training programmes, what is becoming apparent from the results of this study is that the training offered by LEA has not been focused on the recent trend in businesses, which is to collaborate. As was indicated in the above results, many businesses want start-ups to be registered as joint ventures, with different parties bringing their ideas. The study also identified the inability of most businesses to know how to initiate partnerships and subsequently develop them into open collaborations for innovation purposes. It is, therefore, imperative that any efforts by the government or by institutions towards the development of MSMEs should incorporate training aimed at successfully enhancing open collaboration and knowledge governance. There is a need to improve the framework conditions for innovation—which include improved business environment, access to finance, competition, and trade openness. There is also a need to provide dedicated innovation policies, which will target the innovation actors themselves, namely MSMEs, research institutions, and researchers, and the linkages between them. The policies should encourage collaborative research projects, public-private partnerships, and create an innovation culture with businesses, students, and the larger society, as this will spur greater entrepreneurial activity.

As outlined above in the “Study Context” section, one other area of concern of businesses in partnering with each other is intellectual property violations (INOVA, n.d.; Saunière et al., 2013). Surprisingly, in the study, most of the enterprises that had adopted open collaborative innovations did not experience any IP violations, but for those that did, it was all about customer relations management and long-term labour contracts. These violations were managed by the enterprises organising regular reviews of the existing IP, exploring third party IP rights (freedom to operate infringement) and confronting competitors who copied their ideas. The MSME policy falls short of addressing issues of IPs in an anticipated collaboration between MSMEs.

The study, among other things, shows that medium-sized enterprises are more likely to engage in open collaborative innovation than micro and small enterprises. This result is in line with the work of Freel (2000) and Narula (2004), who identified the size of enterprises (not big enough) as the main weakness regarding engaging in innovation. The size of enterprises affects their marketing capacity and should therefore act as a driver for the MSMEs to engage in open innovation in order



to respond actively to market changes and to meet customer demands (Lee, Park, Yoon & Park, 2010; Van de Vrande et al., 2009; OECD, 2010a). Existing open innovation research pays more attention to large enterprises, and less to MSMEs. Abulrub and Lee (2011) argue that the degree of open innovation depends on four environmental factors, one of which is company size (large company, or small and medium enterprises). The number of years of business operation of the enterprise has a positive relationship with the adoption of open collaborative innovation, with newer businesses (between 6 and 20 years old) being more likely to engage in open collaborative innovation than older ones. Stangler and Litan (2009), for example, show that from 1980 to 2005 nearly all net job creation in the United States occurred in firms less than five years old, while in 2007 two-thirds of the entire pool of new jobs had been created by firms between one and five years old (hence excluding the very newest and most vulnerable to closure). Also, the OECD (2010b) notes that:

Computer-numerically-controlled production tools have made it possible for small firms in many industries to produce small batches as efficiently as large firms once produced large batches. These trends have favoured the new and small firms, or at least taken away much of one of the main advantages that large firms enjoyed in the past – namely producing standardised products in large volumes at low cost (OECD, 2010b, p. 26).

Belonging to a network has also been shown to have a positive relationship with the adoption of open collaborative innovation, with enterprises that belonged to networks being about six times more likely to adopt open collaborative innovation than those that did not. This is supported by the findings of Gronum and Verreyne (2011), that the early formation of a formal network helped small enterprises to participate in open innovation, and that the adoption of open innovation from outside to inside was beneficial, improving the innovation width and performance of small business.

## VI. Recommendations

Based on the findings of the study, it is recommended that government and institutions charged with assisting MSMEs should take the following actions:

- Raise awareness among MSMEs of the benefits and mechanisms of open collaboration, to encourage innovation between the MSMEs, particularly between start-up and medium enterprises.
- Train MSMEs on how to forge partnerships between enterprises in an open innovation environment, to pool together skills, enhance knowledge-sharing skills in open collaborative innovations, and expand their marketing strategy.
- Improve the framework conditions for innovation, which include improved business environment, access to finance, competition, and trade openness; and also provide dedicated innovation policies targeting both the innovation actors themselves, namely MSMEs, research institutions, and researchers, and the linkages between them.
- Encourage mobility of staff between universities and industry, and facilitate knowledge exploitation through licenses, patents and university and corporate spin-offs, and shared foresight and strategy development activities.

- Encourage networking of enterprises to enhance the MSMEs' knowledge of marketing platforms, as well as access to information on available facilities and changing business legislation, including intellectual property rights; develop entrepreneurial human capital, and create social entrepreneurship and social innovation.

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## Appendix

### Multivariate Binary Logistic Regression Model

Reference category	Variables	B	S.E.	Wald	df	Sig. (p-value)	Exp (B) (Odd Ratio)	95% Confidence Level	
								Lower	Upper
2010–date	Year the business started			1.568	3	0.667			
	1980–1989	–1.164	3.505	0.11	1	0.74	0.31	0	300.552
	1990–1999	–1.338	2.008	0.444	1	0.505	0.26	0.005	13.442
	2000–2009	–1.664	1.33	1.565	1	0.211	0.19	0.014	2.567
25–99	Number of employees in the enterprise			12.16	2	0.002			
	1–5	–3.146	1.017	9.57	1	0.002	0.043	0.006	0.316
	6–24	–3.115	0.931	11.2	1	0.001	0.044	0.007	0.275
Registered businesses	Legal status of your registered business entity			8.52	5	0.13			
	Sole proprietorship	1.194	0.945	1.6	1	0.206	3.301	0.518	21.021
	Partnership	2.75	1.103	6.22	1	0.013	15.65	1.802	135.862
	Cooperative	2.182	2.582	0.71	1	0.398	8.87	0.056	1397.63
	Limited private co.	0.472	1.078	0.19	1	0.661	1.6	0.194	13.261
	Society or group	3.059	1.592	3.69	1	0.055	21.3	0.94	482.696
Agriculture	Best description of sector in which firm operates			1.37	4	0.849			
	Manufacturing	0.6	0.98	0.37	1	0.541	1.82	0.267	12.449
	Transport and communication	–0.866	1.636	0.28	1	0.597	0.42	0.017	10.389
	Construction services	–0.63	1.34	0.22	1	0.638	0.53	0.039	7.359
	Wholesale or retail trade	0.051	0.703	0.01	1	0.942	1.05	0.265	4.176
	Number of years business has been operating			3.39	4	0.495			
Above 20	1–5	–1.069	2.93	0.13	1	0.715	0.34	0.001	107.157
	6–10	0.661	2.785	0.06	1	0.812	1.94	0.008	454.883
	11–15	1.819	2.853	0.41	1	0.524	6.16	0.023	1652.92
	16–20	1.055	2.596	0.17	1	0.684	2.87	0.018	465.612
	Firm belongs to business network or association	1.824	0.581	9.856	1	0.002	6.2	1.985	19.365
No	Constant	–19.576	22312.96	0	1	0.999	0		





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