Hackathon: Innovations for Financial Services -Eswatini

University of Eswatini, Kwaluseni

2-4 August 2019

The Innovation Hackathon Eswatini is a product of the partnership between FinMark Trust, Central Bank of Eswatini, Centre for Financial Inclusion, Eswatini Communications Commission, Financial Services Regulatory Authority and University of Eswatini.

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1. Executive summary

The Innovation Hackathon Eswatini was held at the University of Eswatini, Kwaluseni, from the 2nd to the 4th of August 2019. The Hackathon aimed to catalyse the design of innovative and data-driven technological solutions that promote use and access to financial services, targeted at the base of the economic pyramid, rural populations and MSMEs. The event targeted youth with an interest in developing solutions to financial inclusion challenges in Eswatini, with extensive support provided by mentors and sector experts throughout the competition. The event was the first financial services-focussed hackathon to be hosted in Eswatini, convening a large cohort of participants, partners and interested attendees.

During the 3-day event, 24 teams, consisting of 77 participants, designed and developed prototype solutions to 1 of 5 problem statements that represent on-the-ground realities for MSMEs, low-income and rural communities in Eswatini. Judged on a range of fundamental criteria, the winners were awarded E50,000, the runner-up receiving E35,000, and the third placed team awarded E25,000.

What is a Hackathon?

A competition during which computer programmers and other tech-savvy individuals collaborate intensively to innovate and design solutions to a problem using technology. Typically lasting several days, the goal of a Hackathon is to develop usable prototypes that offer innovation through novel product design or by improving existing product/services. Each team then presents their solution to a panel of judges who evaluate the product innovation. Prizes are awarded to the team that develops the best solution to a particular industry problem.

2. Background, rationale and objectives

2.1 Background and rationale

The MSME (Micro, Small and Medium Enterprises) sector of Eswatini is recognized as a significant contributor to economic growth, development and employment. It is therefore important to note that the MSME sector is a crucial anchor to the national economy and is dependent on government, the business community and the general community to enhance its development.

The 2017 FinScope MSME survey for Eswatini established that there 59,283 MSME owners in the country with 68,536 businesses. This sector employs 92,643 people (21% of the national workforce) and generates an estimated E2.8 billion in monthly turn-over. The majority of these MSMEs (39%) are in wholesale/retail, 23% are in agriculture/farming, while 13% are in manufacturing. At least 74% of entrepreneurs are found in rural areas, 74% are females, 26% are the youth (under the age of 35 years), and 53% earn a personal monthly income of less than E2, 500. Approximately 84% of MSME owners are classified as banked, but only 29% of these businesses are able to access credit from the formal banking sector. Improved access to finance has been identified as a key area with the potential to impact MSME growth in the country.

Due to limited access to credit, MSMEs have been hindered from capitalizing on economic benefits such as higher productivity and the opportunity to upgrade to higher value-added productivity. The lack of appropriate credit products targeted at MSMEs, the limited scope of collateral, and the lack of credit and information sharing platforms worsens MSME's access to credit. It is therefore important to create an enabling MSME finance support system that recognizes the different stages of MSME development and strategically addresses their differing financial needs.

This can be achieved through:
- Strengthening leadership, coordination and institutional frameworks for expanded mobile financial services in Eswatini;
- Encouraging access to credit for personal, and small business owners, especially among the population in the bottom of the pyramid;
- Supporting knowledge, and research on the sector for advocacy, innovations and product diversification, focusing on the BoP.

The Innovation Hackathon Eswatini was held at the University of Eswatini, Kwaluseni, from the 2nd to the 4th of August 2019. The competition aimed to support the design and development of products and services that increased use and access to financial services, especially among the poor and MSME population. This is also expected to address challenges in the sector relating to diversification of products and services, improved availability and reach of financial services, to enable inclusive growth and participation of the rural and low-income population in the financial sector.

2.2 Objectives

The Innovation Hackathon Eswatini aimed to catalyse the design of innovative and data-driven technological solutions that promote use and access to financial services, targeted at the base of the economic pyramid and rural populations. The Hackathon provided a platform to engage young innovators from across the country to develop innovative and modern solutions to challenges and bottlenecks within the financial services sector. These innovations should be designed to respond to market demands and the needs of a variety of small business owners.

The Innovation Hackathon Eswatini set out to achieve the following key objectives:

- Design and develop next-generation applications to improve on existing credit systems and digital product offering;
- Connect technology with people to bridge the financial inclusion divide in Eswatini;
- Create technological solutions that are built for Eswatini and solve local challenges;
- Leverage existing information, networks and human capacity to build innovations and solutions to presented challenges.

Innovation Hackathon Eswatini:

Competition outline

- The hackathon was a 3-day, bring your own device event
- Meals, workspaces, internet connectivity, snacks and beverages were provided
- Extensive networks of stakeholders and mentors were invited to attend and contribute

Contributing partners

- FinMark Trust (FMT)
- Centre for Financial Inclusion (CFI)
- Central Bank of Eswatini (CBE)
- Financial Services Regulatory Authority (FSRA)
- Eswatini Communications Commission (ESCCOM)
- University of Eswatini

Participant eligibility

- Entries were open to anyone with an interest in coding/programming, innovative product design and development
- The Hackathon targeted youths (aged 18–35 years) who are Eswatini nationals, or internationals with an academic or work permit in Eswatini

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- Participants must be willing to work together, in teams or collaborative partnerships. Each team is composed of a minimum of 2 members and a maximum of 5 members.

Solution design

- Each team developed a prototype solution to 1 of 5 problem statements, representing opportunities for innovative product design within the financial services sector

- All solution design sessions were overseen by mentors and industry experts, providing guidance throughout the product design and development process

Final pitches

- Each team was given 4 minutes to pitch their solution (followed by 2 minutes of Q&A)

- Each pitch included; a clear problem statement, details of the proposed solution, a business plan and product roadmap, a team overview, and a technical demonstration

Judging Criteria

- Addressing the problem statement (30%)

- Level of innovation (30%)

- Potential impact (30%)

- Level of capacity building (10%)

Judges

- Mr. Mbongeni Mtshali – ESSCOM

- Mr. Thulani Fakudze – ESCCOM

- Mr. Sinaye Dlamini – CBE

- Ms. Nothando Nxumalo – CBE

- Mr. David Myeni – CFI

Awards

- Winner: E50,000 (Team CyberBeasts)

- 2nd place: E35,000 (Team X-Code)

- 3rd place: E25,000 (Team Inhlava)

Innovation Hackathon Eswatini Programme

- See annexure

3. Problem statements

Each team selected one problem statement on which to base their solution (the distribution of challenges selected by the teams is shown in Figure 1). Innovations developed during the Hackathon were expected to address on–the-ground realities for MSMEs, low-income and rural communities. The challenges to be addressed by the Hackathon included:

1. MSME Credit Scoring:

According to the World Bank (1998), the key to improved access to MSME finance is the need to address imperfect information and transaction costs associated with the financial outreach to the sector. The absence of information on these businesses constrain the lenders ability to determine the creditworthiness of the potential borrower and the enforcement of contracts.

Financial transactions involve the financial institutions entering a contractual exchange of cash (for credit) for a promise of a future stream of payments rather than a simultaneous exchange of cash or goods. This requires the need for the lender to be well informed about the potential borrower's ability and willingness to honour contractual obligations. Only 23% of MSMEs in the country have access to credit and only 42% keep business records.

2. MSME Business Finance:

The profiling and segmentation of MSMEs in the country is essential to ensure more effective linkages of the entrepreneurs to bigger businesses and finance. Provide the diagnosis of the capacity of the businesses and a system to assess and score competitiveness. The outcome of this scoring will help determine the appropriate interventions for the business and enable linkages with finance.

The solution must be user-friendly and accessible through online (even on mobile phones) and USSD format. The System to assess the performance of the business should be based on the Business Development Measure (BDM) Indicator Scoring Model developed by CFI and FMT. The business owner to register and fill-up a questionnaire on the performance of the business and get a Score with a Report indicating the strengths, weaknesses of the business and the strategies to improve performance. Provide a dashboard to indicate the performance of the key business indicators and a repository.

3. Business Financial Record-Keeping:

Only 1 in 4 MSMEs in the country are formally registered, with only 42% of these keeping financial records. Most of those who keep financial records (96%) do so manually. The apparent lack of access to formal credit is due to the absence of data generated by merchants that provide relevant information to potential lenders about the business. While a number of financial institutions express a desire to provide loans to MSMEs, micro-merchants have insufficient business information and record-keeping to facilitate suitable lending.

4. Personal Finance Score:

The Eswatini FinScope Consumer Survey 2018 established that only 24% of the adults in Eswatini have a 'high' overall financial capability, 44% have a 'moderate' financial capability and 25% have 'low' financial capability. Results show that adults, despite having high levels of planning for their income and expenses, were unable to track and control their monies. Financial literacy is generally defined

as "a combination of financial awareness, knowledge, skills, attitude and behaviours necessary to make sound financial decisions and ultimately achieve individual financial wellbeing".

Create a digital solution with the following functionalities, generate a financial literacy score, educate the user about money management issues as well as providing the user with comprehensive personal finance management tools based on the score obtained.

5. Regulatory Data Collection and Analysis Portal

ESCCOM is the regulatory body for the electronic communications sector in the country, encompassing telecommunications, broadcasting and postal services, as well as the efficient management of radio frequency spectrum and data protection in electronic communications services. As part of the responsibility to regulate and supervise these sectors, the Commission regularly require service providers to submit market data, for purposes of analysing and monitoring market performance, providing relevant information to the public and consumers as well as making regulatory decisions based on what is happening in the market.

The Commission currently collects data, as an example, on the number of subscribers, total network traffic (voice, SMS and data) from Mobile operators, Fixed operators and internet service providers (ISPs). It is also important to note that some of the information collected is confidential (only for consumption of ESCCOM) while some of the data is for public consumption.

The market data that is required by the Commission for this purpose is collected on a monthly, quarterly and annual basis from all the licensees (Mobile, Fixed and ISPs). ESCCOM currently collects the data manually from service providers, using data collection templates. The Commission has realized that the current data collection method is time consuming with respect to analysing the collected data and susceptible to errors. To address this issue the ESCCOM has identified the need to develop an automated, online data collection and analysis tool as a replacement for the current manual method.
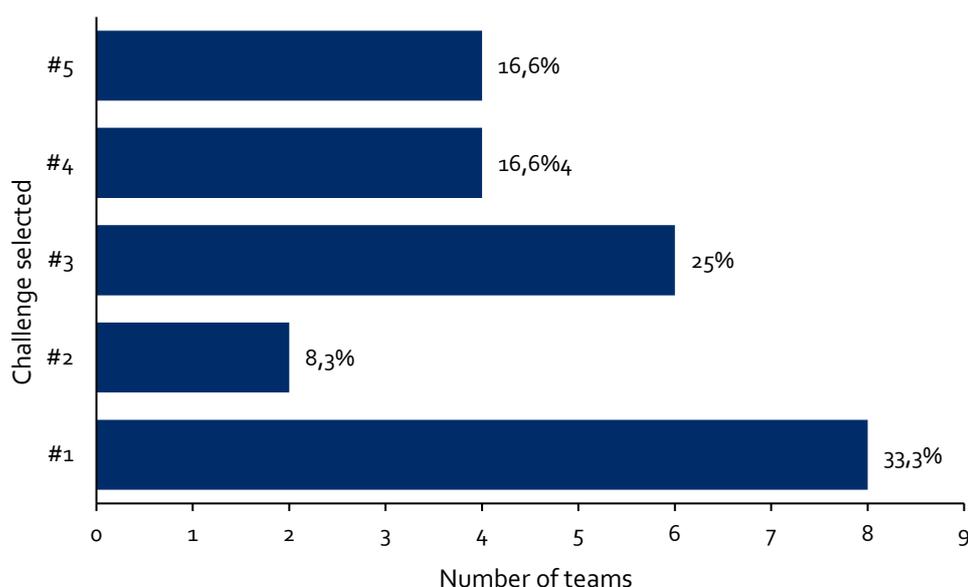

Figure 1: Distribution of challenges selected by the Innovation Hackathon Eswatini teams

4. Participant outline and demographics

A total **77 participants** competed in the Innovation Hackathon Eswatini, consisting of **4 females** (5%) and **73 males** (95%). The average age of the participants was **24 years old**, with the age distribution as follows; 3% younger than 20, 67% between 20-25, 30% between 26-30 years old.

The education status of the participants is displayed in Figure 2, where the majority of participants held an **associate degree (29,87%)** or had **attended college but did not obtain a degree (29,87%)**. The area of study showed a varied range of educational backgrounds; 25.97% Computer Science, 11,69% Information Technology, 10,39% Mathematics, 6,49% Business Information Technology.
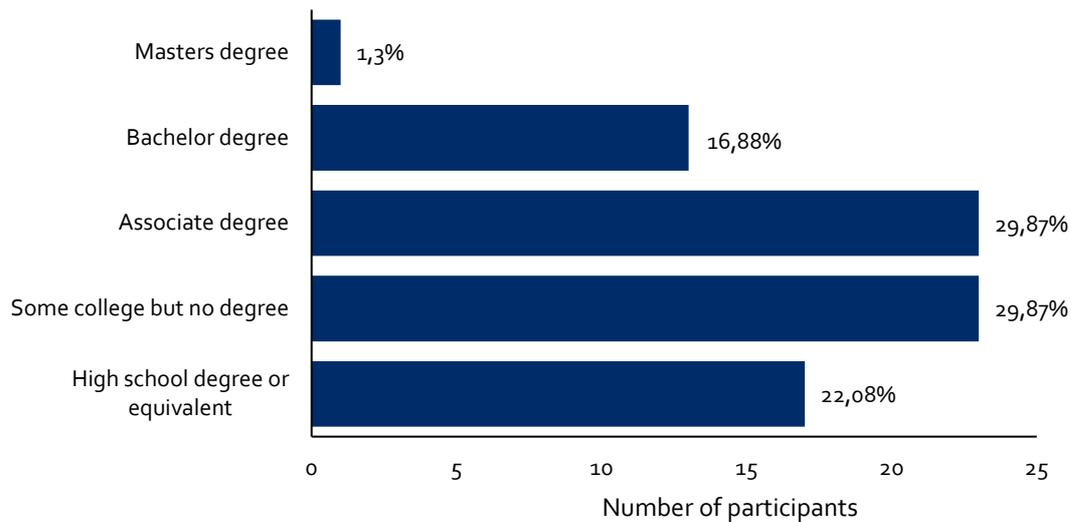

Figure 2: Education status of Innovation Hackathon Eswatini participants

The majority of participants had no prior involvement in innovation competitions of this nature (**45 participants – 58,44%**), although a number of individuals expressed previous involvement in the following; 17 had competed in innovation competition of some form (22,08%), 15 had competed in a Hackathon (19,48%), 13 had attended a boot camp (16,88%), 6 had been involved with an incubator (7,79%), and 2 had been involved in an accelerator programme (2,60%).

The participants organised themselves into a total of **24 teams** based on the 5 problem statements (Table I), with each team consisting of an average of **4 members**. Of the 24 Innovation Hackathon Eswatini teams; **20 joined as a team** (of which 1 team represented an established business), with **4 teams formed during the competition**.

Table 1: Innovation Hackathon Eswatini team outline

	Team name	Problem statement	Joined as a team (✓/✗)	Established company (✓/✗)
1.	Cyber Beasts	#1	✓	✗
2.	X-CODE	#2	✓	✗
3.	DigiBits	#5	✓	✗
4.	Collective	#4	✓	✗
5.	Purple	#3	✓	✗
6.	Open Sourced Life	#1	✓	✗
7.	Young Innovators	#4	✓	✗
8.	Radon	#1	✓	✗
9.	Tech Giants	#3	✓	✗
10.	Team DC	#1	✓	✗
11.	Innov8 Eswatini	#3	✓	✗
12.	StackIT	#1	✗	✗
13.	Nuguyz	#3	✓	✗
14.	Learners	#3	✓	✗
15.	Inhlava	#5	✓	✗
16.	Creanay	#4	✗	✗
17.	The Softechs	#5	✓	✓
18.	TechTeachers	#1	✓	✗
19.	Outsource	#5	✗	✗
20.	Techno-stars	#2	✓	✗
21.	HackMate	#4	✓	✗
22.	Nerds and Beyond	#1	✓	✗
23.	Hope	#1	✓	✗
24.	CyberDavids	#3	✗	✗

5. Winning solutions

<u>WINNER:</u> CyberBeasts

Challenge:	#1 MSME Credit Scoring
Solution name:	Notsa Ngwane Credit Scoring
Team members:	Moses Thwala, Siphamandla Mamba, Mphetfo Tshabalala
Solution details:	Notsa Ngwane Credit Scoring Model is a 100% proudly Swati model which generates a credit score and offers a maximum loan amount from the monthly income and expenditure for informal traders including non-banked hawkers, farmers, etc. The model factors in mobile wallets and stokvel financial position together with various variables which are all written in SiSwati. The Model will run through the Credit Bureau to avoid reckless lending and to promote Financial Inclusion. We used data to identify the gap between urban and MSME which informed us that there were more MSMEs in the Rural areas.
Target market:	Rural and urban poor

<u>SECOND PLACE:</u> X-Code

Challenge:	#2 MSME Business Finance
Solution name:	FinBridge
Team members:	Sabelo Vilakati, Njabulo Makhabane, Majaha Nkambule, Goodboy Shongwe
Solution details:	MSME struggle to acquire funding from formal financial institution due to poor business practices. FinBridge is an online system that provides an electronic performance rating for MSMEs. It enables formal financial institution to properly evaluate whether they qualify to be given financial assistance.
Target market:	MSMEs in rural and urban areas, and women in business

THIRD PLACE: Inhlava

Challenge:	#5 Regulatory Data Collection and Analysis Portal
Solution name:	Inhlava
Team members:	Simphiwe Dlamini, Ashwyn Horton, Samkelo Nxumalo, Fanelesibonge Malaza
Solution details:	We are developing a web-based data collection and analysis tool that requires the Internet Service Providers, mobile operators and fixed operators to upload data through a web-based system as per template on ESSCOM standards. The uploaded data is saved into a database where analysis using various statistical methods is carried out and the results are then used to generate graphs, pie charts, scatter plots and maps to allow ESCCOM a flawless and non-tedious way of achieving data driven decision-making.
Target market:	Internet service providers, Mobile operators and Fixed operators.

6. Key learning outcomes

Based on survey data collected from Innovation Hackathon Eswatini participants, the following key learning outcomes were identified:

1. **Skills development and mentorship**

The youth participants of the Hackathon found the skills development and mentorship opportunities provided during the event to be very beneficial (Figure 3). By engaging with the mentors and sector experts in attendance, the exposure the participants received helped them to design solutions as a team, as well as develop their own digital skills and expertise. On average, the participants rated the skills and mentorship opportunities offered during the event as **4,27 out of 5**.

Not very useful
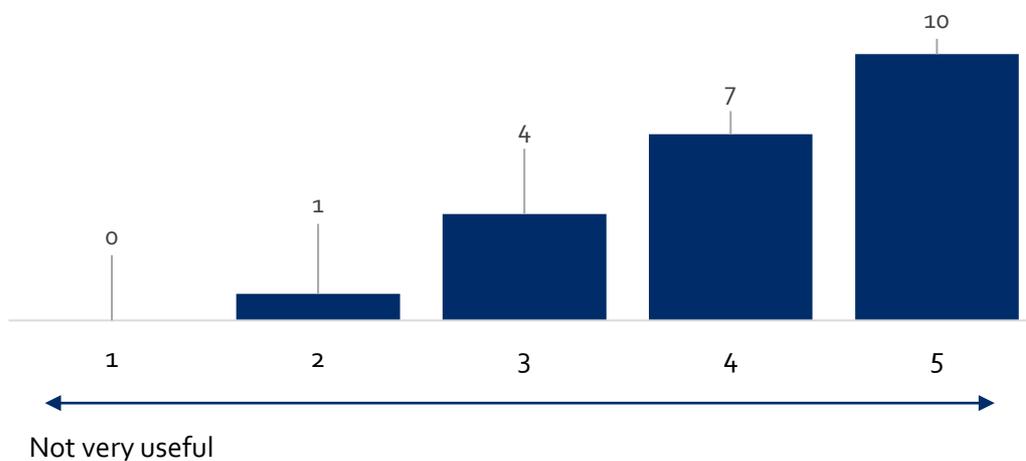
Figure 3: How useful was the Hackathon in providing skills development, mentorship and training?

Source: Innovation Hackathon Eswatini Participant Feedback Survey (limited to 22 respondents)

Q: Please describe 3 valuable skills you learned during the Hackathon...

A: "Leadership skills, the art of pitching, teamwork" → **DigiBits**

A: "Problem solving, programming languages, presentation skills" → **Nerds and Beyond**

A: "Design thinking, data science, business model canvassing" → **Innov8 Eswatini**

A: "Innovative thinking, problem solving, product design" → **CyberBeasts**

A: "Entrepreneurial skills, data science, communication within a team" → **Inhlava**

2. Networking and collaboration

The Innovation Hackathon Eswatini participants found value in the networking opportunities provided during the Hackathon (rated **3,77 out of 5** – Figure 4). The event fostered partnerships and relationships which enabled the development of innovative solution to the 5 problem statements. The networks established during the competition are expected to continue to benefit the teams as they develop products/services in the future.
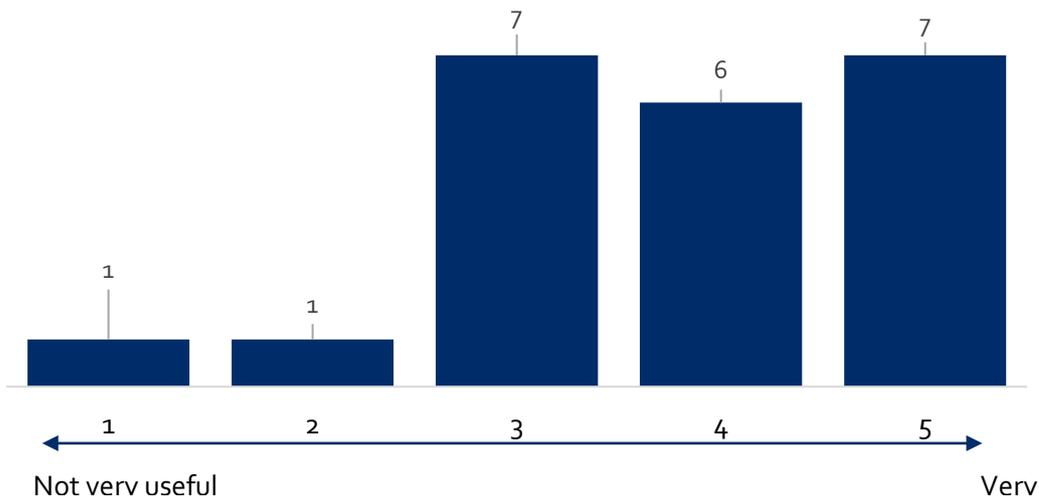

Figure 4: How useful was the Hackathon in providing partnership and collaboration opportunities?

Source: Innovation Hackathon Eswatini Participant Feedback Survey (limited to 22 respondents)

Q: Please describe 3 meaningful connections you made during the Hackathon...

A: "Mentors and ICT experts, team members, other developers" → **Learners**

A: "Young innovators, tech experts, entrepreneurs" → **HackMate**

A: "Likeminded developers, business managers, experts" → **StackIT**

A: "Industry professionals, successful entrepreneurs, my team" → **Hope**

3. Objectives

The Innovation Hackathon Eswatini set out to catalyse the design of innovative and data-driven technological solutions that promote use and access to financial services, by providing a platform for young innovators to use their skills while accessing mentorship and skills development opportunities. The solutions developed during the Hackathon were expected to address on–the-ground realities for MSMEs, low-income and rural communities. The participants report that the event was successful in achieving these objectives, to an extent rated at **4,18 out of 5** (Figure 5).
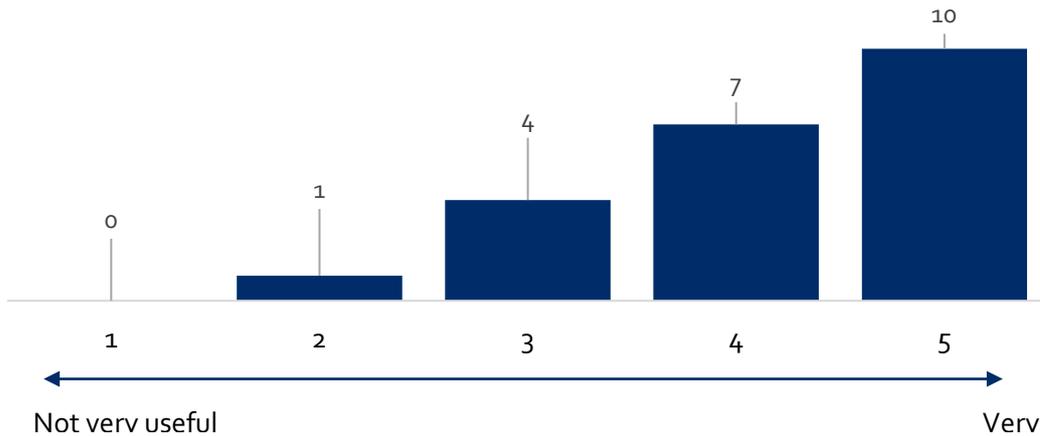
Figure 5: Do you think the Hackathon achieved its objectives?

Source: Innovation Hackathon Eswatini Participant Feedback Survey (limited to 22 respondents)

Q: What was the most beneficial part of the Hackathon…

A: "The opportunity to showcase the young talent in Eswatini" → **Hope**

A: "Being exposed to the many challenges we have in the Kingdom" → **DigiBits**

A: "Creating a solution in limited time and brainstorming with the team" → **Nerds and Beyond**

A: "The opportunity to interact with the organizing partners and experts" → **Innov8 Eswatini**

A: "Bringing together developers from every part of the country to work together." → **StackIT**

A: "Learning to work under pressure" → **CyberBeasts**

A: "The master class on data science and design thinking" → **HackMate**

A: "Being exposed to the problems we are facing in Eswatini and given a chance to develop solutions" → **Learners**

A: "Masterclasses and mentorship" → **X-Code**

A: "Understanding the business side of innovation" → **Creanay**

A: "Masterclasses and being introduced to the finance sector" → **Tech Giants**

A: "The opportunity of solving current problems using technology with the link to entrepreneurship" → **Collective**

4. Event marketing

The most effective event marketing methods are shown in Figure 6 (top 4). The majority of participants were exposed to Innovation Hackathon Eswatini via word of mouth **(35,53% - 27 participants)**, social media platforms **(31,58% - 24 participants)**, WhatsApp groups (10,53% - 8 participants), and print media (5,26% - 4 participants).
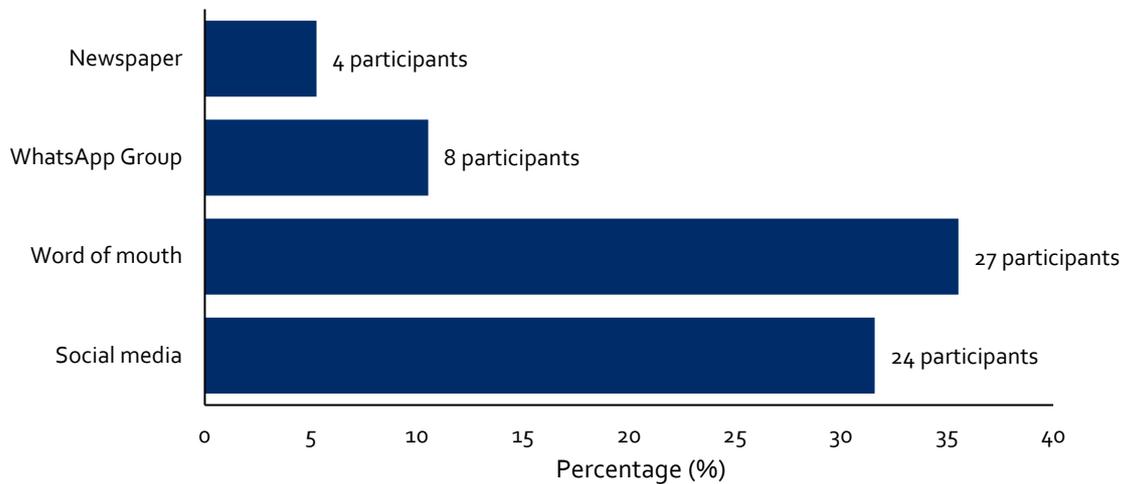

Figure 6: How did you hear about the Innovation Hackathon Eswatini?

Source: Innovation Hackathon Eswatini Participant Registration Form (77 respondents- Top 4)

5. Event improvement feedback

The participants highlighted several areas where future events could be improved, thereby enhancing skills development, networking and collaboration, and ultimately the extent to which the Hackathon achieves its objectives:

- *Judging* - "There needs to be a separate demo session where the developed software/solution is checked for functionality."
- *Awards* - "One team should be chosen for each problem statement."
- *Content* - "Participants could be given the tasks/problem statements prior to the event."
- *Judging* - "Clearer judging criteria and more clarity from the onset as to what is required from participants."
- *Judging* - "Increase the time allocated for pitching."
- *Post-event support* - "Swaziland has a lot of developers which need to be supported more."
- *Communications* - "Clearer criteria and guidelines for applicants."
- *Judging* - "Solutions should be judged on both the presentation and prototype, not only the pitch."

7. Annexures

Innovation

HACKATHON
Eswatini

DAY 2

TIME	ACTIVITY AND OBJECTIVE	RESPONSIBLE
7:00 – 8:30	BREAKFAST	
8:30 – 9:30	Team Profiles	FMT
9:30 – 10:00	Master class: Data sources	Tech Mentor
10:00 – 10:30	REFRESHMENTS	
10:30 – 12:30	Solution Design/Hackathon	Business & Tech Mentors
12:30 – 13:30	LUNCH	
13:30 – 14:00	Solution Design/Hackathon	Business & Tech Mentors
14:00 – 15:30	Solution Design/Hackathon	Business & Tech Mentors
15:30 – 16:00	REFRESHMENTS	
16:00 – 17:00	Update and pitch training	FMT
17:00 – 18:00	Solution Design/Hackathon	Business & Tech Mentors
18:30 – 19:30	LUNCH	
19:30 – 20:30	Mock Presentation training (Optional)	Business & Tech Mentors

DAY 3

TIME	ACTIVITY AND OBJECTIVE	RESPONSIBLE
7:00 – 8:30	BREAKFAST	
8:30 – 09:00	Pitch order briefing	FMT
09:00 – 10:00	Solution Design/Hackathon	Business & Tech Mentors
10:00 – 10:30	REFRESHMENTS	
10:30 – 12:30	Final Pitch Event	Judges
12:30 – 13:30	LUNCH	
13:30 – 14:00	Announcement of Winners	CBS: Mr. Majozi Sithole
14:00 – 14h10	Vote of thanks	FSRA: Mr. Sandile Dlamini
14h10 – 14h30	PHOTO SHOOT	

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