



Decision Enhancement for Starting Clay Mining Enterprises in Uganda

Habinka EA

Institute of Computer Science, Mbarara University of Science and Technology,

Email Address: annabinka@yahoo.co.uk; annabinka@must.ac.ug

Abstract

The startup phase plays an important role in the success and survival of any enterprise, which greatly depends on adequate and timely information for decision making. The entrepreneur's ability to identify and access relevant information promptly is significant to making timely decisions within the startup stage. The correctness of the decision made is mainly affected by the quality of information which depends on its availability. Enterprise suites have been developed to support the startup segment by enabling timely access to information. However, there is lack of a generalized and systematic means to carrying out enterprise startup that emphasizes constant communication and prioritization to support decision making. This article is part of results of a doctoral study in the University of Groningen. The study was conducted to establish the characteristics of mining SMEs write in full and their decision issues that matter to the starting mining entrepreneur, and recommend the important business information needs required for enhancing decision making in Uganda. It was carried out on the assumption that the mining SMEs in Uganda collapse because of lack of information access to improve decision making at startup. A descriptive survey research design was used to collect the required data using a combination of interview and focus group discussions. Sample size of fifty five mining SMEs, twenty five potential entrepreneurs, five mining consultants and five representatives from the department of geology survey and mines. Quantitative data obtained were analysed using Statistical Package for the Social Sciences (SPSS). The findings reveal that the mining SMEs have business information needs that require a studio based approach in the provision of business information for improved decision making at the enterprise startup. The study recommends that a design unique to mining Small and Medium Enterprises in Uganda to provide information on mineral identification, land ownership, regulatory, pricing, financial analysis and communication issues.

Keywords: *Decision enhancement, Information needs, Studio, startup*

1. Introduction

The start up process plays a vital aspect in enterprise survival. There is a global drive for job creation and self employment as the population of unemployed youth is on the rise. Enterprise ventures are a viable means of dealing with this concern. Small and Medium Enterprises (SMEs) are important for a national economy. An enterprise is defined by the number of employees, its annual sales or revenue turnover. Uganda adopted the following definitions of small and medium enterprises. A *Small Enterprise* employs a maximum of 50 people, annual sales/revenue turnover of a maximum 360 million Uganda Shillings (UGX) (USD) 120,000, or Euros (€) 84,000 and total assets of 360 million UGX. A *Medium Enterprise* employs more than 50 people with a maximum of 500 people; annual sales/revenue turnover of more than 360 million UGX and total assets of more than 360 million UGX [UIA, 2008; Hivos, 2008; Kasekende and Opondo, 2003].

In Uganda, SMEs contribute to more than 20 % of the National Gross Domestic Product (GDP) with an estimated 1,500,000 SMEs of which more than 90 % are privately owned [Ssebugwawo 2007; Hatega, 2007]. More than 150,000 of these are mining SMEs with estimated one million Ugandan direct beneficiaries [Kato, 2010; Hinton et al. 2009]. A study carried out by Uganda Bureau of Statistics, clarified the reason why many SMEs collapse and fail to remain in operation for more than a year. It was attributed to the entrepreneurs' decision making problems since they rely on intuition and lack of information to base their decisions [UBOS, 2007]. In Uganda, more than 30% SMEs established do not survive the first year due to limited access to information, lack of appropriate technologies and inadequate opportunities [Ishengoma and Kappel 2008; Hatega 2007]. *Enterprise startup* is defined by GEM [2007] as any attempt by individuals to start a new firm including any attempt for self employment. An *entrepreneur* is a risk taker who sees an opportunity in the market, gathers resources, creates, grows a business venture to satisfy these needs and is rewarded with profit (an added value if it succeeds) [Kunene, 2008].

Decision processes that lack agility and quality have a tremendous impact on the SME start-ups. In situations where the current decision process is slow, inflexible, fragmented, conflicted, multiple unknown procedures, and highly bureaucratic, chances of crisis and collapse are high. Start up decision agility is defined as the ability to swiftly and appropriately adjust a set of related activities performed to achieve a given start-up goal in response to unpredictable challenges that occur in this phase, beyond the normal level of flexibility. Keen and Sol [2008] argued



that, the enterprises that sustain success develop decision disciplines that are integral part of their culture. There is need to engage in a more controlled approach to decision making within the enterprise start-up process by systematic identification of the best outcomes to problems. This will enable the entrepreneurs to focus on the decision priorities in the enterprise start-up process.

Literature on mining SMEs start-up support is relatively limited. There has been a growing tendency to focus on the use of technology in the optimization of rock cracks, which deal with the operational sector of the mining industry [Heuberger, 2005; Zahiri, 2004; Simonsen and Perry, 1999]. Additionally, little has been provided on “how to” enable a starting entrepreneur make an informed decision. Various technologies in the mining sector were proposed, however their emphasis was on the use of experts to make decisions without the managers and owners involved thus the need for the fusion of the stakeholders, process and the technology for improved start-up decision processed. In absence of comprehensive integrated models and information systems, incomplete decisions are faced. Emphasis has been put on the use of technology to improve production in the mining sector; however, people handle complex decisions using human judgment, intuition, word of mouth, sixth sense, and experience in starting a mining enterprise [Habinka et al, 2009; UBOS 2007]. The current ways of enterprise start-up are adhoc and not structured hence the need for a guiding framework and services to support the mining SME start-up decision process in Uganda. This paper seeks to address the following research question: *what are the current and key issues in mining enterprise start ups in Uganda?* This research question was answered in an exploratory case study described.

In summary, this paper was intended to help us gain understanding on the contextual small and medium enterprise startup challenges. To address this goal, we first look at decision enhancement in section 2, followed by the research approach and results in section 3. Subsequently section 4 addresses the results. Finally section 5 presents the future work and conclusion.

2. Decision enhancement

Decision Enhancement Services (DES) utilized a studio-based approach to enhance ill-structured decision processes presented by Keen and Sol [2008]. In this paradigm, the concept of a “studio” is introduced and defined as a facilitative and, interactive environment for decision enhancement [Keen and Sol, 2008]. The goal of a studio is to help managers “rehearse the future” by building their comfort with and confidence in directly using appropriate, interactive tools in the decision process. Decision Enhancement Services involves the fusion of tools, processes and people to make an informed decision [Keen and Sol, 2008]. The studio environment enhances decision agility by creating opportunities for speedy, adaptive, coordinated, collaborative, and innovation among its participants. According to Keen and Sol [2008], DES focuses on landscaping, orientation and initiation, recipes, suites and processes. *Landscaping* defines the decision context, stakeholders and governance rules for the decision process. *Orientation and initiation* ensures that teams with the skills, credibility and domain expertise to attract, motivate coordinate and help the studio participants’ move to a decision commitment. *Recipes* apply to whatever possible proven guidelines which may include scripts. Suites are the tools and technologies that are designed and implemented within an overall distributed architecture. *Process* involves making commitment to a decision the explicit target and agenda. This approach was used in South Africa, and Uganda respectively [Muniafu, 2007; and Mulira, 2007]. It was used in inter-organizational service inter-dependency [Mulira 2007]; and logistic service delivery [Muniafu, 2007].

3. Research Approach

3.1 Research strategy

This research was inductive in nature as it derived its problem from the community, abstracted and synthesized it with an aim of understanding contextual issues that cause mining SMES collapse within the start-up phase. According to Trochim [2007], an inductive hypothetical strategy is suitable for synthesis, multi-disciplinary attempt to integrate scientific, ethical and esthetic modes of thought. This approach is suitable when dealing with ill-structured problems. It consists of five steps namely initiation, abstraction, theory formulation, implementation and evaluation [Trochim, 2007; Sol, 1982]. The initiation stage involves gathering information from mining SME owners and managers on the operational and administrative decision issues. The second step involved abstracting the essential aspects. Requirements will then be derived from literature and the challenges. Based on the requirements, the essential components will be classified to get their interactions in the global design stage in the theory formulation stage. A studio instantiation will be developed in the implementation phase. This will be taken for testing and validation in the final phase. This paper looks at the results of the initiation phase through an exploratory study.

3.2 Research Philosophy

The research philosophy used in this study of starting mining SMEs followed the design science research



philosophy. This method consists of three cycles namely: the relevance, design and rigor cycles [Hevner and Chatterjee 2010; Herver 2007]. We chose this method because it aims at handling ill-structured problems by producing artefacts that contribute to the body of knowledge and are relevant to the community [Hevner 2007]. In this research, design science was used to emphasize the relationships between the environment, existing knowledgebase and our research project. A review of theories, methods, practices in mining SME start-ups and information systems was done with an aim of positioning our research. This was done and referenced in the introduction section to ensure innovation and novelty. In the relevance cycle, we explored single case studies [Yin 2003] to gain an in-depth understanding of the mining challenges that cause them to collapse. Secondly, the exploratory study was used to identify user requirements for the proposed solution based on the challenges faced by mining enterprise managers. In the design cycle, the build and evaluate loop, a decision enhancement studio will be designed and an artefact will developed in an iterative way [Hevner 2007; Hevner et al. 2004]. This paper contains the first step in this cycle as discussed in section 3.

4. Results

Interviews and Focus Group Discussions (FGDs) were used to collect opinions and experiences from the respondents concerning mining SMEs. Interviews were useful in capturing the personal account of the respondents while FGDs were instrumental in revealing, discussing and clarifying issues and doubts. The exploratory study involved the following stakeholders: mining entrepreneurs, consultants, DGSM representatives and potential miners in mining SME startups.

Table 1: Respondents in the exploratory study

Category	Number of respondents	Percentage (%)
Mining entrepreneurs	55	61.1
DGSM staff	5	5.6
Mining consultants	5	5.6
Potential miners	25	27.7
Total	90	100

The mining entrepreneurs involved in the study were classified in two categories: 40 enterprise owners (72.7 %) and 15 site managers (27.3 %) the key decision makers in SME start up. In the exploratory study, it was discovered that the main challenge faced in developing mining enterprise start-up services was how to improve their coordination. The main causes of the problems were attributed to the inaccessibility, illiteracy and presence of fragmented and incomplete information to the rural masses. In the interview sessions with the mining entrepreneurs, the following observations in the rural areas were made.

Inaccessibility to information: It was clear that the miners face challenges of identifying mineral deposits due to lack of information. In cases where decisions were to be made on mineral locations, inadequate information on the quality and quantity of the remaining ore was available. Thus the need for stakeholder involvement in directed decision making on alternative mineral distribution, their quality and quantity. Based on the results from the table 2 the respondents got the information from family and friends.

Table 2: Mineral identification

Mineral exploration agents	Frequency	Percent (%)
Department of geology survey and mines	5	9.1
Family or friends (pitting)	45	81.8
Mining consultants / metallurgists	5	9.1
Total	55	100.0

Information on land cost and ownership issues: In Uganda, the minerals belong to the government but the land is owned by individuals (DGSM, 2009). In the exploratory study, it was noted that the mining entrepreneurs lack information on alternative methods of land possession and costs involved. This affects the entrepreneurs start-up decision process thus the need for a structured way on disseminating procedures. Additionally, the mining entrepreneurs are often exploited by middlemen on the cost of land. There is need for stakeholders to make informed decisions based on information on procedures and costs of land acquisition shown in table 3.



Table 3: Mine land acquisition (Surface rights)

Options	Frequency	Percent
Bought the land	15	27.3%
Lease land from land owner	10	18.2%
Joint venture with land owner or customary owned land	30	54.5%
Total	55	100.0%

The legal process to acquire a mine: The researcher wanted to understand the problems associated with regulations in the mining sector. We sought to know whether the mining entrepreneurs had legally registered companies, obtained mining licenses, paid royalties, made returns to DGSM and whether they knew where to obtain that information as shown in table 4.

Table 4: Need for regulatory services

Questions	Options	Frequency	Percent %
Do you have a mining licence? (Prospective licence, exclusive prospective licence, mining lease licence, mineral dealers licence.	Yes	5	9.1
	No	50	90.9
How did you access the licencing information?	Unlicenced	50	90.9
	DGSM	2	3.6
	Family or friends	1	1.8
	Mining consultants or metallurgists	2	3.6
Do you have an environmental impact assessment certificate?	Yes	5	9.1
	No	50	90.9

Linking mining entrepreneurs to customers by eliminating the middlemen: The problems associated with the middle man's involvement in the start-up process of linking the entrepreneur to the customers were raised. The middlemen essentially operate as a chain of dealers thereby introducing complexity in the transactions. Additionally, the dealers sometimes fail to remit the money to the entrepreneurs. There was a need to provide support in linking the entrepreneurs to the customer as a means of streamlining the middleman's role as shown in table 5.

Table 5: The middle man's and financial issues at start-up

Financial and middlemen issues at start up	Options	Frequency	Percent %
Do you face challenges of obtaining and remitting loan to banks at start-up?	Yes	50	90.9
	No	5	9.1
Investment decisions - calculating profits	Yes	53	96.4
	No	2	3.64
What issues are faced with the middleman at start-up? (Increased costs as a result of middlemen)	Yes	50	90.9
	No	5	9.1

Financial problems: The mining entrepreneurs often get start-up financial loans from banks and micro-finance schemes. However, the entrepreneurs face problems of paying the loan and systematically counting the expenses in relation to the profits from mining activities. The entrepreneurs attributed the financial decision problems to inadequate book keeping skills and showed the need for guided procedures, stakeholder involvement and the use of appropriate tools and techniques for complex financial decision problems as shown in table 5.



Regulatory inquiries: A mining plan is one of the pre-requisites for the license and bank loan acquisition. This involves issues on production, marketing, and mining method alternatives. Based on the findings, the participants had inadequate information on coming up with a mining plan. Hence the need for stakeholder involvement to support the mining plan decision process as shown in table 6.

Table 3-6: Mining plan services

Questions	Options	Frequency	Percent %
Do you have a mining plan?	Yes	5	9.1
	No	50	90.9
What type of mining is carried out at your mining site?	Surface mining (extraction of mineral near the surface)	35	63.6
	Underground mining (extraction of ore located vertically or horizontal tunnels into the ore body)	20	36.4
Is your mining enterprise mechanized or not?	Yes	1	1.8
	No	54	98.2
What mining method(s) do you use when extracting the ore?	Drilling	30	63.6
	Blasting	25	36.4
Do you cover or utilize any pits after mining?	Yes	35	63.6
	No	20	36.4
Do you have any piped metered water at your mining site?	Yes	5	9.1
	No	50	90.9
Do you use electricity at your mining site?	Yes	5	9.1
	No	50	90.9

The need to enhance interaction between the miners and the service providers: In the exploratory study, it was noted that there was inadequate interaction and communication between the mining entrepreneurs and the service providers as deduced from table 7.

Table 7: Interaction between the entrepreneurs and the service providers

Question	Options	Frequency	Percent %
How the entrepreneurs identified the minerals.	DGSM	5	9.1
	Family or friends	45	81.8
	Mining consultants	5	9.1
Whether the mining entrepreneurs had their licensed business.	Unlicensed	50	90.9
	Licensed	5	9.1
Of the 5% that had licensed mining enterprises, how they accessed the licensing information.	DGSM	2	3.6
	Family or friends	1	1.8
	Mining consultant or metallurgists	2	3.6

Access to services: The study involved understanding the role of ICT in the entrepreneur's day to day mining operations. Three questions were generated to seek the participants preferred mode of delivery of services, the levels of experience with ICT and its usage. The participants preferred to have useful information passed to them using ICT (mobile phone) as the mode of delivery as shown in table 8.

Guidance: As the entrepreneurs started their businesses on trial and error mechanisms, experience and luck, the respondents mentioned the need for guidance in mining enterprise start-up process. The entrepreneurs are mainly



driven by the need to make a living which explained why they need adequate guidance on mining SME procedures. In addition, the respondents noted that the cost of getting the guidance and start-up facilities should be affordable.

Table 8: ICT access

Questions	Options	Frequency	Percent %
How to access information availed	Computers	10	18.2
	Mobile phone	34	61.8
	CD ROMS	11	20.0
I have experience with using the following ICT services 1 – Email, 2 – Web browsing, 3 – Voice (mobile or fixed line), 4 – SMS (mobile or website), 5 – ICT professional, 6 – None of the above, 7 – All of the above, 8 – 1 to 2 items, 9 – 3 to 4 items	All	1	1.8
	One to two items	50	90.9
	Three to four items	4	7.3
The level of my ICT usage skills are?	Low	39	70.9
	Moderate	11	20.0
	Good	4	7.3
	Proficient	1	1.8

Infrastructure for access to services: The respondents further noted that since most of the mining enterprises are based in rural areas, it is important to consider the infrastructural constraints on accessing services like voice and data networks. Based on the results in table 3-8, the mining entrepreneurs had basic ICT skills. With the presence of six mobile company operators in Uganda with affordable voice and text services, the mobile phone technology was noted to be the most accessible and cost effective ICT service.

External challenges: The respondents mentioned external challenges that affect the mining SME start-up process as shown in table 9.

Table 9: External issues outside the mining enterprises control

Question	Options	Frequency	Percent %
Which other external problems affects your decision making process? (items out side of your control) These include 1. Market demands and supply, 2. Competitors, 3. International mineral prices, 4. Foreign exchange rates, 5. High taxation from government, 6. Political instability, 7. World wide economic instability.	None of the above	8	14.5
	Any 1 - 2 items	19	34.5
	Any 3 - 4 items	13	23.6
	Any 5 - 7 items	15	27.3
	Total	55	100.0

5. Discussion

The results of this study provide us with issues concerning starting a mining SME in Uganda. In this section we provide our reflection on the results and their implications to the existing body of knowledge. The SMEs operate in cash constrained and operate in business environments characterized by fragmented, incomplete and inconsistent information regard start-up services. Thus to develop start-up services, they should not put financial constraints to the start-up entrepreneur.

Flexibility: According to Muniafu [2007], services for rural enterprise managers should be flexible and reusable. The SMEs had unique problems of information needs thus developing start-up services is challenging since they need to be flexible and reusable to suite the activities identified in the exploratory study, thus the need to develop services for each of the mentioned activities. According to Gonzalez, [2010] Information quality has the following attributes: accuracy, timeliness, relevance, quantity, completeness, format, security and consistency.

Un-fragmented services: The review of literature reveals that many entities involved in decision processes i.e. people, process and technology are often in isolation and treated as separate segments. Usually the people that matter are left out and the process is left to experts [Heuberger 2005]. There is need for stakeholder participation in making start-up decisions. This will improve of the kind decisions being made create consensus and uniformity of ideas.



Land acquisition issues suggest that miners will most likely start-up if they possess land with their desired mineral of interest as a result of collective result of miners effort in 1) identifying a mineral of interest 2) ensure alternative nearest resources are known 3) adequacy of mineral deposit 4) the quality of the ore in relation to the customers need 5) inquiry from experts on the ore grade and 6) availability of funding. In literature, various factors pointing to the importance of the identified issue on land acquisition at enterprise level [Hilson and Banchirigah 2009]. We acknowledge the value of these contributions to enterprise start-up land acquisition implementation. Our results differ from them in one important way, enterprise managers involved in the start-up phase do not have a check list of factors to help them decide to start or not to start a mining enterprise initiative and also an integration of technology to show the location of various areas with the same mineral, and the involvement of stakeholders at each step.

The *regulatory* issues involve the miner formalizing their business with the basic required governmental bodies. These include: registering the enterprise with the registry of companies, Environmental Impact Assessment (EIA), acquire mining license (Prospective Licence (PL), Exclusive Prospective Licence (EPL) renewable, Mining Lease (ML), Mineral Dealers Licence (MDL)). Issues related to regulatory policies literature reveals the need for regulations as mentioned by [Nabukenya 2008; Siegel and Veiga 2009]. However, we differ in the sense that we suggest an interactive environment where the regulatory forms are easily downloaded, explanations and communication from the stakeholders on their importance and the use of the exact form as what stage. We also differ in a way that we provide a check list of how to achieve each of the important regulatory steps needed for legalization.

Considering the *pricing and financial* strategies [Kazooba 2006] emphasizes that such practices are important and we acknowledge their contribution. However, we suggest a checklist of issues to consider in carrying out the financial analysis and pricing comparison to bridge the demand and supply gap. In addition, these issues are looked at in a discrete way which we differ by suggesting a combination of technology, stakeholders and processes. To blend the three identified issues mentioned above the communication issue considers the mix of ICT, methods and stakeholder which we propose as the way forward. Our findings further the existing propositions by suggesting generic issues such as usefulness convenience on access of start-up information with interaction from technology with experts. In addition, the local language is an important issue to consider in the effective reach of miners in rural areas. These languages may include Luganda, Swahili, and Runyakitara as the major spoken languages in Uganda.

6. Conclusion

The objective of this study was to establish the issues potential to explain the mining enterprise startups in Uganda. We identified seven issues: limited accessibility to information about mineral distribution; lack of information on the alternative methods of land ownership; limited access to regulatory and licensing information, difficulty in developing a mining plan as a prerequisite in the legalization process, increased costs as a result of middlemen, limited support for Cost Benefit Analysis (CBA) and Return On Investment (ROI) projections or forecasting; there is no interaction between the miners and the service providers. Our results face some important limitations. Firstly the factors may have causal effects towards each other. In this study we did not investigate that aspect. Secondly, issues such as national administration style may have an impact on mining SME startups. Thirdly because the study was carried out only in Uganda, care must be taken in utilizing its conclusions in other contexts. However, they still provide an important starting point as far as mining enterprise startup is concerned. They provide initial understanding for designing appropriate approaches for overcoming mining startup issues in developing countries. Future work is dedicated to the design, implementation and testing of the solution.

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