13

A Studio Based Approach to Enhancing Decision Making in Sme Start-Up

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Abstract

The start-up phase plays an important role in the success and survival of many enterprises, which greatly depends on adequate and timely services for decision making. However, deciding to startup a mining Small and Medium Enterprise (SME) is a challenging task for many entrepreneurs in Uganda. Research on SME start-up support is limitedly available. Information Communication and Technology (ICT) is envisaged to facilitate enterprise start-ups. However, there are still acknowledged deficiencies in Uganda due to their discrete and isolated approach of technology, stakeholders and processes. There is lack of a generalized and systematic means to carrying out SME start-up that emphasizes constant communication and prioritization to support decision processes. Hence, this design science research aims to enhance ill-structured mining SME start-up decision processes with a decision enhancement studio. This studio consists of services for participants in an interactive environment to enhance the enterprise start-up decision processes by doing an analysis of the decision alternatives. This paper presents a design of the decision enhancement studio for mining SME start-ups. The studio is based on the requirements derived from literature and an exploratory study in Uganda. The future research will be dedicated to the implementation, evaluation, and refinement of the decision enhancement studio for mining enterprise start-ups.

Keywords*: Small and Medium Enterprise, Start-up, Decision Enhancement, Studio*

Introduction

The Uganda government has turned to Information Communication and Technology (ICT) as a tool to improve access to information as a new medium for social and economic change [Uganda Ministry of Finance, Planning and Economic Development 2010]. There is a strong push for job creation and self employment in Uganda especially 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 and its annual sales or revenue turnover. In Uganda, we adopt the following definitions of small and medium enterprises. A Small Enterprise employs a maximum of 50 people, has annual sales/revenue turnover of a maximum 360 million Uganda Shillings (UGX) (USD) 150,000, or Euros (€) 110,000) and total assets of maximum 360 million UGX. A Medium Enterprise employs more than 50 people with a maximum of 500 people, has annual sales/revenue turnover of more than 360 million UGX and total assets of more than 360 million UGX [UIA 2008; Hivos 2008; UBOS 2007; 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; Ssewanyana 2007; Ssewanyana and Busler 2007; Hatega 2007]. More than 150,000 of these are mining SMEs with an 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 challenges 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 to support technology transfer [Ishengoma and Kappel 2008; Hatega 2007]. Their survival is greatly influenced by the amount of information availed to the SME stakeholders [Habinka et al. 2009]. To achieve a sustainable enterprise start-up, it is vital for one to understand the start-up process and activities involved so as to decisively establish what is required and the development of the right strategy. Enterprise start-up 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]. Starting up an enterprise is a decision or choice a manager makes to start a business or enterprise [Wickham 2001].

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 [Habinka et al. 2009]. 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 [Habinka et al. 2009; GEM 2007]. Keen and Sol [2008] argue that, the enterprises that sustain success, develop decision disciplines that are an 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 as a means of improvement to decisions. This will enable the entrepreneurs to focus on the decision priorities in the enterprise start-up process.

The availability of 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 mineral rock cracks, which deal with the operational sector of the mining industry [Vanek and Ruckova 2010; Berglund and Karltun 2007; Everett 2007; Heuberger 2005; Zahiri 2004; Simonsen and Perry 1999; Kaden et al, 1990]. However, a lot has been said on the pre-investment sector but 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 in the rural areas of Uganda [Habinka et al, 2009; UBOS 2007]. The current system for carrying out enterprise start-ups are adhoc and not structured hence the need for a guiding framework and services to support the mining SME start-up decision process in rural areas of Uganda. Hence, the main question of this research is: How can we provide support for enhancing mining SME start-ups in rural areas of Uganda? Keen and Sol, [2008] emphasize that technology is to be used for administrative, meeting and analytical support coupled with quality information for enhancement of decision processes. Therefore, in this paper we use the studio based approach to provide support to mining enterprise start-ups in Uganda.

In summary, this research aims to enhance mining SME start-up decision processes with the design of a decision enhancement studio. To address this goal, we first look at decision enhancement services presented in section 2, followed by the research approach in section 3. Subsequently section 4 addresses the mining SME challenges, requirements, and the studio design. Finally section 5 presents the future work and conclusion.

Decision enhancement services: a studio based approach

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 this is defined as a facilitative, 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 innovative projects among its participants. According to Keen and Sol [2008], decision enhancement services focus 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 developing countries like 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]. Muniafu [2007], handled a complex situation of matching supply and demand transport scheduling services in a rural transition country that is South Africa. His aim was to get a solution to conflicting interests of transportation parties using ICT services. Mulira [2007], was able to come up with a studio that supported inter-organizational service systems in volatile contexts. The study was in Uganda handling collaboration within three universities that is Makerere University, Kyambogo University and Uganda Martyrs University Nkozi. The studio was used to enhance decision making within the inter-organizational service systems, among independent actors with divers technical infrastructure and scarce resources. In order to enhance mining SME start-up decision processes, in this research a decision enhancement studio will be developed using the studio based approach following [Keen and Sol 2008]. A set of services delivered with suites that are deployed in a decision process will be developed within the studio for mining enterprise start-ups.

Research Approach

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 to 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. In addition, it is regarded as a

bottom-up approach in conducting multi-disciplinary research. This approach is suitable when dealing with ill-structured problems or when seeking to define problems.
The inductive hypothetical research strategy consists of five steps namely initiation, abstraction, theory formulation, implementation and evaluation as explained below [Trochim 2007; Sol 1982]. The initiation stage involves gathering information from mining SME owners and managers on the operational, administrative decision issues involved at start-up. The second step involved abstracting the essential aspects. Here, the challenges faced by the miners were analyzed to get the key issues. Requirements were then derived from literature and the challenges. Based on the requirements, the essential components were classified to get their interactions in the global design stage in the theory formulation stage. A studio instantiation comprising a prototype and sets of guidelines from the design will be developed in the implementation phase. This will then be taken back to context for testing and validation in the final phase.

Research Philosophy

In order to design a generic framework for improving the decision process of starting a mining SME, we 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 [Carlsson 2006; Hevner 2007; Winter 2008]. In this research, design science was used to emphasize the relationships between the environment, existing knowledge base 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 multiple 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 was designed and an artefact will be developed in an iterative way [Hevner 2007; Hevner et al. 2004]. This paper contains the first and second steps in this cycle as to be discussed in section 4. These comprise the artefact that will be deployed together with a prototype to the mining enterprise owners/managers during the testing and validation stage.

Studio design

Requirements of the studio

Challenges and decision needs for mining SME start-ups in Uganda

Seven challenges that mining SME entrepreneurs encounter in the decision process of starting a mining enterprise in Uganda were found, based on an exploratory study. This involved focus group discussions and interview sessions with a total of

ninety (90) mining SME stakeholders from various mining regions of Uganda. These include mining entrepreneurs, mining consultants, mining representatives from the Department of Geology Survey and Mines (DGSM) and potential miners. Documents from government and a countrywide mining workshop added more insights to the regional and major problems faced by miners with potential solutions. Interviews and Focus Group Discussions (FDGs) were used to collect opinions and experiences from the mining entrepreneurs, consultants, DGSM representatives and potential miners concerning decision-making problems in starting a mining enterprise. Interviews were useful in discussing and clarifying issues and doubts. We collected data from four regions in Uganda: Kampala (central), Mbarara (south), Kasese (western) and Gulu (northern). These were selected because they are in the main rift valley wings with lots of mining activities in Uganda.

Based on information from the exploratory study, several needs for the mining SME start-up process were formulated and they were: limited accessibility to information about mineral distribution, lack 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 and return on investment projections or forecasting, and no interaction with the service providers. These are explained further below.

i. Limited accessibility to information about mineral distribution

The miners face challenges of identifying mineral deposits. In cases where decisions have been made on mineral locations, the miners have inadequate information on the quality and quantity of the remaining ore available for exploration, thus the need for stakeholder involvement in directed decision-making on alternative mineral distribution, their quality and quantity.

ii. Lack of information on the alternative methods of land ownership

The miners lack information on alternative methods of land possession and costs involved. This affects their decision-making process thus the need for a structured way on disseminating these procedures for improved decision-making when applied correctly. Currently the alternatives known of land ownership is by joint venture with the land owners.

iii. There is limited access to regulatory and licensing information

The miners have limited information about where they can acquire licenses more quickly and cheaply due to the bureaucratic procedures involved. There is too much bureaucracy involved in acquiring a mining license. There is no cheap way one can acquire a license directly. The miners attribute their failure to acquire licenses to their distance to the mining headquarters as being far and expensive.

iv. There is difficulty in developing a mining plan as a prerequisite in the legalization process

This is a requirement in getting the mining license. As one of the prerequisites in getting the licensing, a mining plan is needed and the miners need a guide in developing one. The miners have limited information in coming up with a mining plan. This involves plans on production, marketing, and mining method alternatives, therefore, the need for stakeholders to enable decision-making processes when coming up with the mining plan.

vi. Increased costs as a result of middlemen

The miners incur losses as a result of middlemen since they do not have direct contacts with their customers. They have to use middle men or brokers to help out which causes them to get less profit from their products. The operation of these middle men is done in a chain of dealers who also link up with other dealers making a complex chain of dealers. The dealers sometimes fail to remit the money to the miners with worst cases being that of running away with money obtained from customers after making deals with miners. There is a need to get direct access to the customers in a transparent manner hence eliminating the middleman's role.

vii. Limited support for Cost Benefit Analysis (CBA) and Return On Investment (ROI) projections or forecasting

The mining business is capital intensive and needs huge sums of money which miners usually get from loaning facilities like banks and micro-finance schemes. As time goes by with the mining business and capital intensive mining operational activities, they face problems of paying the loan and systematically counting the expenses in relation to the profits from a mining activity. Hence there is a need for guided procedures, blend stakeholders using appropriate tools and techniques to handle this issue.

viii. There is no interaction between the miners and the service providers

On various issues of concern like request for information, suggestions, complaints, follow-up and contacts. In order to have the miners survive in the mining enterprise field, it is necessary to get a cheap and effective way of interaction between the miners and the service providers.

The above shows that overall a need for a solution that enables mining SME collaboration, coordination, and service sharing as well as for generation and analysis of decisions alternatives clearly exists for mining SME start-ups in Uganda, confirming that the deployment of a decision enhancement studio is a suitable solution to this end.

Theoretical reflection on the findings

Based on the findings and the observations made through the exploratory case study and presented in this chapter, we learnt that it is very challenging to develop mining enterprise

start-up services in rural areas of Uganda especially because of the environmental and technological constraints. The objective of this research is to use the decision enhanced services to support and improve mining enterprise start-up services.

The information on mining enterprises in rural areas is limited or non-existent. The SMEs operate with cash constraints and operate in business environments characterized by fragmented, incomplete and inconsistent information regarding start-up services. The mining SMEs cannot afford information systems to help them compete favourably with the large mining enterprises. Thus it is noted that to develop start-up services, they should not put financial constraints on the managers. It is therefore important to note that the start-up services are best to be developed at the mining knowledge service centers within the infrastructure and attendance of the staff of the Department of Geology Survey and Miners to improve on their support to start-up miners. This contributes to the relevance of the research objective and the need to provide support for the development of mining enterprise services.

Flexibility: According to Muniafu [2007], services for rural enterprise managers should be flexible and reusable. The SMEs in the rural areas we studied had unique problems of information needs thus developing start-up services is challenging since they need to be flexible and reusable to suit the activities identified in the exploratory study, thus the need to develop services for each of the mentioned activities. Simon [1977] suggests that this hierarchy (inflexibility) creates costs for example in the form of communication, and motivation towards achieving a goal.

These **information quality** services include information on mineral distribution to handle the limited accessibility to such information, alternatives to cater for lack of information on the alternative methods of land ownership, regulatory information to cater for limited access to regulatory and licensing information, a mining plan, middlemen intermediation to reduce costs as a result of middlemen, finances to cater for limited support for cost benefit analysis and return on investment projections or forecasting and communication services to handle interaction with the service providers. According to Gonzalez, [2010] Information quality has the following attributes: accuracy [Kontogiannis 1996], timeliness [Atoji et al., 2000], relevance [Adam et al. 2007] quantity [Atoji et al, 2000], completeness [UBOS 2007], format [Jenvald et al, 2001], security [Kim et al, 2007] and consistency [Fisher and Kingma 2001].

Un-fragmented services: The review of literature reveals that the major 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. Therefore the services to be developed will consider un-fragmentation as an important issue. This will improve the kind of decisions being made, by creating consensus and uniformity of ideas. Lack of un-isolated services cases the decision makers and stakeholders involve remain un-contented and grambling over

their opinions. In order to view the enterprise as a whole it is important to consider un-fragmented workable practical solutions when starting a mining enterprise.

These are classified in four categories: land acquisition, regulations, pricing and communication. This suggests that mining start-ups will be achieved if these issues will be considered and manipulated in favour of the miner. In this section we compare our results against the existing literature. This helps to identify and explain any relevant similarities and or variations from the existing body of knowledge.

Land acquisition issues suggest that miners will be more likely to start-up if they possess land with their desired mineral of interest. In land acquisition, there is a collective result of miners effort in 1) identifying a mineral of interest 2) ensuring alternative nearest resources are known 3) ensuring adequacy of mineral deposit 4) ensuring the quality of the ore in relation to the customers need 5) inquiring from experts on the ore grade and 6) availability of funding. Miners will unlikely collapse at start-up if they acquire land with their desired mineral of interest.

The regulatory category involves the miner formalizing their business with the basic required governmental bodies. These include: 1) registering the enterprise with the registry of companies - Memorandum of Understanding (MOU) and Articles of Association (AOA), Uganda Revenue Authority (URA) for Tax payers Identification Number (TIN) for both the enterprise and individual 2) ensuring that Environmental Impact Assessment (EIA) is carried out with National Environmental Management Authority (NEMA), acquiring a mining license (Prospective Licence (PL), an Exclusive Prospective Licence (EPL) renewable, a Mining Lease (ML) and Mineral Dealers License (MDL)).

We found in the 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. Instead their start-up decisions are influenced by the extent to which an entrepreneur has information. Specifically they mainly use experience and word of mouth on the location of minerals from the indigenous people in the area.

Issues related to regulatory policies literature reveals the need for regulations as mentioned by [Nabukenya 2008; Siegel and Veiga 2009; Hilson and Banchirigah 2009]. However, we differ in the sense that we suggest an interactive environment where the regulatory forms are easily downloaded and explanations and communication from the stakeholders on their importance given 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. This can help in decision making by the entrepreneur at start-up.

Considering the pricing and financial strategies [Kazooba 2006; Zavatta 2008] emphasize 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 blend of technology, stakeholder involvement and processes. To blend the three identified issues mentioned above, the communication issue is important in a way that the available means are discrete in nature not considering the mix of ICT, methods and stakeholders which we propose as the way forward.

The categorization of service issues presented above is not new, however this approach is similar to that used by [Kunene 2008]. They look at the process partially with emphasis on training as the major component. Our findings further the existing propositions by suggesting generic issues such as usefulness and convenience to 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 the rural areas of Uganda. These languages may include Luganda, Swahili, and Runyakitara as the major spoken languages in Uganda.

Requirements

The theoretical basis of the requirements of the studio developed is this research is derived from the work of [Keen and Sol 2008].

Requirement 1: The studio should allow for start-up request and response services. The studio should contain services that facilitate collecting the details of the service requests and responses from the end user. The studio should provide for a means of categorizing the services according to the similarity of functional services like land acquisition to handle land issues and pricing to cater for pricing and financial analysis services. The request for information in the studio should be considered to enable particular services of interest. Due to the band width problems, it is important to cater for services that need limited bandwidth by providing distributed systems on the local networks that get updated frequently. The stakeholders should be involved from the inception of the start-up initiative and actively involved in the decision-making processes. This is important for consensus and agreement of particular start-up decisions like those concerning issues of land ownership or financial commitment to a particular mineral of interest. The studio should also contain video-conferencing or interactive chatting and discussion virtual environments for stakeholder to meet based on location independence [Glushko 2010]. Literature from Uganda Communication Commission (UCC) report shows that there is an estimated mobile telephone subscription of 13.2 million people in Uganda with an estimated 24.9 million by 2015 [UCC 2011].

Requirement 2: The studio should support distributed and dynamic selection of mining enterprise start-up services.

The studio should be developed on platform and browser independent systems, allowing for flexible and adaptive services. The sets of services in the studio should facilitate creation of services definitions, and modification of services [Muniafu and Van de Kar 2008; Muniafu 2007]. Considering situations where the infrastructure is low, getting feedback may take a long time considering the urgency of the request. The need for decentralized architecture for different locations would be a solution to the centralized kind of system architecture. This will reduce on the service inefficiency.

Requirement 3: The studio should facilitate effective combination of service components.

The studio should contain middleware services that blend the different services provided in each of the tools in the studio. The studio should contain middleware that reduces the infrastructure problems and effectively combine the service components. The studio should provide for means of creating value added services for the basic survival of the users and service providers based on the environment. The components should have been tested and free of bugs [Franke and von Hippel 2003; Muniafu and Van der Kar 2008].

Requirement 4: The studio should support flexible and adaptive value added services.

The studio should be able to contain services that can be used to identify the start-up service needed from the service provider in a flexible manner. The services should enable the knowledge center managers to enter new services, and update the existing ones whenever necessary. This could apply to entering land availability details, mineral prices and any other regulatory services that are needed to add value to a start-up mining entrepreneur.

Requirement 5: The studio should provide a solution space (graphical user interface) for the services

The studio should contain services that provided on a front end tool, with an easy to use graphical user interface to enable service providers to manually enter new details necessary for a start-up mining entrepreneurs. It should also allow the users to access the services necessary for mining enterprise start-up. Glushko [2010] suggests that an interface allows the service provider and service consumer to exchange requests and responses services.

Requirement 6: The studio should facilitate effective means of communication among the different actors involved in the organizational architecture such as with partners offering mining start-up services in order to achieve competitive advantage.

The studio should contain services that enable the knowledge service center managers to adapt mining enterprise start-up services to suite the users and connect to partners in the stakeholder organizations that provide start-up services like company registration (URA), environmental issues (NEMA) and standards (UNBS). These should be in a transparent and flexible way on mutual agreement of the different ministries

and organization departments. Given the complexity of the multiple services from the actors, it is important for the knowledge service manager to remain focused on the start-up service delivery [Papazoglou and Van de Heuvel 2006].

Requirement 7: The studio should provide guidelines for using the studio

The studio must be accompanied by practical and usable sets of guidelines that facilitate the knowledge service center managers, and the users to follow up on the various services. These could be in form of user manuals attached to every suite showing how to use each of the suites in the studio. These should be available to provide support to enable easy navigation and to cater for the expectations of the users.

Requirement 8: The studio should be user friendly

The users should be able to operate it using their existing skills and customary design languages [Franke and von Hippel 2003; Muniafu and Van der Kar 2008].

Studio design

Based on the requirements and information from the exploratory study, a mining SME start-up design was derived. This diagram below presents a design of the decision enhancement studio for mining SME start-ups. Considering the requirements and the literature reviewed above, we propose a decision enhancement studio consisting of four suites that provide the required functionality. These are the (i) Land acquisition suite (ii) Regulatory suite (iii) pricing suite and (iv) Communication suite as illustrated in figure 1 below. Figure 1 shows the design process design in which the following services are deployed: landscaping, facilitation, recipes, suites and process [Keen and Sol, 2008]

- **Landscaping**: It involves the definition of the decision context in this research which is enhancing mining small and medium enterprise start-ups in Uganda. This involves understanding the decision issues, decision makers, information resources, and the basics to model the mining SME start-up process. These include the four major suites in figure 1.
- **Facilitation**: Here, behavioural knowledge and process skills are major. The role of the facilitator is important in the process of decision enhancement. This involved the assembling of stakeholders coupled with an agenda and followed through a start-up process. In this stage, initiating the guidelines is carried out to ensure that the team supporting the studio participants was alert.
- **Suites**: The tools are to be designed and implemented within a distributed architecture. The aim is to get the prototype easy to access, from any location by making use of the Internet. The appropriate tools were used to provide the services needed during the enterprise start-up process.
- **Recipes**: Recipes are proven, repeatable and transferable specific ingredients and sequencing permit variations and innovations. In this study, we came up with guidelines that were derived as systematic, to the mining enterprise start-up process. These were carefully chosen in line with the government

regulatory body and the mining enterprises coupled with literature and creativity.

- **Decision process**: This involves making a commitment to a decision, the explicit target and agenda.

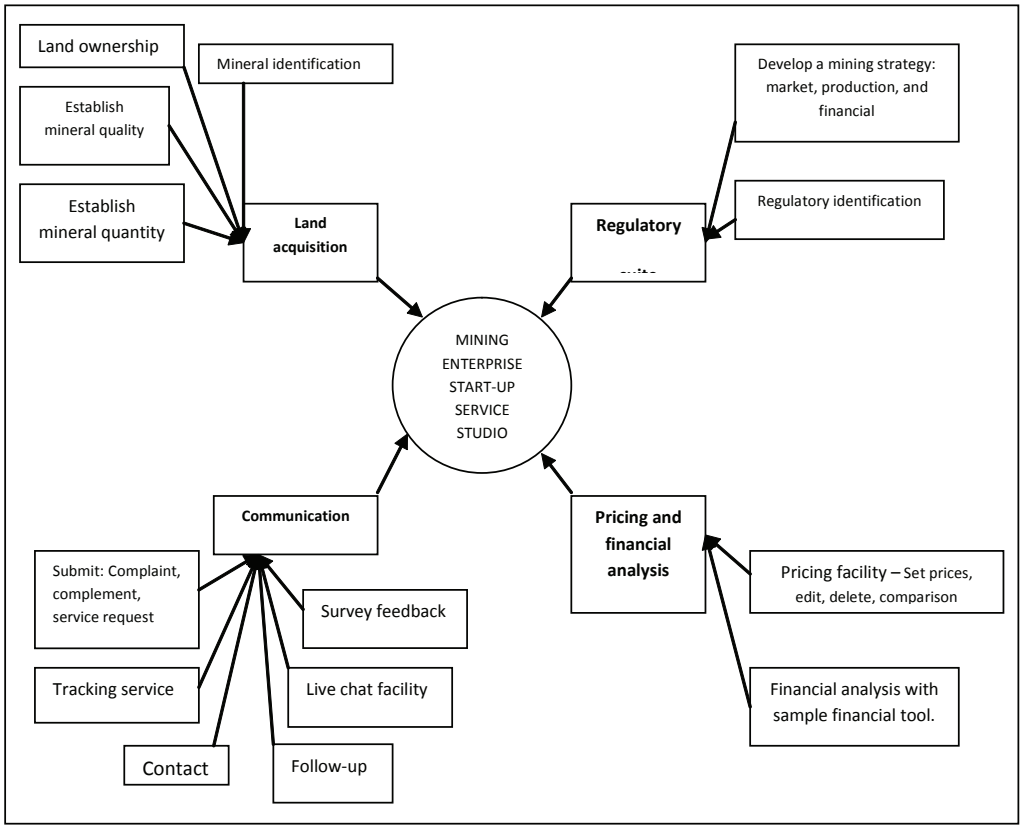
The *land acquisition* suite is responsible for enabling identification of mineral distribution by giving information to start-up miners on alternative mineral deposit locations during the land acquisition process. This suite also avails alternative methods of land ownership by giving information to the start-up miners on the processes involved such as costs involved and access to the required forms in a timely way hence improving their strategy in land ownership.

The *regulatory* suite enables access to regulatory and licensing information by giving information to the start-up miners on the relevant documents for the start – up phase. It also provides support in the development of a mining plan through giving the miners an improved approach of coming up with a mining plan.

The pricing and financial analysis suite provides direct linkage of suppliers to consumers by giving the start-up miner a beginning point for price estimation of their product that will in turn be a source of revenue for the business and thus the financial analysis decisions improvement. It also supports Cost Benefit Analysis (CBA) and Return On Investment (ROI) for projections and forecasts by giving information on investment decision-making. In addition, this suite also provides functionality to link the mining entrepreneurs directly with the customers thereby eliminating the middleman's role.

The communication suite provides a means to support communication between miners (problem owners) and service providers (problem solvers) by using tools to bridge the gap between the two parties.

Figure 1: Design of decision enhancement studio for a mining enterprise start-up service



Conclusion and future work

In summary, this research aims to enhance mining SME start-up decision process with the design of a decision enhancement studio in Uganda rural areas. Based on a list of requirements, this paper presents a design of the decision enhancement studio for mining small and medium enterprise start-up decision process that consists of a set of services that are delivered in a decision process in which the four suites are deployed. Following the iterative "build and evaluate" of design science, future research will be dedicated to the implementation, refinement and evaluation of the design into a plausible solution space for the decision enhancement studio for mining small and medium enterprise start-up decision process presented in this paper. The evaluation of the solution will be based on the work of [Hevner and Chatterjee 2010].

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