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Growth and Formalisation of Information Systems in Developing Country SMEs

RICHARD A. DUNCOMBE

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University of Manchester, Precinct Centre, Manchester, M13 9QH, UK
Tel: +44-161-275-2800/2804 Email: idpm@manchester.ac.uk
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Richard A. Duncombe
IDPM, University of Manchester, UK
richard.duncombe@man.ac.uk

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Abstract

The purpose of this paper is to improve understanding of how small and medium enterprises (SMEs) in developing countries move from informal to formal information systems (IS). Formalisation of IS for SMEs implies greater use of sources and channels of formal information and upgrading of internal and external information systems, including use of information and communication technologies (ICTs). This study provides an exploratory model that assesses the factors that influence formalisation of IS, supported by data from a developing country environment.

The study finds that formalisation of IS is important because it leads to improvements in the internal and external business processes that influence enterprise growth and development. Although there is a strong reliance on informal information practices amongst SMEs, there is also widespread unmet demand for formal information. Overall, successful enterprise development requires optimum use of both formal and informal IS. Evidence suggests this is achieved through developing the necessary internal competencies and skills for information handling and by forging key external market linkages – a duality of factors that provide the key drivers for formalisation.

Introduction

A series of studies conducted over the past decade has highlighted the important socio-economic role of small and medium enterprise (SME) growth and development in developing countries – particularly within the economies of sub-Saharan Africa where they make a significant contribution to sustainable economic activity (Liedholm, 2002; Trulsson, 2001; Liedholm & Mead, 1999). Research has identified enterprises with potential for growth as being particularly important. These enterprises predominate in the formal sector and are almost exclusively urban-based. The range and volume of business activity conducted by formal sector SMEs is large, although the number of enterprises is relatively small.

Although relatively advantaged, formal sector enterprises in sub-Saharan Africa suffer constraints to growth, which have been observed to vary in their intensity and scope according to sector, location and other enterprise- or entrepreneur-specific factors (Liedholm, 2002; King & McGrath, 1999; McCormick & Pedersen, 1996). Constraints to growth for SMEs are generally well understood, and considerable effort has been expended on assisting such enterprises in overcoming them, through the provision of a wide range of targeted assistance, covering finance, enhancement of skills, market access and through other information-driven business development services (BDS) (Trulsson, 2001).

Experience shows that in order for the benefits of assistance to be realised, enterprises themselves need to improve their capacity to respond to external stimuli. In this respect, the upgrading of internal competencies and skills has been identified as critical for effective processing and use of externally-sourced information and knowledge resources (Murphy, 2002). This process of upgrading has also been characterised as a move toward *formalisation* of information systems (IS) (Butler & Hansen, 1991). The formalisation thesis contends that as enterprises grow and develop, their reliance on informal information and unstructured processes is diminished, whilst the importance of formal information and structured processes is enhanced – resulting in more efficient internal use of information and knowledge resources, more beneficial interaction with external information and knowledge networks, and increased use of information and communication technology (ICT).

Currently, there is only limited knowledge and evidence of the role information systems perform in growth and development for SMEs in developing countries, and only a small number of studies have been conducted on the African continent. Of these, Moyi (2003) highlights an important role for both formal and informal information systems in small enterprise development, and argues that the use of new IS should be built firmly on existing systems. Similarly, Pigato (2001) and Duncombe & Heeks (1999) emphasise the importance of informal IS but detect a greater role for new technologies that are able to supplement existing systems – such as through use of mobile cellular networks, for example.

Although existing evidence acknowledges the role of both formal and informal IS, there is little analysis of relative importance, and little understanding of the internal and external processes that enable enterprises to benefit from greater infusions of formal information. This study endeavours to fill this gap in knowledge by achieving a better understanding of the relative importance of informal and formal information

and IS practices; by identifying the internal and external factors that influence transition from informal to formal IS; and by assessing how ICTs impact upon processes of formalisation for SMEs in a developing country context.

Field research is presented from Botswana, a country which has achieved a higher development status than most other countries within sub-Saharan Africa, providing considerable opportunities for enhanced use of IS and ICT resources by SMEs. Botswana is a country that has succeeded developmentally largely because of the creation of a conducive enabling environment for enterprise growth. This has been underpinned by open and democratic government, liberal trade policies and effective macro-economic management that has encouraged a high degree of inward investment in the SME sector – particularly from South Africa. This has provided for a considerable infusion of new skills and technology – including ICTs – in a relatively short space of time. However, wide-ranging resource-, market- and institution-based constraints have inhibited SME development – most noticeably amongst citizen-run enterprises in the formal sector (Lisenda, 1997; Jefferis, 1996; Briscoe, 1995). Thus Botswana was deemed a suitable case for analysis.

A. Conceptual Approach and Framework of Analysis

Conceptual approaches towards understanding the role of IS in small enterprise development have drawn upon research traditions encompassing a wide range of disciplines utilising a blend of models and methods from different paradigms (Mingers, 2001; Levy & Powell, 2000; Blili & Raymond, 1993). For the purposes of this paper, models of IS and small enterprise development are considered in two main categories – those that are concerned predominantly with either the *internal* or the *external* enterprise environment. This distinction is useful for the purposes of distinguishing between approaches. It also raises questions of how the boundary between the internal and external enterprise environment can be defined, which also has implications for the application of practical research methodologies involving the use of case studies of SMEs (Perren & Ram, 2004).

This research study made use of a combination of survey- and case study-based analysis, and was aimed at understanding how interaction between internal and external factors influences the process of formalisation. The research posed three interrelated questions:

- What is the relative importance of formal and informal information processes? A key issue was exploration of the quality attributes of formal and informal information *content*, and the effectiveness of formal and informal information *sources*, and *channels* of communication.
- What role do internal and external factors play in the process of IS formalisation? An external focus explored the market, and non-market, factors that drive formalisation, whilst an internal focus identified the factors that influence the assessment and application of information, and which impinge on enterprise-level decision-making.
- How do internal and external factors influence the ownership and use of ICT resources? The extent of ownership and use of ICT resources was used as a proxy measure for the degree of formalisation.

Approaches to understanding *internal* IS are founded primarily on a resource-based view of the enterprise (Wernerfelt, 1984). Here the focus is on the internal competencies that can lead to a competitive advantage. Advantage is gained through developing enterprise-specific resources that enable the enterprise to secure competitive market niches based on their individuality (Caldeira & Ward, 2003; Yap, Soh & Raman, 1992). Evidence suggests that what are considered to be more valuable resources – such as knowledge, skills and marketing capabilities – are acquired through a unique pattern of enterprise-specific learning (Lundvall & Johnson, 1994; Arrow, 1962). The resource-based view contends that in this respect all enterprises are fundamentally different in their nature and composition, whilst success in the market depends upon having a unique set of capabilities, competencies and resource endowments, which both rare and difficult to imitate.

Approaches to understanding *external* IS have sought to understand enterprises, not as individual entities, but as part of wider and more integrated socio-economic networks (Sengenberger & Pyke, 1992). External approaches have highlighted the role of social networks and the networking behaviour of entrepreneurs – most importantly those which are influenced by family, kinship and close personal ties (Levy, Loebbecke & Powell, 2003; Sawyerr, McGee & Peterson, 2003; Blackburn, Curran & Jarvis, 1991). This is particularly relevant in the development context, where a key constraint to SME development has been lack of *social capital*. Social capital can be loosely defined according to the benefits that accrue from establishing the social networks that form the basis of key market relationships (Humphrey and Schmitz, 1995). In developing countries, social networks have been observed to be particularly important for the delivery of a range of intangible, but critical, enterprise resource inputs – including empowerment, trust and motivation as well as new knowledge and information inputs (Murphy, 2002; McCormick, 1999; Barr, 1998; Van Dijk & Rabellotti, 1997; McCormick and Pedersen, 1996).

Networks should be distinguished from linkages (Chell & Baines, 2000). Small enterprise networks tend to be composed of – and more highly influenced by – the strong ties of close personal and family relationships. These provide important conduits for predominantly informal, but trusted, information. Linkages extend beyond the immediate social circle of the entrepreneur and although they may constitute weaker personal ties, they are able to draw upon information from wider and more diverse formal sources. For the purposes of this study, linkages are understood in two main ways: whether they are predominantly business linkages such as with customers or suppliers, or predominantly institutional linkages such as with regulatory bodies or business support agencies.

Within the basic framework of analysis (Fig 1) information is treated as a resource that is acted upon and processed by the information system – which can be viewed as a broad set of business processes, environmental influences, networks and linkages that span both the internal and external enterprise domain. External factors relating to the availability of information, and the level of development of infrastructure, will partially determine whether or not entrepreneurs are able to *access* information. However, factors internal to the enterprise are considered equally important – the capabilities, competencies and skills that enable entrepreneurs to *assess*, *apply* and *act* upon the information received (Caldeira & Ward, 2003).

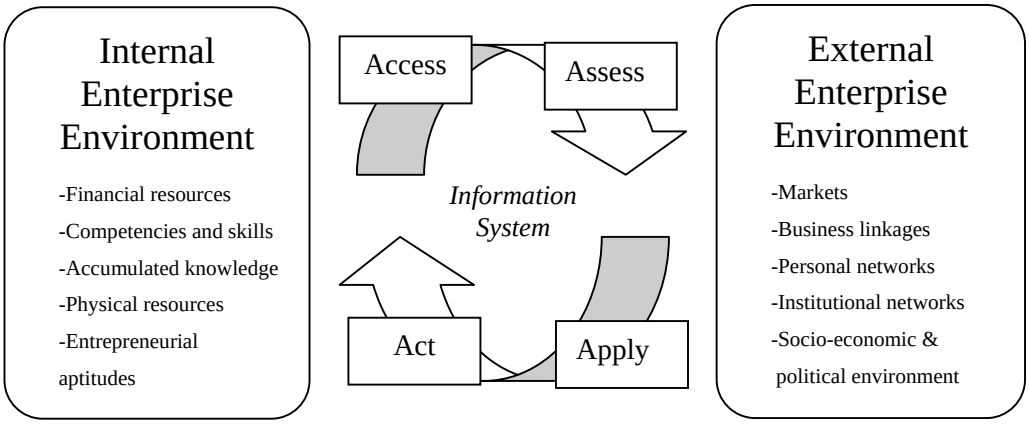

Figure 1. Basic Framework of Analysis for Linking Information Processes via Internal and External Enterprise Environments

The processes – access, assessment, application and action – are those which are required to make use of information and achieve valuable business outcomes. They require not only information inputs but also overt resources – both tangible and intangible. Tangible resources will include a physical infrastructure and the necessary access tools (including ICTs). Intangible resources, which form a major component of any information system, will include inputs of finance and skills. It is not only overt resources (physical and organisational) that need to be in place, but also embedded resources. These are more difficult to define, but include human-centred needs such as trust of the information source and the necessary motivation to interact with and use the information system. Pre-existing knowledge is a further resource requirement for successfully assimilating new information, drawing upon a relevant existing knowledge base. So too is having a sufficient level of empowerment to actively participate in using an information system.

The model recognises that most information that is acquired by an enterprise will be in the form of raw unstructured data (for example, unprocessed financial data in the form of invoices, delivery notes and cash slips or verbal feedback from customers). In order to be made useful to the recipient such data needs to be processed into usable information. Knowledge, however, is enhanced through the process of assessing and applying information, and assimilating new information into a pre-existing knowledge base (Wilson & Heeks, 2000). This process of knowledge building can also be understood in terms of 'learning by doing': a characteristic associated with the development of small enterprise capabilities and competencies (Caldeira & Ward, 2003; Storey, 1994). Effective use of information has been shown to be dependent upon the existence of sufficiently developed in-house competencies. This remains a pressing issue in developing countries – such as Botswana – where, historically, education and skills for small enterprise development have been lacking (SMME Task Force Report, 1998).

B. Research Design and Methodology

The research methods chosen were designed to be complementary and thus provide a means of cross-checking data. Detailed survey-based responses provided both qualitative data from open questions and quantitative data from structured responses using a Likert scale. Correctly completed questionnaires were received from 90 formal sector enterprises spanning eight key sub-sectors of the economy in Botswana. The initial sample was based on the *Botswana Standard Industrial Classification (BSIC)* and was drawn from the *Registry of Establishments* (CSO, 1998), and included: Textiles, Clothing, and Leather Products; Wood Products; Furniture and Crafts; Building and Construction Materials; Printing and Publishing; Tourism; IT and Computing; Transport; Engineering and Technical Services. For the purposes of comparative analysis the sample was sub-divided into three broad groupings: 1) local manufacturers; 2) the service sector; and 3) exporters (enterprises exporting >10% of their output and including the tourism sector).

Matambalya & Wolf (2001) point toward constraints in using solely quantitative techniques to assess the impact of new IS/ICT on SMEs due in part to the practical difficulties of collecting such data in a developing country environment. The exploratory nature of the research, therefore, also demanded a more rigorous qualitative approach than solely provided through survey-based methods. Richer qualitative data was gained through individual case studies based on direct observation – a proven method for extracting in-depth qualitative case study data in the small business sector (Perren & Ram, 2004; Curran & Blackburn, 2001; Yin, 1994). The method involved not only observation but also the recording, analysis and interpretation of entrepreneurs' actions and behaviour (Hill, McGowan and Drummond, 1999; Klein & Myers, 1999; Walsham, 1995). Observational case studies also served as a powerful descriptive and explanatory tool providing the necessary detail of evidence by seeking to focus on critical incidents of information processing and enterprise-level decision-making (Chell, 1998; Chell & Adam, 1994). A case study approach also supported a broader inductive model-building process, in contrast to a quantitative data approach that is narrower in concept, deductive and aimed at testing pre-existing theoretical frameworks (Eisenhardt, 1989).

The observations themselves varied in length but typically involved a minimum of a single day spent within the enterprise, observing information processes and information activities conducted by the business owner or employees. Immediately following each observation an interview was carried out with the purpose of discussing the observational period in general, and to follow up or clarify any events, actions or decisions that took place. A total of eight case studies were conducted over a four-week period (Table 1). Case studies were selected from the survey respondents in order to present a range of enterprise archetypes – categorised according to their level of formalisation – using their level of ICT ownership and use as a valid proxy measure (see Table 6). Case study selection also reflected a broad representation according to sub-sector and enterprise size.

Enterprise Name	*IT Archetype*	*Main Activity (Sub-sector)*	*No of Employees (fte)*	*Turnover US$ (97/98)*
Ithuteng Tin Workshop	Non-IT user	Crafts	3	1,000
Festus Optical Works	Non-IT user	Technical services	2	1,850
Akanya	Non-networked IT user	Furniture manufacturing	28	180,000
MMR Engineering	Non-networked IT user	Agricultural equipment manufacturing	24	81,200
Modern Woodworks	Networked IT user	Furniture manufacturing	22	180,000
Tony Signs	Networked IT user	Sign printing	5	39,000
PC Net	Intensive IT user	IT services	4	90,000
Gaborone Printing Works (GPW)	Intensive IT user	Printing and publishing	42	360,000

Fte: full-time equivalent employee

Table 1. Characteristics of Case Study Enterprises

C. Analysis of Research Findings

C1. The Dominant Role of Informal IS

Overall, the evidence highlights the dominant influence of informal IS. Survey-based evidence reflected a strong bias towards the accessing of informal information and the use of informal information practices for its assessment and application. Results from the case study observations are summarised in Table 2, highlighting the key formal and informal information practices observed. These findings were corroborated by the broader findings of the survey, and generally fall into line with previous research indicating that entrepreneurs favour informal IS practices in developing countries (Van Bussell, 1998; Sarder, 1995).

Formal IS Practices	*Informal IS Practices*
Use of market research, forward planning and marketing techniques	Reliance on market leads and referrals via informal networks
Independent advice, via external accountants or consultants	Advice from family, friends and business associates. Knowledge and experience of the business owner
Links to external training bodies	In-house, on the job training
Links to larger suppliers – probably abroad	Dependence on local suppliers and local contact networks for business inputs
Technical assistance from large suppliers or consultants	In-house adaptation of technologies through learning by doing
Greater contact with business intermediaries and business networks	Greater reliance on social and crossover networks
Greater use of published material via written reports/ handbooks/ Internet, etc	Greater use of interpersonal communication – word of mouth – non-recorded sources.
Greater use of IT resources	Little/no use of IT resources

Table 2. Observed Characteristics of Formal and Informal Information Systems

Interview data from the case studies suggested that business owners prefer information generated by informal sources because it tends to be in closest proximity, it is more highly trusted, and it is applicable to their existing knowledge base. It is also derived from sources that exhibit similar outlook and aspirations to that of the recipient. Respondents particularly emphasised the importance of informal leads and referrals for market access. Building a business reputation based on 'word of mouth' was seen as essential. Locating new customers is not normally dependent on receiving single leads but usually entails a long process of assembling a wide range of information, and following up leads in order to cultivate customer relationships.

Informal sources and channels were favoured by the respondents, as indicated in Tables 3 & 4 which present a list of sources and channels prioritised according to their level of importance. The findings show that internalised knowledge, customers, contacts outside Botswana, and family and friends are considered more important than formal and institutional sources, whilst personalised communications (either face-to-

face or via telecommunication networks) were the channels most used by entrepreneurs.

Information Source	***% of sample for which source was 'essential' or 'very important'*** *Service sector*	***% of sample for which source was 'essential' or 'very important'*** *Local manufacturers*	***% of sample for which source was 'essential' or 'very important'*** *Exporters*
Knowledge of the business owner	88%	81%	73%
Local customers	49%	50%	33%
Contacts outside Botswana	13%	19%	60%
Family and friends	35%	22%	40%
Government organisations	9%	50%	23%
Local suppliers	19%	34%	27%
Banks/ consultants	14%	44%	13%
Journals/ handbooks	26%	22%	20%
NGOs	6%	41%	13%
Competitors	12%	19%	20%
Internet/ databases	26%	9%	13%

Table 3. Respondents' Prioritisation of Importance of Information Sources

	General business communications			***Communications with customers***		
Information Channel	***% of sample using channel 'very often'*** *Services*	***% of sample using channel 'very often'*** *Local manufacturers*	***% of sample using channel 'very often'*** *Exporters*	***% of sample using channel 'very often'*** *Services*	***% of sample using channel 'very often'*** *Local manufacturers*	***% of sample using channel 'very often'*** *Exporters*
Face to face meetings	67%	69%	66%	86%	84%	80%
Postal service	30%	15%	13%	6%	0%	7%
Telephone fixed line	72%	72%	80%			
Fax	69%	63%	73%	16%	22%	40%
Telephone mobile	37%	18%	20%			
Email/ Internet	47%	3%	20%	9%	9%	13%
Radio	12%	0%	0%	6%	12%	7%
Bill-boards	N/A	N/A	N/A	6%	29%	0%
Printed material	N/A	N/A	N/A	14%	29%	20%

Table 4. Respondents' Prioritisation of Importance of Information Channels

It is noticeable that there were some variations between market sectors, with local manufacturers tending to place higher priority on institutional sources such as information accessed from government extension services and local enterprise support agencies.

Individual incidents observed from the case studies confirmed the picture that emerged from the survey data. The content of informal information was observed to be more appropriately presented and was often more timely than formal information. It cost less to access and apply and was provided within the social and personal context needed to supply details about trust (Fafchamps, 1999; Barr, 1998). It also tended to be more flexible than formal information and easier to interrogate for greater or more customised details.

However, it was also observed that the use of informal information presented negative aspects. For example, for accessing business inputs there was a high level of dependency on informal information sourced through networks of family and personal acquaintances. In many instances, the quality of such information proved to be particularly poor in terms of accuracy and completeness. Informal information was also more vulnerable to loss and misinterpretation, and harder to pass on to others than formal information. Additionally, unlike formal information, it tended to restrict enterprises to doing business and gaining knowledge within their direct-contact network.

Here, then, lies a paradox for many enterprises. Informal information and informal information systems represent a critical resource but they can also restrict enterprise development.

C2. Formalisation of Information Systems

Entrepreneurs had an intrinsic understanding of the value of informal IS but their needs were expressed primarily in terms of greater inputs of formal information content, and greater use of formal IS practices. This was reflected in the survey, where more than half of the respondents stated their needs for more formalised forms of information as ‘essential’ or ‘very important’ across all the information categories specified. Less than half of the respondents had been able to successfully access the information they needed (Table 5).

Information category	*% of sample for which information needs were 'essential' or 'very important'* *Local manufacturers*	*% of sample for which information needs were 'essential' or 'very important'* *Exporters*	*% of sample for which information needs were 'essential' or 'very important'* *Service sector*	***% of <u>total</u> sample for which information needs were 'essential' or 'very important'*** *All sectors*	***% of <u>total</u> sample that 'had been able to obtain' information needed*** *All sectors*
Management/ staff training	84%	80%	72%	77%	31%
New local customers	84%	67%	65%	72%	21%
New technology	78%	53%	67%	68%	32%
Sources of finance	90%	67%	49%	65%	28%
Existing customers	88%	47%	49%	62%	51%
Land/premises	72%	47%	56%	60%	14%
Laws and regulations	69%	47%	46%	53%	49%
New staff	34%	53%	58%	48%	30%
Export markets	40%	67%	28%	38%	3%

Table 5. Prioritisation of Formal Information Needs

For example, 68% of the total questionnaire sample of 90 enterprises stated they had needs for information about new technology in their businesses that were essential or very important, but only 32% had been successful in fulfilling those needs through their existing sources and channels. There appeared to be two root causes of this 'information needs gap'. Information relating to management skills training, skilled employees, availability of land/premises, export markets and technical expertise was difficult to obtain primarily because it was in short supply locally. For example, entrepreneurs were unable to get local information on skilled workers because so few of those workers existed. In contrast, difficulty in obtaining information relating to finance and new local customers (and to a lesser extent laws and regulations) related more to lack of access than lack of availability. This was illustrated in relation to finance, where difficulties in accessing information resulted from barriers erected by lending institutions and the lack of capacities to effectively search out and acquire such information on behalf of business owners.

Survey results also suggested important sectoral differences governing the information needs of enterprises. Two particular points can be made. First, manufacturers that serve domestic markets (non-exporting manufacturers) had an overall higher level of information needs. This reflected their continuing struggle to survive: finding difficulties across all information categories. By contrast, service-based enterprises and manufacturing exporters had gone beyond the basics of survival. They required information for growth through new skills and new markets, and they already had many information-handling capacities that the other enterprises did not. It was also apparent that information needs were greatest for enterprises which were smaller in size, oriented toward domestic markets and which were overwhelmingly dependent on single customers (especially for those with high dependency on public procurement). However, because of their greater

sophistication, exporters, larger enterprises and those with a diversified customer base, actually needed far more information to run their businesses and formal information and IS practices were of greater value to this type of enterprise.

Individual case studies highlighted clear limits to informal information systems. There are two aspects to this. Firstly, limits of capacity – the point where the enterprise is unable to effectively process the amount of information that is being generated, requiring greater use of formal IS. Secondly, limits to compatibility – between the functioning of internal IS and external requirements – primarily the need to achieve compatibility with the systems of key customers and suppliers. For example, enterprises with close relationships with suppliers benefited from increased access to formal information – such as through technical back up and support, as well as knowledge inputs via tailored training programmes supplied by vendors.

Case Study Example: *GPW specialises in offset lithographic printing as well as handling upstream printing processes including layout, typesetting and desktop publishing (DTP). Suppliers played a key role in formalising IS for GPW. An investment of US$72,000 was made in Apple DTP and printing technology, purchased from the local Apple Centre. This enabled GPW to receive technical back up and support after installation, as well as knowledge inputs via a structured training programme delivered by a DTP specialist. A second example concerned material inputs (paper, plates, film, etc) purchased in Botswana from a sole supplier – Copy One. The supplier was able to hold a full range of material stocks that cover all GPW customer requirements. This helped to keep GPW inventories low. GPW had access to the Copy One stock list via email, giving rise to efficient information exchange and timely delivery. Such close relationships with suppliers has enabled GPW to formalise internal information systems, making effective use of IT across a wide range of business processes, including ordering, upstream DTP, delivery, invoicing and customer records. There was also a market cost driver that demanded more efficient IS in order to adequately control the low margins and high overheads associated with the printing sector.*

Such formalisation processes tend to be enterprise- and sector-specific and, overall, the evidence demonstrated that unique patterns of formalisation were specific to individual enterprises. However, common factors were also observed:

- Firstly, there was raised demand for an increased volume and complexity of information as the value of information was recognised.
- Secondly, there was a diminution of information needs gaps for externally sourced information, as internal capacity to meet information needs rose. This was reflected in the survey results that strongly indicated that the knowledge and experience of the business owner was considered to be the most important source of business information (Table 3).
- Thirdly, and most noticeably in the case studies, there was a greater emphasis on the external communication of information through key business linkages. This was often reflected in a shift from reliance on looser social networks to more formal business linkages. There was also a tendency for enterprises to move away from non-commercial institutional linkages (e.g. via enterprise-support agencies) to commercial institutional linkages (e.g. via trade missions).

The influence of key business linkages on the process of formalisation was particularly profound in most cases. This transition from reliance on looser networks to stronger linkages was required both to access formal sources of business inputs and to access distant and/or larger customer markets. Strong commercial external linkages were identified to be the most effective. For example, pressure from suppliers or competitors, market linkages with existing ICT users, and value chain processes amenable to computerisation, etc. Evidence suggested that such linkages were able to provide and combine a wider breadth of knowledge and experience – leading directly to internal IS (and ICT) innovations.

Case study example: *Modern Woodworks (MW) had built up a good reputation as a local sub-contractor and established contractual linkages with South African-based main contractors and materials suppliers. Modern Woodworks – as the sub-contractor – worked on the basis of detailed specifications, drawings and bills of quantities specified by the main contractor, as well as receiving formal information inputs from suppliers – quotations, bills of quantities, catalogues, etc. Modern Woodworks was often required to put together quotations very quickly, in response to the narrow deadlines of the main contractors. Their suppliers were able to prepare detailed bills of quantities on the basis of contractor specifications – cutting down significantly on MW workload for submission of tenders. This taught MW how to deal effectively with contractors, and to organise their internal information systems in an effective way that was compatible with both their suppliers and their customers.*

Of particular benefit were strong linkages to regional sources. For example, local information sources concerning repair, maintenance and servicing of specialist equipment were very limited. There were a number of instances when business owners had to travel to South Africa in order to obtain the necessary information about spare parts and/or technical assistance. Enterprises with market linkages outside Botswana – such as in the export and tourist sector – had considerable advantages in accessing such specialist information. On the other hand, local entrepreneurs serving domestic markets remained limited in their scope – relying to a greater extent on information sourced through local business support structures.

C3. Factors Influencing Use of ICT Resources

The extent of ownership and use of ICTs within enterprises can be utilised as a valid proxy indicator for the extent of formalisation. Enterprises were categorised according to the extent to which they had progressed up an ICT adoption ladder comprising four stages – non-users; non-networked users; networked users and intensive users (in line with the approach used by Southern & Tilley, 2000). These are termed ICT archetypes and are outlined in more detail in Table 6.

ICT Archetype	*ICT Resources* *(% of sample shown in brackets)*	*Usage Characteristics*	*Key Constraints*
Non-Users	Enterprises make no use of computers, but have access (direct or indirect) to telecommunication services, primarily telephone and fax (20%).	Approximately 75% of this group used telephone and fax on a regular basis. 25% had no direct access to telecommunication networks.	Lack of finance. Lack of management and workforce skills. (Over 90% of business owners regarding them as critical or very important)
Non-Networked Users	Enterprises have one or more computers on their premises, but with no external network connections (28%).	24% had computerised basic business functions such as customer invoicing and internal accounting systems. Computer systems were largely used for general administrative activities, 76% making use of word processing applications and 44% using spreadsheets.	Over 90% regarded lack of finance and management/ employee skills as key constraints. (50% also regarded upgrading computer systems as being critical to their business)
Networked Users	Enterprises with one or more stand-alone computers (i.e. no internal networking) but with an external email/Internet connection (23%).	86% used computer-based systems for company accounts, 73% for sales and invoicing, but under 50% for other categories such as wages/salaries and inventories. Email was used on a regular basis by 91% and 59% used Internet access very often.	Lack of workforce/ management skills. Problems of sustaining/ increasing sales. (Only 27% described financial constraints as critical)
Intensive Users	Enterprises that utilise two or more computers that are networked. They have email/Internet connectivity and are also connected to an internal network (29%).	High levels of computer-based processes across all business functions including: accounting and customer invoicing (80%); inventories, customer and supplier records (60%); use of Internet (77%); business/project planning (69%).	Lack of workforce skills. Problems of sustaining/ increasing sales. Lack of product/service innovation.

Table 6. Degree of Formalisation According to ICT Archetypes: Usage Characteristics and Key Constraints

Survey data indicated that the ownership of ICT resources by enterprises is extremely variable, suggesting their use is governed by multiple influences. Overall, there was no relationship between ownership of ICT resources and enterprise size according to number of employees, except to note that the majority of ICT users amongst the sample had more than five employees. However, when enterprises were categorised according to annual turnover, there was a far greater degree of correlation. The

majority (79%) of networked and intensive users had turnovers in excess of US$90,000 per annum, whilst the majority (62%) of non-users and non-networked users had turnovers of less than US$90,000 per annum. All enterprises surveyed with annual turnovers less than US$18,000 were non-users. Survey responses also highlighted lack of investment resources as a key factor constraining use of ICT. However, results varied according to market sector. Lack of financial resources was regarded as a critical constraint by 88% of non-exporting manufacturers, compared with only 30% of service-based enterprises and 26% of manufacturing exporters (including the tourist sector).

Findings suggest that the threshold for ownership and use of ICT resources is primarily financial. However, actual levels of take up were associated with three further factors. The first is market sector. Levels of ICT use were very low in all the manufacturing sectors covered – textiles and clothing, building materials, furniture and fabrication – irrespective of other variables such as enterprise size, the educational level of the entrepreneur, and the form of ownership. In contrast, the use of ICT was fast becoming a minimum requirement for survival in the market for manufacturing exporters, the tourist sector and domestic service sub-sectors. For example, in more advanced sectors, a strong Internet presence was already becoming a powerful and relatively cheap marketing tool, both for raising the profile of the business and for rapid dissemination of information to potential and existing clients at home and abroad.

It appears, therefore, that for enterprises that are able to reach the financial threshold, their degree of use of ICT resources is highly dependent on the nature of the sub-sector in which they operate. Within sub-sectors, factors likely to determine usage were observed to be twofold. First, the extent to which ICT is integrated within the primary value chain of individual sectors (for example, a high degree of integration is found in printing and publishing and in engineering services). Secondly, the maturity of backward and/or forward linkages with suppliers and/or customers that may already be using ICT effectively (as in the ICT sector, tourism or the export sector).

A second influencing factor concerned the form of ownership and control. There was some evidence that citizens were less likely to be ICT users but only among non-exporting manufacturers. Among a sub-sample of citizen-owned non-exporting manufacturing enterprises (with a greater than US$18,000 annual turnover), 53% were non-users. In contrast, amongst a matched sub-sample of non-citizen-owned enterprises the figure was only 6%. For service-based enterprises and exporters (including the tourist sector) no significant differences in ICT use were observed according to the form of ownership.

A third key influencing factor concerned available skills and competencies. This was reflected in the survey, which identified human resource-based factors as the most prevalent business constraint. Respondents most often stated poor existing management skills, lack of access to improved management skills, the inability to acquire and retain skilled workers, or the lack of access to skills training as their most significant constraints with little or no variation according to market sector. In line with previous studies conducted in Africa (summarised by Kiggundu, 2002) this study was not able to come to any definitive conclusions with regard to the influence of formal education and training. Among the networked and intensive users surveyed,

all bar one of the respondents was educated to senior secondary level and above. However, 50% of respondents who were non-users were similarly qualified. This reflected an overall bias toward educated entrepreneurs in the sample response, but it may also indicate that high levels of education are not always and necessarily a spur to utilising modern business tools: issues of turnover and sub-sector are more important. The findings of this study also suggest that proprietors are generally not inclined to seek ICT-related training either for themselves or their employees, even though enhanced managerial and technical skills are a strong perceived need. Reasons for this were highlighted in the case study interviews, and included lack of time and resources to pursue such training, and a perception that the training on offer locally does not fulfil business needs.

Simple measures of ownership or use of ICT resources do not of course indicate whether or not those resources are being used effectively. In general terms, evidence suggested that those enterprises that had progressed further up the adoption ladder, to being either networked or intensive users, were making more effective use of ICT resources across a wider range of business processes (Table 6). Over 80% of intensive and networked users had computerised accounting and customer invoicing systems. Most other business functions, such as inventories, customer and supplier records, were computerised in approximately 60% of cases. The Internet was used very or quite often by 77% of these enterprises, and computers were widely used for more complex business activities such as project planning. In contrast, non-networked users (those using stand-alone computers with no external network connections) tended to be using their ICT resources less effectively – primarily using word processing and spreadsheets for administrative purposes. 39% of the respondents in this group also stated that they made no everyday use of basic applications, despite having a computer located on their business premises.

It was also the case that business owners tended to prioritise investment in, often inappropriate, computer-based accounting packages rather than information value-adding applications that supported customer-facing processes. For example, all categories of users prioritised ‘off-the-shelf’ computer applications for accounting, sales and invoicing ahead of applications for customer records and marketing.

D. Conceptual Observations

This research sought to investigate the relative importance of formal and informal information as a precursor to assessing the factors that influence formalisation of information systems (IS) and use of information and communication technology (ICT) in small and medium enterprises in a developing country environment – taking Botswana as a case study.

Most enterprises favour informal information and make use of informal information practices but their needs are voiced primarily in terms of formal information. Information needs are, however, inextricably linked to resource needs. When business owners voice their needs for information, they are really voicing their needs for resources – such as finance, technology and markets. For most enterprises these primary needs are also representative of prioritised business constraints, and as pointed out by Moyi (2003) they are of a considerably greater magnitude for SMEs in developing countries. Thus the ability to command resources – both tangible and intangible – should be considered of greater importance than the ability to access information.

Formality or informality was also found to be a less important factor than the quality attributes assigned to information. Heeks (1999) defines information quality according to whether it is complete, accurate, relevant, timely and appropriately presented – attributes that make information accessible, intelligible and useful to the recipient. On this basis, case study evidence suggested that informal information has a tendency to be more appropriately presented, whereas formal information tends to be more accurate. Informal information may be timely, but formal information may be more complete, and relevance varies considerably.

It is clear, however, there is a large unmet demand for formal information, and a need to move away from wholly informal IS practices and move towards more effective use of IS (and ICT). Personal and social networks remain largely inadequate for creating the critical mass of information required to stimulate internal IS development. In line with previous studies, this study also points toward a degree of crossover between the personal and business networks that act as information providers, and both can act as conduits for informal, as well as formal, information (Sawyerr, McGee & Peterson, 2003; Greve & Salaff, 2003; Van Bussel, 1998). The cultivation of such *crossover networks* brings both advantages and disadvantages for entrepreneurs. For market access they are essential, but they can constrain access to business inputs. It is clear, therefore, that both formal and informal information and information systems must play a role in successful enterprise growth and development. The creation of a balance between formal and informal information appears to be a key requirement.

The evidence concerning the influence of internal and external factors on formalisation of IS supports the view of Chell & Baines (2000) that both sets of factors need to be considered in unison. The following is a suggested framework for explaining the transition from informal to mixed informal/formal information systems and – developing ideas from Fig 1 – it highlights the key internal and external influencing factors critical to achieving that transition.

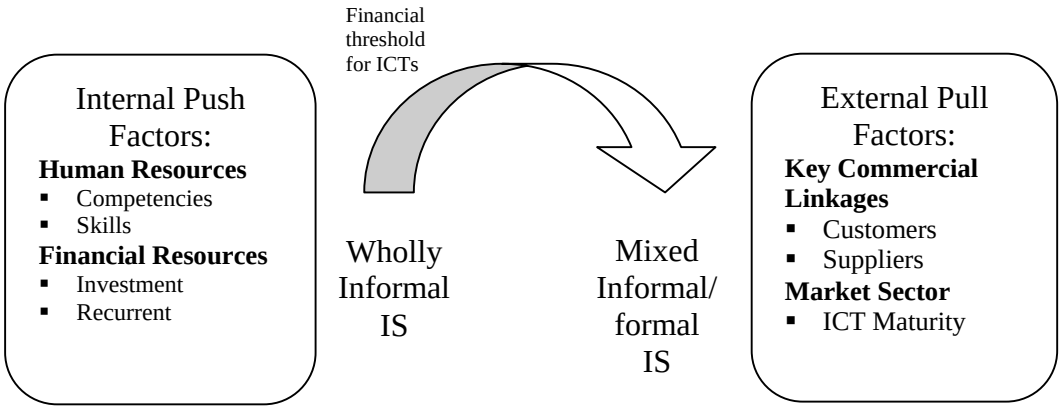

Figure 2. Internal and External Influencing Factors Critical to Formalisation

D1. External Factors

A key observation of this study concerned the relative importance of networks and linkages as influencing factors. On the basis of the evidence collected, key business linkages appear to exert most influence on formalisation. This finding corroborates the model of network evolution put forward by Butler and Hansen (1991) suggesting that the essential feature of formality is the formation of strategic linkages to other firms or institutions. This study suggests that it is predominantly other firms, rather than institutions, that exert the most positive effect on formalisation. In all the cases where formalisation had occurred, external linkages had been forged with organisations (most commonly key customers or suppliers) that were able to supply not only formal information but also a range of complementary resource inputs. In this respect, information forms only a single component of a broader set of resources that are transferred via such linkages. Other resources – both tangible and intangible – drive the formalisation process. These were observed to include new knowledge, formal or informal training inputs, technologies and other financial or non-financial incentives. In this respect, commercial (more often contractual) linkages tend to provide greater benefits than institutional linkages because they give rise to greater two-way flows of information and they also tend to be more permanent. In contrast, institutional linkages (such as via consultants or enterprise support agencies) facilitate weaker information flows, are predominantly one-way (from agency to client) and tend to be short term.

In contrast to strong business linkages – and in line with evidence provided by Kiggundu (2002) and Ramachandran & Shah (1999) – this study suggests that the potential for personal and social networks to operate effectively as information providers is relatively weak. There are a number of reasons why this should be so in the Botswana context. The overall small size of the market reduces network size within individual sectors. Consequently, keen competition tends to be a common feature within sub-sectors, with few observed examples of collaboration through information sharing. There may also be cultural constraints. It is often suggested that citizen entrepreneurs in Botswana lack the necessary entrepreneurial skills and motivations that are required to build social capital. This is largely because there has

been no tradition of enterprise ownership within the formal business sector. Expatriates or other non-citizens have dominated formal sector business activity. A formal sector industry survey carried out in 1994 showed only 30% of medium-sized enterprises as citizen-owned, rising to 56% for small enterprises (BOCCIM, 1994).

Observations from this study also indicate that entrepreneurial behaviour may have a negative impact on networking activities – due to characteristics of self-reliance and tendencies towards the guarding of information (Fuellhart & Glasmeier, 2003; Hill, McGowan & Drummond, 1999). These characteristics were observed consistently in the case studies, and as already stated, a key finding from the survey was that business owners regarded internal resources – primarily their own accumulated knowledge and experience – as their most valued source of business information.

It is apparent, therefore, that personal and social networks generate predominantly informal information, whilst business and crossover networks provide a balance of informal and formal. For many enterprises that are struggling to establish themselves, personal and social networks are able to substitute for absent market functions (Van Bussell, 1998). Economic development dictates, however, that such enterprises break away from being mainly social entities to being more economic entities. To facilitate this, commercial linkages are required, and where institutional linkages exist, they appear to be most beneficial when they are commercially founded.

D2. Internal Factors

Results from the case studies, and from the wider survey, show conclusively that a high level of dependency on informal information for decision-making persists even within enterprises that have achieved a degree of formalisation. Entrepreneurs persist with informal practices because they are trusted and familiar. However, case study incidents also suggest that decisions were often based on misplaced trust, giving rise to poor decisions that resulted in negative business outcomes. It was also apparent that persistence of informal practices leads to failure to build the internal competencies and skills required to deal effectively with formal information.

The process of formalisation cannot be fully understood, therefore, without employing an internal focus – a perspective that gives greater prominence to the entrepreneurial factors that govern the assessment and application of information and subsequent decision-making processes. In common with previous research conducted in SMEs (Kyobe, 2004; Caldeira & Ward, 2003; Thong, 2001; Ballantine, Levy & Powell, 1998) this study identifies constraints to IS development as being primarily internal – identifying a combination of skills, competency and resource constraints as paramount. The primary resource constraint was identified as limited access to financial resources for funding both investment and recurrent expenditure in IS and ICT. Until enterprises have reached a financial threshold, individual ownership of ICT and access to infrastructure remains largely unaffordable in Botswana.
The second most critical constraint was the considerable skills gaps and human resource deficiencies for effective use of IS (and ICT). In this respect, evidence suggested that the personality and motivation of the business owner or manager seemed to be playing a strong role in internalising new information and knowledge resources and providing the necessary personal qualities to drive IS innovations (in a

number of instances this role was also played by a key employee such as a secretary, personal assistant or workshop foremen). The importance of entrepreneurial factors has also been highlighted by other studies conducted in sub-Saharan Africa (Murphy, 2002; Frese, 2000). These identify psychological variables such as personal initiative, innovativeness and autonomy as key factors that determine the ability of SMEs to react positively to stimuli from the external environment.

Conclusions

The findings of this study suggest there a need to question the widely held view that information failures associated with SMEs in developing countries can be corrected through external means, such as through reforming institutions and enacting enabling policies (World Bank, 1998). It has been relatively easy for governments and enterprise-support agencies to try to overcome perceived market failures through this type of support – for example, through information dissemination, stronger government statistical services, stronger business associations and through support for other professional associations that can produce and disseminate useful information for enterprise.

These actions are important but there is a more pressing need to reduce the internal resource and competency constraints that prevent entrepreneurs from establishing effective information systems. Dealing with factors that are internal to the enterprise presents a bigger challenge for policy makers and those agencies actively involved with assisting small enterprise. The provision of focused training and skills development can help, but entrepreneurs in Botswana, as in other developing countries, are reluctant to seek external training inputs for either themselves or their employees – due to time, money and cultural constraints. This further strengthens the case for a market-based approach to building competency and skills encouraged through facilitating effective business linkages for SMEs.

The formation of business linkages may provide an effective solution to addressing a wide range of internal and external enterprise constraints. Case study evidence suggests that strong commercial linkages not only provide good quality information, but also help to provide complementary resources that help build competency and overcome skill constraints. In line with the views of Dawson (1997) and Gibson (1997) this suggests that existing providers of business development services should facilitate inputs (of finance, training, technology, etc), at least in part via existing private sector providers. In this way, more-valuable business linkages are created – substituting for less-valuable institutional linkages – for which there was less evidence of a strong formalising effect.

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