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Process Analysis and e-Business Adoption in Nigerian SBEs: A Report on Case Study Research

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Abstract— It is generally acknowledged that e-business technologies can provide internal value as well as opportunities to reach different local and international markets, for both large and small organisations. Although the use of web-based systems and technologies to improve business processes has increased steadily over the past decade, there remains a dearth of research in this field in developing countries such as Nigeria. This paper examines how e-business is being used in two Nigerian small businesses, using a process mapping technique, system profiling and two main models from the existing literature. The results indicate that these models provide a valid framework for the initial analysis of e-business in this environment, and that these companies are indeed benefitting from the deployment of e-business technologies, particularly in their customer facing processes and functions.

Keywords- e-business; Nigeria; Small Business Enterprises; SBEs; process mapping; e-business models.

I. INTRODUCTION

The adoption of electronic business (e-business) technologies and processes has increased significantly in recent years [1][2]. In developed countries, research has shown that both large enterprises and small businesses have successfully adopted e-business technologies and processes to gain competitive advantage[3], transform business models [4], and improve relationships with customers and suppliers [5][6]. Various researchers have pointed out that the motivation for e-business adoption varies from organisation to organisation, though it often encompasses reducing transaction costs [7], improved access to global markets [8], or increasing bottom-line profit performance [9].

In developing countries such as Nigeria, there is a dearth of research on the adoption of e-business in Small Business Enterprises (SBEs). This research investigates e-business in Nigerian SBEs by using a process mapping approach to analyse the current situation in two SBEs. For the purposes of this research, SBEs are defined as enterprises which employ fewer than 50 persons, while Small to Medium Enterprises (SMEs) are defined as enterprises which employ fewer than 250 persons [10][11].

Following this brief introduction, Section II reviews relevant literature on e-business, e-business models, process mapping and the challenges faced by SBEs in Nigeria. Section III then describes the methodology employed in this study and Section IV presents and discusses some of the initial findings. Section V provides an initial analysis of

these findings, and the final concluding section suggests how further research will adapt and improve existing models for application in the Nigerian business context.

II. LITERATURE REVIEW

The term e-business was used by IBM in 1997 to mean “the transformation of key business processes through the use of internet technologies” [12]. E-business can be viewed as the integration of web technologies with business processes and management practices to increase efficiency and lower costs [13][14]. Several recent studies have focused on the adoption of e-business technology and processes by SMEs in developed countries, including the UK [9][15], the USA [16], Australia [14] and in Canada [17]. However, there is still considerable debate in the existing literature on the value and productivity gain e-business has to offer to SBEs [9][18], who generally contribute significantly to a nation’s economic growth by offering flexible employment opportunities [8], poverty alleviation [19], and enhance supply chain flexibility, and thereby support the country’s overall GDP growth [20].

After rebasing its GDP in 2014, Nigeria became the largest economy in Africa, and the 26th largest economy in the world with a GDP of \$509 billion [21][22], overtaking South Africa whose GDP at the time was \$384.3 billion [20]. SMEs contributed about 46.5% to Nigeria’s GDP with SBEs making up 99% of these SMEs in Nigeria. However, as an indication of the problems that need confronting in the uptake of e-business, it is worth noting that Nigerian businesses experience power outages about 5 to 10 times weekly, with each one lasting an average of one hour [23].

As a result of the increased use of the internet [24][25], and mobile networks penetration in Nigeria [26], current and potential customers of SBEs are not only equipped with desktop computers and laptops, but also with mobile devices such as iPads, Smart phones and tablets. The demand for e-business capabilities in Nigerian companies from customers is thus likely to increase, but very little research has explored the extent to which Nigerian SBEs are adopting e-business technologies and processes.

To date, most studies on e-business in Nigerian small businesses have focused primarily on e-commerce i.e., the buying and selling of good and services online, neglecting the potential of e-business in transforming business processes and core operations in the more traditional “bricks and mortar” companies [8][19]. In 2011, Olatokun and

Bankole [7] investigated the factors influencing e-business technology adoption by SMEs in Ibadan, a city in south western Nigeria. Data was collected by structured questionnaires administered to key personnel in 60 SMEs (30 adopters and 30 non adopters of e-business), and the results revealed that the age of SMEs was a significant influencing factor on whether e-business was used or not, while company size was of very little significance. It was the younger companies that constituted the majority of e-business users.

Process mapping has been applied as a tool to define and analyse processes in an organisation [27] and thereby to improve performance [28]. Researchers and systems analysts have applied this analytical tool in a number of different systems contexts. These range from the all-encompassing Enterprise Resource Planning (ERP) packages in large businesses [29][30] to e-business technology adoption in small businesses [9][31].

SMEs vary in structure, size and type of business, and the nature of e-business adoption will vary accordingly between businesses. The criteria and related models for assessing e-business need to accommodate these variations. For example, a small manufacturing company with one main customer is likely to focus more on internal efficiency gains, whilst an SBE with products with global potential is likely to focus more on online sales and marketing activities[32].

Various frameworks and models have been designed to both measure e-business adoption as well as aid e-business implementation. The DTI Adoption Ladder is one of the early e-business frameworks. It breaks down e-business adoption into 5 stages and suggests that organisations move through these stages in a sequential order [9][33]. Levy and Powell [34] proposed the “transporter model” as an alternative non-linear e-business adoption model for SMEs. This model suggests that different types of SMEs will view e-business adoption in different ways and identifies four dimensions of e-business deployment in an SME - brochureware, business opportunity, business network and business support.

In order to determine e-business adoption at individual process level – rather than at overall company level - the Connect, Publish, Interact, Transform (CPIT) model was developed by the UK Department of Trade and Industry [35]. This model offers a 2-dimensional matrix to evaluate the impact of e-business technologies across an organisation’s main business processes. When compared with the Adoption Ladder, the CPIT model offers a more in-depth assessment of the impact of e-business on SME operations[9]. The Stages of Growth for e-business (SOG-e) model [36] is the combination of a six stage IT maturity model with a six stage Internet Commerce maturity model. However, somewhat akin to the CPIT model, the SOG-e model recognises that it is possible for an organisation to have different levels of e-business maturity in different areas of a business. A related model is that of Willcocks and Sauer [37] who identified 4 main stages through which organisations will pass as they develop and apply the skills needed for successful e-business deployment. The organization gains increased business value from e-business

as it attains the new capabilities required to advance to the next stage.

While previous studies in developed countries have applied some of these methods and frameworks to evaluate e-business technology and process adoption in SMEs; to date, no study has applied similar methods in the analysis of e-business adoption in Nigerian SBEs. This research will attempt to apply some of these models to various Nigerian SBEs, using, as a starting point, a simple top level process mapping technique that has been applied in similar studies [9][31][38]. More specifically, it will address the following research questions (RQs):

RQ1. Can these mapping techniques and models of e-business adoption be usefully applied to SBEs in a developing world context?

RQ2. If so, what do they tell us about the use of e-business in these small businesses in Nigeria?

III. RESEARCH METHODOLOGY

Research projects usually adopt a particular philosophical stance based on a research paradigm, for example post-positivism, pragmatism, interpretivism or constructivism [39]. This philosophical stance has a major influence on the choice of research methods and approaches to be used in order to obtain relevant findings [40]. For the purposes of this research, an interpretivist paradigm is adopted, and the research approach is qualitative, using multiple case studies.

The case study method of research is well suited for observations where the researcher aims to probe deeply and analyse rigorously with a view to making generalisations about the wider population in which the unit being studied belongs [41][42]. Multiple case studies of Nigerian SBEs are investigated to assess and analyse e-business adoption in the country. The case studies were selected from a cross-section of SBE industry sectors in Lagos – Nigeria’s most populous city and its economic capital. The use of multiple case studies adds greater weight to the research and makes research findings more convincing [43]. Qualitative data was gathered through questionnaires and semi-structured interviews with key personnel in the company case studies. The case studies were identified through the researcher’s existing contacts with company owners and IT managers and all organisations selected for the study have already attempted to apply e-business within their organisations. This paper reports on the findings from just the first two case studies.

While this research is qualitative, exploratory and inductive in nature, some quantitative assessment of company turnover, number of staff and period of e-business usage was done. Necessary approval and consent from participatory organisations were sought and aliases have been used for company and individuals’ names. Empirical evidence gathered from these organisations was developed and assessment made against selected models.

IV. FINDINGS

ABC Laundries is a family business founded in 2010. It originated as a home based operation, but has now expanded to become a budget laundry and dry cleaning

service for people living in Lagos. The company provides a wide range of laundry and dry cleaning services to people living in the Lagos Metropolis from its locations in Yaba and Surulere (urban areas within Lagos). With its main operations office in Surulere strategically located within the Lagos University Teaching Hospital, ABC Laundries is able to offer its laundry services to students and staff at the hospital, as well as pickup and delivery services to companies, corporate services, and guest houses across Lagos State. Currently, the company turns over circa 6 million Naira (£24,000) per annum, and employs 7 staff. (Staff wages are very low in comparison with developed world norms, averaging less than £1000 a year for these staff). The current business plan is to further increase revenue by expanding the company's customer base and increasing market share.

The management of ABC Laundries view e-business as a key enabler of corporate growth and, to this end, invested in a bespoke web-based system in 2013, to handle its key sales and marketing and financial management processes. Prior to this, most business processes were handled by a combination of paper based receipts, Excel spreadsheets and open source accounting tools. However, this became difficult to manage with the opening of a new branch in 2012, and this was the catalyst for investment in a new web portal. The key objectives of this investment were:

1. To provide a system where orders can be captured in real time at both locations.
2. To provide a mechanism to allow staff and customers to track the status of a laundry order from pickup to delivery.
3. To enable top-level financial reporting in real-time.
4. To maintain a database of customers and contact details.

The web portal was implemented in phases, adding new functionality as the old support systems were phased out. The key objectives have been met, with the addition of a few functionality enhancements. The web portal was built using PHP and the MYSQL database. Integration with email servers as well as SMS gateways has enabled emails and SMS notifications to be sent to customers.

GPY properties is a property development and marketing company founded in 2012. In the context of Nigeria's housing deficit and the acute absence of quality housing in the country, the company aims to help redress this imbalance through the provision of innovative, high quality and affordable homes.

The company originated as the property sales division of a larger consulting company called PYI Consulting Limited. However, as sales of developed properties increased, the owner decided to hive off the division into a separate corporate entity to focus on property development sales and marketing as its core business. In 2014, the company turned over about 20 million Naira (£80,000) and the forecast for 2015 is double this figure, due in part to the imminent completion a new state of the art private residential estate in Ogun State, Nigeria.

GPY Properties maintains a website mainly for marketing properties and showcasing its ongoing projects to customers and potential customers. The company also maintains a cloud based Customer Relationship Management (CRM) system for maintaining and analysing customer contact details.

From time to time, the company also advertises on Facebook and various other property aggregator websites. Invoice generation and other accounting activities are currently managed by Excel spreadsheets, but plans are in place to subscribe to a cloud based accounting solution; the Wave Accounting and Xero Accounting packages are possible solutions.

With three full time staff and twenty contract staff, the company has been able to automate most of its daily business activities concerning customer engagement, internal communication and product marketing.

V. INITIAL ANALYSIS

Initial analysis of e-business deployment in the case study companies was undertaken through the combination of four models - process mapping, systems profiling, CPIT (a process based e-business model) and the Willcocks and Sauer e-business staged model. Previous research [8][34] indicates that the use of simple stage based models alone to determine the level of e-business use in an organisation is not sufficient, as different processes may be at different levels. However, even with models that examine technology deployment at process level, such as the CPIT model, there is still the need to adapt these to a small business environment, as the process definitions may not be appropriate to new SBEs [31]. This combination of pre-existing models, derived and adapted from previous research [9], is used as the conceptual framework for analysis of the case studies.

The web based system implemented at ABC Laundries now enables it to generate receipts and invoices at its sales desk on the fly, as well as manage the status of each laundry order throughout its lifecycle (i.e., from pickup/drop off to delivery/pickup). The company's business plan now entails the opening up of multiple locations across the State, and this will involve leveraging of further benefit from its web based system.

Using data from the questionnaire responses and semi structured interviews, seven core processes were identified in ABC Laundries (Fig. 1) - Laundry Operations, Financial Management, Sales & Marketing, Collection & Delivery Management, Stock & Procurement Management, Payroll & HR Management and Customer Services. At PGY properties, there were six core processes (Fig. 2) that the organisation performs - Financial Management, Constructor Liaison & Management, Customer Services, Property Sales and Marketing, Logistics & Procurement and Payroll & HR Management.

Systems profiling was applied to identify e-business systems currently in place in each process area. By employing a simple Red-Amber-Green assessment (Fig. 3 and Fig. 4), systems were assessed to indicate those in need of replacement, those that could possibly be retained and those that were deemed strategically and/or operationally

sound. This procedure initiated the analysis of e-business systems at individual process level as well as indicating which processes are automated, semi-automated or non-automated.



ABC Laundries

Figure 1. Main business processes at ABC Laundries

A CPIT analysis of ABC Laundries (Fig. 5) then provided a more detailed view of the impact of e-business systems at process level. This revealed that e-business systems have made significant impact in the financial management and customer facing processes. Decision makers within the organisation are easily able to keep track of daily, weekly and monthly revenue from any of the two premises, or remotely, thus helping the organisation to plan effectively and take appropriate action when needed. The sales and marketing process has also been made more efficient with the ability to automate and notify selected groups of customer via SMS or emails. There remain further benefits to be gained by automating the communication of marketing information to customers and by making relevant information available across processes. This may allow, for example, special offers to be made to customers in specific geographic locations, with high frequency of delivery, with a mind to keep delivery cost constant and increase orders to be delivered. This type of further development, which is akin to what, in a larger organization, would be termed Business Intelligence, would arguably move the company into the transformation stage on the CPIT model.



GPY Properties

Figure 2. Main business processes at GPY properties

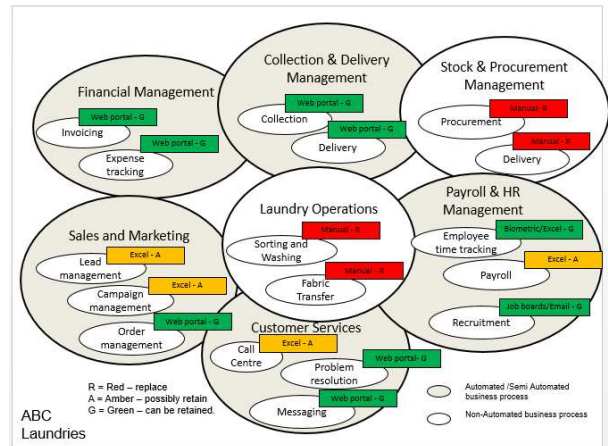


Figure 3. Main business processes, sub-processes and systems profiling at ABC Laundries

GPY Properties has been able to adopt e-business technologies without the need to use in-house IT staff, as it has been able to utilise a cloud based CRM tool. The CPIT Model for GPY Properties shows that its sales and marketing processes are well supported by e-business technology. According to the company’s managing director, the strategy to advertise online has helped the company gather new leads - often people with very busy schedules, who would not normally have time to visit the company’s office - as well as reach different geographical locations with its advertisements. This year, without doing any advert campaign specifically targeted at the northern part of Nigeria, the company has been able to make two property sales to individuals who live in this location, and a number of further sales are currently in the final stages of completion in this part of the country. One of the current subscribers to its flagship residential estate is a Nigerian who resides in Canada and who saw the advert on the company’s Facebook page.

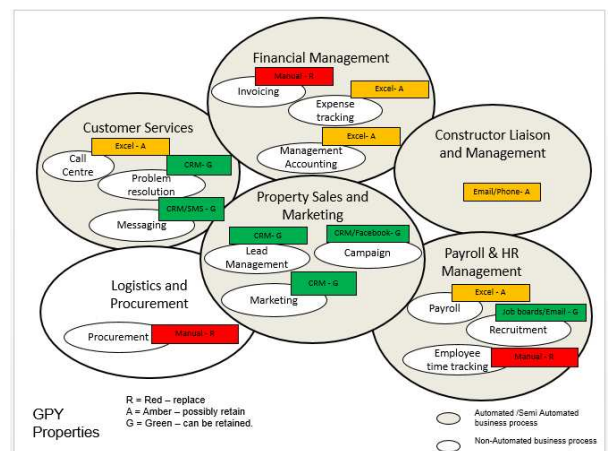


Figure 4. Main business processes and systems profiling at GPY Properties

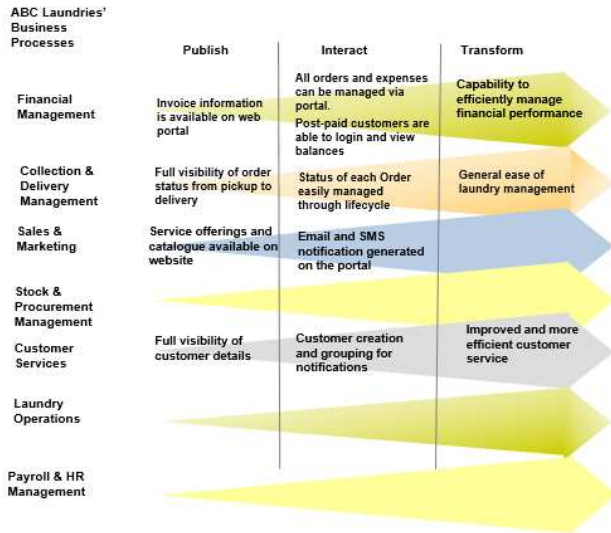


Figure 5. CPIT model applied to ABC Laundries

Nevertheless, Fig. 6 shows us that as of now, the deployment of e-business technologies at GPY Properties is restricted to the sales, marketing and customer service processes. The managing director has affirmed that the volume of data generated by the various departments in the other process areas does not justify further investment in e-business systems at present, although this may change as the organisation expands and takes up more construction projects.

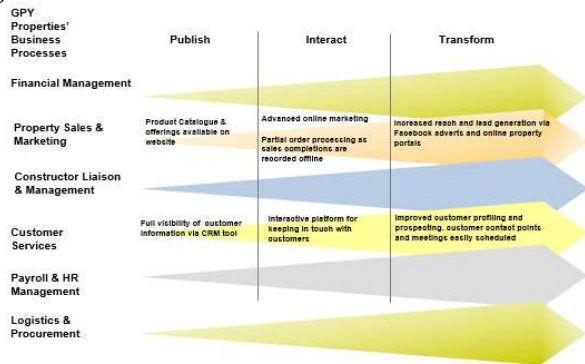


Figure 6. CPIT model applied to GPY Properties

Further, if we now look at these two companies against Willcocks and Sauer's model [37], the analysis suggests they are between stages 2 and 3 (Fig. 7), whereas other authors [44] have suggested that many small companies do not progress past stage 1 because they often do not see the benefit in investing in capital intensive e-business projects. This apparent contradiction is partly explained by the reduction in cost of e-business infrastructure in recent years, and, partly because of this, it has become a de facto norm to use e-business in the sales and marketing processes in many organisations, including SBEs. Moreover, in the two case study companies investigated here, the management sees e-business as a key enabler to growth. In ABC Laundries, in

particular, their success with e-business to date can be attributed to the phased introduction of new e-business features which has helped the organisation derive value from relatively small scale, staged, expenditure. This has also allowed a phased upgrade in technology, accompanied by appropriate process improvement and staff training, before moving on to focus on another process. Similarly, at GPY Properties, the company has used cloud based systems that offer very low entry costs.

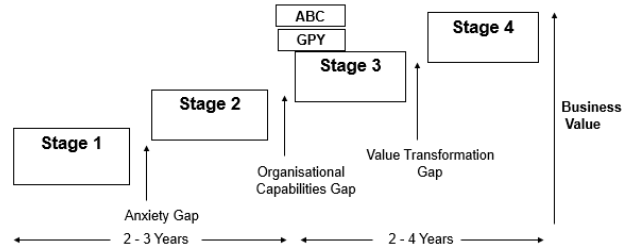


Figure 7. The Two Nigerian SBEs on the E-business Stage Model

Stage 1- Web Presence

- Develop presence
- Develop technology capability

Stage 2- Access Information and Transact Business

- Re-orientate business/technology thinking skills
- Build integrated approach with the web and business systems

Stage 3- Further Integration of Skills, Processes, Technologies

- Reorganise people/structures
- Reengineer processes
- Remodel technology infrastructure

Stage 4- Capability, Leveraging, Experience and Know-How to Maximise Value

- Customer-focused organisation

VI. CONCLUSION

The analysis of the two case studies indicates that e-business technologies and processes are being adopted by Nigerian SBEs, and that existing e-business models can be usefully applied to assess e-business operations in these companies. So, in answer to the RQs noted earlier in this paper, this research suggests that the e-business adoption models, developed to gauge the impact of e-business in the developed world over a decade ago, are of value today in a developing world context. Although the definition of e-business has evolved, the process mapping technique and the application of models like CPIT can give a clear framework and point of departure for the assessment of e-business in countries like Nigeria; and they clearly show that e-business technologies are bringing value to the studied SBEs, particularly in the customer facing processes, which mirrors the early deployment of e-business in the developed world.

Future research will now focus on how these models can be advanced and refined to provide an enhanced analytical framework for understanding and progressing e-business deployment in Nigeria. In particular, the three dimensions of change discussed above in relation to ABC Laundries – technology deployment, process improvement, and people skills enhancement – will be incorporated into a new combined model of e-business implementation. These

dimensions of change have been identified by other authors [45] [46] with regard to information systems projects in developing world contexts, and this provides a theoretical platform for further investigation of these concepts in current and future case studies of e-business in Nigerian SBEs.

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