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Technology policy and change in developing economies: advancing a banking strategy for world developments

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Abstract
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Technology policy and change in developing economies: advancing a banking strategy for world developments

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Abstract: This article examines technology policy and change in the Sudanese banking industry. Attention is given to the context of a developing economy that is aiming to fast track into the international banking arena through the introduction and use of new technology that is consistent with banking IT associated with more advanced industrialised economies. Some of the problems of translating a technology policy into practice and overcoming cultural, historical and socio-political legacies and attitudes are analysed and a number of implications for the adoption of IT in developing counties are assessed. Attention is given to the role of managers in translating national policy and the influence of key stakeholders on the process and outcomes of change. In presenting new empirical data the article aims to further our understanding of some of the main issues facing less developed economies as they seek to operate and compete within the increasingly electronic and international world of banking.

Keywords: Technology policy; management of change; IT; banking; developing countries; technological change; management.

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Patrick Dawson is a Professor at the University of Aberdeen Business School (UABS) where he has held positions as Head of School and Director of Graduate Business Programmes. He holds a PhD in industrial sociology from the University of Southampton and has published a number of books including: *Understanding Organizational Change: The Contemporary Experience of People at Work*, London, Sage, 2003; and *Organizational Change: A Processual Approach*, London: Paul Chapman Publishing, 1994. He is currently working on a book with Costas Andriopoulos entitled: *Managing Creativity, Innovation and Change*, Essex: Pearson Education.

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1 Introduction

This article examines the development of a technology policy by the Bank of Sudan (BOS) and the uptake and implementation of information technology in the Sudanese Banking Industry (SBI). Banking has been practised in Sudan for over a hundred years and yet, there has been little documentation or analysis of Sudanese banking operations. The absence of data on the development of the Sudanese banking sector and the issues faced by SBI in the uptake and use of new technology draws attention to the need for empirical research. This article draws on data collected in the Sudan over a six-month period from January to July 2003 and draws on both qualitative and quantitative material. It seeks to contribute to knowledge about organizational change and more

particularly, to the introduction and implementation of IT into the commercial banking sector of developing economies. As such, the context of Sudan provides an ideal opportunity to investigate the issues and problems faced by banks adopting IT in such an economy. Developments in the Sudanese economy, including the formulation of a Comprehensive National Strategy (CNS) 1992 – 2002, and the creation of a central Bank of Sudan, have been central to the development and growth of commercial organizations in Sudan. Since January 1999, Sudanese banks have been required to consider the implementation of technology as a part of the central Bank of Sudan's (BOS) restructuring and banking control program. To follow the progress of the banking industry in implementing technology, the governor appointed a high level committee to work closely with the banks, collecting information in order to monitor and evaluate BOS policies. Although some banks responded to the prevailing challenges by introducing technology solutions, such as the introduction of the Society for Worldwide Interbank Financial Telecommunications (SWIFT); in general, banking technology in Sudan lags behind other countries in the region. From the perspective of BOS, the whole banking industry requires radical technological change [1]. In examining the introduction and implementation of IT in the Sudanese Banking Industry (SBI), an historical overview is provided of five key socio-political periods that have shaped banking developments. Some of the main findings from our study on technology and change are then reported. The policy implications from these findings are then further investigated and discussed. But first, some of the relevant findings from the literature on technology and banking are appraised and the research strategy and methods used in the study are outlined.

2 Information technology and banking

The financial services industry has been described as an important area for study as it plays a major role in the changing fortunes of a country's economy [2]. Banks are considered to be one of the major players in this field [3] and are viewed as intensive users of technology [4]. International banks generally invest heavily in technology and telecommunications networks to connect overseas offices to their headquarters and the global SWIFT network enables banks to transact business information at speed across geographically distributed sites [5]. Attention has been drawn to the way that information technology has changed how banks operate [6] and also it has been noted how by the 1990s, more than 50 per cent of foreign exchange trades were carried out electronically [7]. Prior to developments in computer, telecommunications and information technologies, banks used manual systems of information processing and could get away with a mediocre operation and systems capability if its customer service was viewed as excellent. It has been indicated how banks increasingly have to be excellent both in the front counter-desk and in the internal back office, and how throughout the 1950s and early 1990s, the banking sector has remained at the forefront of the introduction of IT throughout the industrialised world [8]. These developments have been linked to the growing competition of international financial markets, the increasing number of bank customers, an expansion in the volume of work and as has been noted, the characteristic of business finance and wholesale banking are being radically changed by new technology [9]. IT in banking services has also had a significant effect on client behaviour and has changed the number and types of transactions that now take place [10]. For example, there has been:

- An increase in the number of bank cheques being processed, arising from an increase in the number of people using banking facilities and accounts.
- A reduction in the cost of money transmission services.

- A rapid development in sophisticated communication networks.
- A growing use of the Internet by customers to run their bank accounts, and business clients to manage their finances [9].

Similar findings emerge from an earlier study where it is noted that during the early 1980s [11] the proportion of the adult population using banking services increased with over 90 per cent of the population holding a current account in France and Germany [12]. Other factors that can be associated directly and indirectly with the diffusion of IT in banking (apart from the growing number of people using banking accounts and services) included: competition cost of labour, government policy, deregulation, union resistance, and customer expectations. An early study on the social implications of IT in the banking sector identified these as key factors affecting the diffusion of technology [12]. As banks operate very large centralised information processing networks in which paper remains an important medium and as transmission through the network is standardised both in content and timing, they were from the outset well suited to electronic automation [13]. Banks have also been pioneers in the advanced use of computer technology despite some constraints such as the legal requirements of checking individual entries and verification of signatures. It has also been observed that banking activity consists of handling large quantities of information much of which is in numerical form [14]. For example, it has been estimated that about 81 per cent of the output (in terms of statements and printouts) in USA banking is used in providing information services. Similarly, in the USA, it has been argued that without mechanisation in banking, many of the paper-based systems simply could not have coped with the growth in the use of bank services in the 1970s and 1980s [15]. Not only have labour costs risen greatly, but also, given the need for the careful checking

and balancing of individual entries, the complete handling of paper documents would have made it impossible to keep the conduct of transactions timely. In addition, it has been noted that due to mechanisation, USA banking productivity in the processing of cheques, more than doubled between 1960 and 1980 [16].

Over the past two decades, banks have continued to develop services and products through the development and use of advanced IT systems, for example, digital banking that allow customers to access statements, pay bills and transfer funds through internet connections are now commonplace in Western industrialized countries. Moreover, the progressive deregulation in the financial services industry and the availability of new technological opportunities have removed many of the traditional barriers to market entry, with new Internet banks offering competitive services [10]. Accordingly, it has been argued that this has resulted in greatly increased levels of competition in the industry [2]. In response to these ongoing changes, the banking industry has undergone significant structural adjustment. For example, recent merger and acquisition activity includes Lloyds TSB and the Cheltenham and Gloucester Building Society, the Hong Kong and Shanghai Banking Corporation, and the merger of Halifax and Leeds Building Societies. Many building societies have also chosen to lose their 'mutual' status, effectively turning themselves into banks and thereby allowing the provision of a full range of financial services.

In 2004, banks remained one of the largest investors in new technology within a society that is increasingly dominated by service industries [17]. The findings from an information technology survey carried out by the *Financial Times* indicate that total expenditure on IT systems by European banks alone exceeded $21 billion in 1999 [2]. IT applications in banks have increased processing capacity by automating tasks previously accomplished manually and as already noted, corporate banking is likely to

be further transformed by new technology throughout the 2000s [9]. For example, it has been estimated that U.S. banks will spend $1.4 billion on new technology by 2006 - the figure stood at $800 million in 2003 [17]. Many of the current IT initiatives are aimed at improving customer 'remote' services with wireless technology becoming an increasingly important tool.

3 Research strategy and methods: an overview

Fieldwork for this study was carried out over a six-month period in the Sudan during 2003. An interview schedule was compiled to elicit data in face-to-face interviews with the General Managers in Sudanese banks and specialist IT managers. The questions focussed on the enabling and constraining factors that had shaped the process of technological change. We were also interested in the attitudes and perspectives of these respective managers and their evaluation of policy and practice in the uptake of new technology. At the start of each interview, interviewees were briefed about the main objectives of the study. Each respondent was told that the interview would be conducted anonymously, that the interview would be tape-recorded, and assurances were given that all information would be treated as confidential in only being used for research and academic purposes. Although it was not possible to secure appointments with 11 banks in the SBI, appointments were secured with 18 banks including the Electronic Banking Services Company (EBS) and the Bank of Sudan (BOS), representing 62 per cent of the SBI (see Table 1). This qualitative data was analysed through formulating a series of themes and sub-themes and then analyzing the responses across the data set.

No	Bank Name	General	IT Managers	Employees	Total

		Managers (**17**)	(**19**)	(**46**)	(**82**)
	<u>Public Banks</u> (3):				
1	Bank of Khartoum	1	1	3	5
2	El-Nilein Industrial Development Bank	2	2	2	6
3	Agricultural Bank of Sudan	1	1	(Busy)	2
	Total	**4**	**4**	**5**	**13**
	<u>Private Banks</u> (11):				
4	Sudanese French Bank	1	1	3	5
5	Tadamon Islamic Bank	1	1	3	5
6	Islamic Cooperative Development	1	1	1	3
7	Bank	1	0	4	5
8	Baraka Bank	0	1	3	4
9	Exports Development Bank	1	1	4	6
10	Sudanese Saudi Bank	1	1	3	5
11	Workers Bank	1	1	5	7
12	Farmer's Commercial Bank	1	1	3	5
13	Ivory Bank	1	1	3	5
14	Omdurman National Bank	1	0	3	4
	Financial Investment Bank	**10**	**9**	**35**	**54**
	Total				
	<u>Foreign Banks</u> (2):				
15	AbuDhabi National Bank	1	1	3	5
16	Habib Bank	0	1	3	4
	Total	**1**	**2**	**6**	**9**
17	EBSC	**1**	**1**	-	**2**
18	BOS	**1**	**3**	-	**4**
	Total	**17**	**19**	**46**	**82**

<u>Table 1: Number of Individuals Interviewed in the SBI</u>

In addition to the collection of qualitative data, a questionnaire was also designed, piloted and used in the study. The questionnaire was distributed to the entire population (27) of SBI banks. Copies of the questionnaire were also given to the General/Bank

Manager and the IT/Head of computer department at the Headquarters of the SBI based in Khartoum. Responses were supervised and controlled by the personal administration and collection of the questionnaires by the researcher. A summary of the questionnaire distribution is illustrated in Table 2 below. The advantages and disadvantages of using a dual methods approach has been discussed elsewhere [18] and are not detailed here. Although access did prove problematic in a number of cases, the need to work closely with respondents and develop rapport and trust was highlighted throughout the course of conducting the research in Sudan.

No	Bank Name	General Managers (**23**)	IT Managers (**26**)	Total Received (**49**)
	Public Banks* (**4**):			
1	Bank of Khartoum	1	1	2
2	El-Nilein Industrial Development Bank	1	1	2
3	Agricultural Bank of Sudan	1	1	2
4	Savings & Social Development Bank	1	1	2
	Total	**4**	**4**	**8**
	Private Banks* (**19**):			
5	Faisal Islamic Bank	1	0	1
6	Sudanese French Bank	1	1	2
7	National Bank of Sudan	0	1	1
8	Blue Nile Bank	1	1	2
9	Sudanese Islamic Bank	1	1	2
10	Tadamon Islamic Bank	1	1	2
11	Islamic Cooperative Development Bank	0	1	1
12	Baraka Bank	1	1	2
13	Exports Development Bank	1	1	2
14	Sudanese Saudi Bank	1	1	2
15	Workers National Bank	1	1	2

16	Animal Resources Bank	1	1	2
17	Al-Shamal Islamic Bank	1	1	2
18	Farmer's Commercial Bank	0	1	1
19	Ivory Bank	1	1	2
20	Omdurman National Bank	1	1	2
21	Financial Investment Bank	1	1	2
22	Gedaref Investment Bank	1	1	2
23	Commercial Estate Bank	1	1	2
	Total	**16**	**18**	**34**
	Foreign Banks* (**4**):			
24	AbuDhabi National Bank	1	1	2
25	El-Mashreg Bank	0	1	1
26	Habib Bank	1	1	2
27	African Bank for Development & Commerce	1	1	2
	Total	**3**	**4**	**7**
	Total Received	**23**	**26**	**49**
*Banks have been categorized as such by the BOS.				

Table 2: Questionnaires Received

4 The historical development of the Sudanese banking industry

The Sudanese banking structure witnessed various changes and several important developments in the period 1903 to 2003. This can usefully be discussed and described under five historical stages that: highlight the links between prominent political events in the history of Sudan and change in the Sudanese finance industry; present some of the factors that affected the development of SBI; and illustrates the development of the SBI in context and over time. Although our focus is on more recent developments, historical developments are critical in setting the context within which to understand current developments and in particular, management issues, policy developments as part

of the BOS agenda, and factors shaping the uptake and implementation of new technology in Sudanese banks. The five prominent socio-political periods comprise:

- *Period before Independence from 1903 to 1956*: this period witnessed the commencement of the banking industry in the Sudan, which included five (5) foreign banks with twenty-eight branches spread all over the country. At this time, there was no national currency and not a single Sudanese bank was recognized during this period.
- *Period after Independence from 1956 to 1969*: British and Egyptian troops left the country and ten banks were founded including a national and foreign presence. By the end of 1960, the number of foreign banks operating in the country had reached seven, with their thirty-seven branches spread across Sudan. The Central Bank of Sudan (BOS) was established in 1960.
- *Period of May Regime from 1969 to 1985*: this period witnessed a bloodless coup and the new regime (May Regime) adopted a state-regulated approach and nationalized five of the foreign commercial banks working in the country. For the first time in the history of Sudan, the formation of banks that operate in Modes of Islamic Finance were established. A very turbulent time within the Sudan that witnessed many commercial and socio-political changes. The political regime started with communism and socialism, then changed to capitalism and concluded with Islamic Shariah Law.
- *Period of Transitional & Coalition Parties Regime from 1985 to 1989*: the categorization of banks into Islamic and Non-Islamic was invalidated during this period and all were categorized as joint venture banks. In addition, there was a notable increase in the number of banks with a 56 per cent increase in bank branches when compared to the previous period.

- *Period of the National Salvation Regime from 1989 to 2003*: yet another bloodless coup took place in which significant economic measures were introduced into the Sudan. A three-year economic 'salvation' programme was rolled out and a new economic liberalization policy was adopted. Modes of Islamic Finance were generalized to all banks operating in Sudan. The Sudanese Currency Printing Press (SCPP) was established and all commercial banks were obliged to raise their capital fund to comply with a Banking Conformity Programme (BCP) in accordance with the Basle Commission Capital Sufficiency Standards (BCCSS). Banks operating in the country were divided into three categories comprising: Public banks (solely owned by the government), private banks (owned partially by nationals and partially by foreigners), and foreign banks (these are branches of foreign banks registered abroad). The SBI comprises twenty-seven banks, including four government-owned banks (of which three are specialized banks), nineteen private banks (eleven of them are joint venture banks, one is an investment bank and one is a regional bank), and four branches of foreign banks. At this period of time, the implementation of technology-based services within banking operations was a major concern in the BOS current comprehensive programme for restructuring the Sudanese banking sector. As part of its modernisation plan, the BOS was looking to introduce technology solutions to the whole banking industry [1].

As already indicated, the Central Bank of Sudan (BOS) was established in 1960. The aim of BOS was to develop banking policies that would lead to greater monetary stability through monitoring activities, encouraging planning, facilitating more foreign trade and investment and generally supervising the activities of the banking sector as a

whole. During this early period, the focus of BOS was on directing the banking industry towards the process of economic and social development of the country; nonetheless, its plans did not include the development of Sudanese banking industry in terms of the uptake and use of banking technology.

In 1994, the BOS adopted the Basle Commission Capital Sufficiency Standards. The programme was aimed at restructuring the banks in order to create strong local and financially sound banking institutions that could compete both nationally and internationally. As a result, the BOS formed a committee in July 1994. This committee was functioning until the end of 1998. It was then transformed into a unit in the preventive control section in the Central Bank Control Department. The unit was entrusted with the duty to follow up, study, analyze and evaluate banking operations with regards to restructuring requirements, and then submit quarterly, biannual, and annual reports. The BOS then directed all banks to take the necessary steps to comply with Basle Standards and accordingly, a number of banks operating in the country were closed due to insufficient funds; for example, the Credit and Commerce International Bank and the Middle-East Bank were liquidated in 1991 and 1992 respectively.

During the last two decades, there has been a considerable increase in the number of banks and branches in Sudan. The number of branches increased from 173 in 1980 to 632 in 1999 [19]. However, by the end of 2000, the total number of authorized banks in the whole country dropped to 26 with 617 branches, in addition to the Central Bank of Sudan with eleven of its branches operating in the different states. A major component of a four-year restructuring programme (1998-2002) is privatisation of government-owned banks. Domestic banks are also being encouraged to merge and to create larger and stronger entities, with the aim of reducing the number of banks to less than a third of the current number. The SBI is undergoing a major reform process

to keep pace with changes in the domestic economy and international developments. By the end of year 2003 banks operating in the country were divided into three categories comprising:

- Public banks: solely owned by the government.
- Private banks: owned partially by nationals and partially by foreigners.
- Foreign banks: these are branches of foreign banks registered abroad.

The privately owned banks represent about 60 per cent of the total number of operating banks and have about 55 per cent of the total branches, while the publicly owned banks have about 45 per cent of the total branches all over the country [20]. SBI comprises twenty-seven banks, including four government-owned banks (of which three are specialized banks), nineteen private banks (eleven of them are joint venture banks, one is an investment bank and one is a regional bank), and four branches of foreign banks.

Due to recent developments in the international economy, namely liberalization, globalisation and the application of Basle committee recommendations, the BOS has issued a Comprehensive Banking Policy (CBP) which among other things, set out to promote the adoptions and introduction of new technology [20]. Through using its supervisory and regulatory functions towards adopting modern technology, BOS seeks to play a leading role in the achievement of the expected technological changes. In this context, BOS is responsible for encouraging all banking institutions to undergo a radical change in their technology-based services comprising: automation and modernization of the bank services; installation and use of computer networks and systems; and ensuring that banking technology is a genuine part of the supervisory programme of the BOS and the CBP. Since January 1999, banks are required to consider the implementation of technology as a part of the BOS restructuring and banking control programme. To

follow the progress of banks in implementing technology, the governor appointed a high level committee to work closely with the banks, collecting information and reflecting BOS policies. Although some banks responded to the prevailing challenges by introducing some technology solutions; in general, banking technology in the Sudan is lagging behind other countries in the region [21]. In an attempt to answer some elements of this question, the next section draws on new empirical data in investigating the main contextual, historical and political issues that have shaped change at the international, national, sectoral and organisational levels with regard to new technology and banking in Sudan.

5 Technology and change: the case of the Sudanese banking industry

In analysing quantitative and qualitative data a number of key findings emerged that relate to the international, national, sectoral, organizational levels that reflect issues arising in three broad areas comprising: the political and social context, the business economic and technological environment, and the historical and cultural climate. We would argue that these three categories of factors are not discreet in nature, but rather they overlap and influence each other. For example, writing off the huge international debts incurred by developing countries, lifting imposed economic sanctions or withdrawing any political boycott, is likely to revive an economy, encourage the establishment of new relationships and enable greater engagement with others in the international business community. In contrast, a change in a political government by a military coup creates a climate of uncertainty and a sense of insecurity, which in turn discourage both local and foreign investments that may discourage the development, uptake and use of new technology at work. Thus we argue it is important to consider these factors at a number of different levels (that is, the international, national, industry

sector and organizational levels), as each of these levels present their own set of contextual conditions that serve to influence the speed, direction and process of change and the way that IT is configured, used or resisted during implementation and uptake.

At the international context level, foreign investment strategies, external earnings and developments in technology and banking all set an external global environment in which strategies for change can be considered and developed. The findings from the study draw attention to three main types of banks in the SBI. These are the public sector, the private sector owned banks and the foreign banks. The findings reveal how the majority of General Managers (47.8%, 11) and IT Managers (65.4%, 17) in the SBI describe their banks as public sector and private sector owned banks; whereas only few respondents (General Managers (17.4%, 4) and IT Managers (19.2%, 5) report their banks as foreign banks due to the international sanctions imposed on Sudan. The findings show how the economic embargo by external business played a crucial role in depriving Sudan of importing sophisticated technology into the country and building partnerships with large multinational technology companies around the globe. The comparatively small size of Sudanese banks was identified as a factor limiting change in SBI. The main reason for growth limitations within the banking sector was seen to stem from bank ownership. The history of a type of family banking practice produced rather conservative low risk managers who were generally uninterested in IT investment and unwilling to consider mergers in order to increase capital because they believed that this could jeopardize existing authority relationships and threaten their control over their individual shares. Overall, the findings reveal how bank ownership jointly with the international trade sanctions and economic embargo (as internal and external contextual issues that emerged from interview data) have negatively impacted on the introduction and implementation of IT in the Sudanese

banks. In Sudan, bank ownership has developed in a particular way and this historical legacy has influenced the process of technological change. Externally, international sanctions have also constrained the uptake on new technology and as a number of interviewees explained, this situation has excluded Sudan from interaction and liaison with their Western counterparts. This in turn has affected levels of expertise and knowledge in the introduction and implementation of IT in the Sudanese banking sector and has major implications for the future of technological change in the SBI.

In addition to these contextual factors, national level concerns centre on the development of regulatory frameworks, the stability of the economy, political government and the development of infrastructures associated with for example, the provision of a national power grid (electricity), education and the establishment and maintenance of a telecommunications network. The absence of telecommunication infrastructure has presented an obstacle to change in Sudan. Essentially, due to the lack of a highly sophisticated telecommunications system in the country, Sudanese banks were unable to install computer systems in all their branches and to link these between branches and headquarters in order to enable communication with their headquarters, and also to facilitate international communication with foreign counterparts. There are also a number of personnel issues that inhibit IT development in banking. The study confirmed that a lack of IT knowledge and skill among the General Managers in the Sudanese Banking Industry (SBI) inhibits change (p-value 0.003, 0.002, 0.001, 0.001, and 0.001, consecutively). Unsurprisingly, the results also reveal how IT Managers have significantly higher technical qualifications, and more IT/computer experience than their General Managers. This lack of IT knowledge and parallel skill among the general managers, in addition to less technical qualifications and IT experience, are factors affecting the process of the introduction and implementation of banking IT in

SBI. Due to this lack of knowledge, General Managers typically steered clear of IT issues leaving these considerations to their IT Managers. Their low degree of involvement in managing change (p-value 0.02) further inhibited the uptake of IT in the context where Sudanese banks are increasingly being expected to provide better banking services in complying with the directives of the BOS. At the national level, banks are required to cope with globalisation and to accommodate and adhere to the international standards associated with the electronic banking payment systems such as the Society for World-wide Inter-bank Financial Telecommunications (SWIFT), Visa and Master Cards. International banks for example, have invested heavily in telecommunications networks to connect overseas offices to their headquarters and the global SWIFT network enables banks to transact business with each other regardless of time and distance [22]. With the growing push for global electronic financial services it has been described that the push for SBI to adopt new technology is understandable [2] and yet, the data from this study highlights that about half of the respondents (49%, 24) believe that the process of introducing banking IT has not yet been started or implemented in any way in their banks. Interestingly, more than one-third of managers (38.8%, 19) believe that the process of introducing banking IT may have started but it has yet to be fully implemented. Although almost two-thirds of respondents (64.6%, 31) believe IT has been implemented in their banks, there was no urgency to progress change further.

At banking industry sector level, developments and the setting up of committees and agencies to control, monitor, evaluate and improve the sector all serve to influence the direction and speed of IT change in Sudanese banking and financial services. Findings from the study reveal how the strategic decision to change was a top down approach. BOS played a key role in making the decision to introduce new technology

in the SBI, but the process of managing the implementation of change was determined at the local banking level. Interview findings highlight how BOS took the lead by adopting the concept of a comprehensive banking strategy. They established the Banking Technology General Administration (BTGA) in April 2000, which consists of the IT Department that was responsible for the BOS central systems; and the Banking Technology Department (BTD) that was required to work directly with the banks in encouraging the introduction and implementation of new technology. Moreover, Electronic Banking Services Company (EBS) was also established to transfer the electronic banking knowledge from abroad into the country, as well as taking the responsibility for the development and transformation of the Sudanese banks in general. Moreover, the BOS extended the initial stage for an additional year to allow for the accomplishment of the restructuring process, whereas another extra four years are thought to be required for full implementation, which is expected to be completed by the end of 2007. In planning for future change, the findings reveal how the 'Interbranch On-line Services', were ranked top among the international electronic banking services planned for implementation (22.7%, 5); whereas, the 'Credit Card Services' represented the least likely services to be taken up by the SBI (6%, 1). The outcomes of the study reveal how the banks bought banking IT systems from ten different countries. This shows how Sudanese banks are not constrained in their purchasing decisions for banking IT systems, which can be acquired from the country of their choice. Nonetheless, few banks bought their required banking IT systems from the local market. The findings also establish how more than a half (52.2%, 12) of Sudanese banks acquired banking IT systems from external vendors. These vendors in turn played an influential role in shaping banking practices in the SBI. This highlights the need for foreign IT companies working in Sudan to redesign their systems to adapt to the

Sudanese local banking practice. External companies are expected to make further adjustments to the traditional banking system and or design new banking software, which has the potential to operate within the Islamic investment banking system and run the Modes of Islamic Finance, such as, Mudaraba, Murabaha, and Musharaka. These findings support the structurational approach where it as has been claimed that many of the technologies utilised by organisations today are not constructed internally, rather they are obtained from other organisations 'either custom-designed, off-the-shelf, or in some form that is part mass-produced and part customised' [23]. It has also been explained how developing organisations play an influential role in shaping the social practices of the organisations using the technology [23].

In turning attention to strategies for change, it was found that IT Managers (95.8%, 23) played a more important role in planning strategies than General Managers (73.9%, 17). The survey results reveal how Sudanese banks are adopting different IT strategies, which mirrors an absence of any agreed comprehensive or coherent IT strategy to implementing change in the SBI. Interestingly, the quantitative findings show how three-quarters (79.2%, 38) of all the banks studied claim that they have clear strategies to shift over to banking IT, and how a similar number of banks consider that their IT strategies are written and included in the general strategies of the bank; in contrast, the interview findings disclose how banking management is heavily centralized and how there is a lack of strategic awareness about technology among the vast majority of bank managers. These results highlight how bank managers inhibit the process of change and limit the strategic development of IT in the SBI. The findings also illustrate how there is a general lack of planning, how work is often poorly organized in the Sudanese banks, and how there tended to be an absence of any clear vision. Although the BOS took the initiative to promote the automation of banks in the

enforcement of the uptake of modern technology across the whole banking sector by establishing a Banking Technology Department (BTD) - which is required to work closely with the banks in promoting the introduction and implementation of new technology - it seems that the BTG did not effectively carry out its responsibilities for monitoring the uptake of IT in the SBI. As a consequence, bank managers limited the process of technological change and hampered the strategic development of IT in the Sudanese banking sector, and this has largely been due to a lack of technology awareness and IT knowledge.

At the organization level, existing structures and authority relationships, operating practices, levels of training and education, and the availability and use of technology all shape employee expectations and behaviour at work. Adapting Leavitt's classification of task, people, technology and structure in conjunction with Dawson's culture and history of the organization, provides a useful contextual base from which to examine the implementation and use of IT in banking operations [24]. If we consider the factors shaping the uptake of new technology in the SBI more broadly, a number of constraints to change stemming from the culture, history and context of SBI can be identified. For example, the different routes to recruitment and employment within the banks have created a difference in expectations, interests and priorities. These are evident between Bank Managers and IT Managers and act as a significant barrier to change in SBI. Inadequate funding is a prime cause for delays in the introduction of banking IT in the Sudanese banks.

In Sudanese banks, there are problems in setting priorities and in the proper utilization of financial resources in the allocation of small funds for the introduction and implementation of technology. Although banks need technology, very low budgets are normally assigned for IT purchase and developments. Some banks are not prepared to

spend money on technology, instead they try to find excuses to cut down on their technology fund and continue to spend money on purchasing other assets such as office furniture and executive cars for the banks' senior management team. In short, Bank managers do not pay much attention to IT departments, as they always allocate these departments a comparatively small amount of money.

The quantitative findings reveal how more than one-third (35.6%, 8) of banks believe that they adopted a 'necessary evil' IT strategy, which is based on the belief that the use of computers should be reduced as much as possible. These results show how Sudanese banks believe that only applications which can be done by computer and which are cost-justified should be authorized. This highlights how banks do not generally encourage computer applications, as they remain unwilling to spend money on computer equipment, software, and or personnel development. Thus, the pre-existing culture and attitudes of Sudanese bank managers inhibit the process of change and limit the strategic development of IT in the Sudanese banking sector. Unlike their Western counterparts, there is not the same business culture for IT and change in the provision of international financial services.

Another contextual historical factor generally found in the developing economies, relates to the political socio-economic stability of the country. In Sudan, political appointments were a critical management issue impacting on the development of IT. In the last few decades, there have been real problems over what is called 'political appointments' in the Sudanese banks. Under this system, state authorities normally appoint banking staff for political reasons regardless of their specialization or suitability for the job. The mistake of appointing unqualified loyal individuals has been a major factor limiting the progress of the Sudanese financial services sector. These types of appointments cause changes in policies, and create an unstable environment

that often leads to disruptions in the introduction and implementation of banking technology. Some of the bank appointments are nepotistic or politically motivated, especially in cases where managers recruit their relatives, friends and or those who are known to be politically loyal. This often creates inefficiencies and overstaffing in banks. This kind of political appointment can cause a breakdown in banking practices by changing authority relationships and creating a discontinuity that ultimately hinders the achievement of long-term strategies for technological change. Moreover, these appointments further encourage nepotism among senior banking officials to recruit additional family members, or those who have good relations with them or are believed to be politically loyal in order to empower themselves and safeguard their own positions.

Apart from insufficient funding and these contextual socio-political factors, there are also a number of constraints on staffing and specifically, on the low levels of training and development of existing staff. Both questionnaire surveys and interview data report that considerable number of respondents expressed their opinions about the inadequacy of IT training for banking staff. Within Sudan, there is a scarcity of qualified IT personnel in the labour market owing to poor pay structures, which contrasts with more industrialised parts of the world that can attract a larger number of educated and well-qualified candidates. In Sudan, the issues associated with poor staffing, such as, the lack of qualified and experienced IT personnel, staff turnover, poor staff training and the resistance from older employees, all highlight some of the socio-political, economic and contextual factors that militate against the uptake of new technology in Sudanese banks. They also draw attention to the importance of formulating and implementing policies that can go some way to alleviating these barriers. In the final section, a number of policy implications drawn from the research

are considered and critically evaluated.

6 Policy implications for the introduction and implementation of IT in the SBI

The formulation of policies that encourage greater investment by banks in IT systems and support the training and development of bank employees is central to the uptake and use of new technology in the SBI. Four main areas that require further consideration comprise:

- Investment in telecommunications infrastructure and policy to support IT investment in local banks.
- Transparent policies of recruitment based on merit and qualification rather than on personal relationships.
- Delivery of comprehensive IT training programmes for new recruits that are aligned with the uptake of new technology.
- Modification of systems design to accommodate Islamic modes of local banking practice.

In 2005, there was only one Telecommunications Company operating in Sudan and that was the Sudan Telecommunications Company (SUDATEL). It is difficult for such a company to provide telecommunications services that cover an entire country as large as Sudan and consequently, there is a need to build up the telecommunication infrastructure through *investment* in establishing other telecommunications companies. There is also a need to encourage the Sudanese banking sector to support their IT departments financially, and to give priority to investing money in the purchase of new banking technology instead of using funds to buy new cars and office furniture for their

senior banking staff.

Sudanese banks are very slow in the process of IT change due to a lack of sufficiently qualified employees, especially those that can administer technology projects with the same competence as their foreign counterparts in the developed countries. Appointment of new IT personnel with a combined background of both banking and technology may be useful for the progress of technological change in the SBI. There is a need to set out new, fair and transparent *recruitment policies* for all banking staff in the Sudanese banking sector in order to avoid nepotism and the problems associated with political appointments.

Whilst many of the existing IT banking employees are educated, their IT practical experience is poor, largely due to an absence of international expertise. Prior to working with the new IT systems, banking staff do not generally receive proper training on how to work with the new banking technology. There is also a gap between the uptake of technology and staff training and hence, the need to develop *training programmes* that align these needs. In other words, there is a need for appropriate employee training programmes prior to working with new banking technology, as well as the need for a gradual change or shift from using the manual banking systems to the adoption of new computerized banking systems. Moreover, apart from the Banking Department at the College of Business Studies in Sudan University of Science and Technology, and the Institute of Banking Studies founded by the BOS in 1964 to provide general banking education, none of the Sudanese Business Schools offer practical training in banking technology.

Finally, there is a need for a proper testing of systems prior to full implementation. Any systems imported from abroad need to be modified to include the Islamic investment programme so as to cope with the modes of Islamic finance.

Adjustments should be carried out in Sudan in order to enable the banking sector to operate with the Islamic banking system. Foreign IT companies working in Sudan or those that expect to work in the country should be required to *redesign* their *systems* so that they can accommodate Sudanese local banking practice. External companies should be expected to make further adjustments to the traditional banking system and or design new banking software that can be run in Islamic Modes such as Mudaraba, Murabaha, and Musharaka.

Apart from these four areas, Sudan also needs to ensure the establishment and maintenance of a network of relationships within the broader business community and secure contacts and communication with key international agencies. International policies and regulatory practices in the external context interlock with national and business sector contextual issues that shape policy and practice in the uptake of IT in SBI. Within the Sudanese financial banking sector the study highlights the need for proper investment decisions; the recruitment of specialized and qualified banking staff; aligned IT training for banking employees before they embark on working with new banking systems, in addition to the modification of new banking technology in order to cope with various modes of Islamic finance. The BOS, as the State Agent, has regulatory and supervisory responsibilities over the SBI. The BOS can therefore, play a crucial role in setting general directives and guidelines for Sudanese banks in executing these policies. The Banking Technology Department (BTD) can also play a follow up role in ensuring that such policies are implemented in the Sudanese banking sector.

7 Policy implications for the key stakeholders in the SBI

The four main policy implications for the key stakeholders in the SBI are summarised below. Attention needs to be given to each of the areas identified in developing a

programme for change that further supports the advancement of a Sudanese IT banking strategy for world developments.

Investment policies: there is a need to encourage both national and foreign investors to invest in new technology. Stakeholders such as private bank owners and their general managers, need to be made aware of – 'enlightened' - about the benefits of banking technology and the importance of developing electronic financial services to customers. If investment regulations were less complicated; then this might encourage local and international investors that are required to provide the financial backing for such initiatives and developments.

Recruitment policy: Stakeholders responsible for the recruitment of banking personnel need to be educated to recruit appropriately qualified employees. It is important to employ people who are competent in the use of new technology. There is also a need to encourage stakeholders to appoint new IT staff based on merits and qualification, in order to prevent the tendency for nepotism and the problems associated with political appointments. Such practices have undermined technology and change in the Sudanese banking industry.

IT training policy: stakeholders need to understand the importance of staff training in order to develop and deliver inclusive training programmes to both new and old banking employees in parallel with the adoption of new computerized banking technology. Top/senior banking officials need to discuss banking education programmes with the Ministry of Higher Education to encourage syllabus update and to consider the introduction of pragmatic banking technology programmes in the current Schools of Business across the Universities in Sudan. The development and implementation of such a policy would help to improve the skill levels of graduates and ease the problem of poorly qualified staff.

Modification of systems: stakeholders need to negotiate proper contracts with foreign IT companies working in Sudan, or those that expect to work in the country to redesign their systems so as to accommodate the Islamic investment programme. Foreign companies need to be encouraged to custom design or build in house banking systems appropriate to Sudan. Systems design should accommodate the need to cope with Sudanese local banking practice and to be able to run the modes of Islamic finance such as Mudaraba, Murabaha, and Musharaka.

8 Conclusion

The research reported in this article explains the process of technology and change in the Sudanese banking industry, and identifies potential policy implications of the introduction and implementation of new technology in the SBI. The findings reveal how the strategic decision to change was a top down approach, and how BOS needed to extend the initial stage for one more year to allow for the completion of the restructuring process, whereas an additional four years are required in order to achieve full implementation. The results also show how the Banking Technology Department (BTD) that was established by the BOS to follow up the process of technological change with the Sudanese banks did not effectively carry out its responsibilities of monitoring the uptake of IT in the SBI. The study highlights how bank managers have restricted the process of technological change and hampered the strategic development of IT in the Sudanese banking sector, and how this has largely been due to a lack of technology awareness and IT knowledge.

The findings from this study are significant and have important implications for policy developments in the SBI. Priority should be given to investments that support the establishment of new telecommunications companies, and encourage banking

authorities to invest money in buying new banking systems. Emphasis should be placed on investment in new technology rather than on the purchase of non-essential products or services. Recruitment of specialized and qualified IT staff is critical, in addition to the development and implementation of a retention policy, which might be supportive in ensuring that qualified staff remain in Sudan. There is also a need for setting out new, balanced and consistent transparent recruitment policies for the appointment of banking staff that is not based on nepotism or political considerations. Typically, banking staff did not receive proper training and thus there is a need for appropriate banking staff training in new banking IT systems to enable a gradual shift from using the traditional or manual banking systems to the adoption of new technology and working with new computerized banking systems. Finally, the paucity of literature in the area of technology and change in developing countries makes it important for academics to conduct further research in this field. The bulk of the studies on information technology and change are based in mature industrialised economies with a well-developed infrastructure, extensive education system, and relatively stable political economy. Additional studies in developing countries that investigate this area of technology and change is considered to be vital. In the context of Sudan, further research could usefully be carried out to assess and evaluate the continuing process of change towards the full implementation of IT in the SBI.

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