



# Technological and organizational preconditions to Internet Banking implementation:

## Case of a Tunisian bank

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## Abstract

This paper explores the importance of some prerequisite factors in developing Internet Banking (IB) services. According to the emergent case of Web services in the Tunisian banking sector, two types of preconditions are investigated: technological preconditions and organizational preconditions. Based on a case study, a set of qualitative and quantitative research methods were carried out beside the bank direction, the commercial staff and subscribed customers to IB services. The research illustrates that centralised architectures, fragmented Information Systems (IS), organizational rigidity and disregarding user's implication could be factors of slowness (or failure) in implementing IB.

**Keywords:** Internet Banking, technology, organisation, Information System

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## Introduction

Today, the access to electronic means of payment and the high number of customers connected to Internet have changed the perception of banks toward their market and have accelerated the

development of IB. By eliminating the geographical constraints (presence in agency) and temporal constraints (schedules of openings and closing), IB do not only makes possible to improve customers comfort but also, could reveal new means of creating value. However, several technological and organizational shelves emerged since the Internet becomes a mean of communication with customers and an independent distribution channel of products and services. Also, various work doubted about the real contribution of IB to value creation and about its capacity to confer a competing advantage. Referring to preparation efforts required by banks for the effective development of IB, Mirochnikoff affirms that "[the Internet] will be the money market of tomorrow and to draw part from it, banks have to prepare an early efficient strategy" (1999, pp. 22-23) .

Many authors outlined the impact of ICT on organisations. For example, Electronic Data Interchange (EDI) can push to a general realignment on commercial practices (Baile, 1997) or provoke major changes in firm's activities (Ennouri, 2001). Similar changes can have influences into firm capabilities like flexibility or reactivity (Reix, 1999). Frenzl (1992) explains this flexibility by the existence of a network connecting complex organisations to their providers and customers which can be a factor of reengineering and/or decentralizing core activities. Leading to these facts, it is widely recognised that new technologies -like Internet- have a deep influence on firm's organisation. The purpose of this paper is to explore the implications of implementing IB Web services without a careful attention to some technological and/or organizational preconditions. The paper begins by a brief literature review on banking technologies and organizational specificities of banks. Then, expressed hypothesis are tested in the particular context of a Tunisian bank. Finally, results implications and limitations are discussed.

## Implementing Internet Banking: Research Background

"Internet Banking" can be defined as "systems that enable bank customers to access accounts and general information on bank products and services through a personnel computer (PC) or other intelligent device " or "any banking activity held on Internet (from promotion to sale)" (Mathias & Sahut, 1999). We reflect about the necessary direct and/or indirect preconditions to implement IB services. We particularly study the bank's adaptation in two levels: technological and organizational preconditions.

### Technological preconditions

In the banking sector, technological dimensions affect the marketing and the distribution of products or services (Zollinger & Lamarque, 1999). The same product can be distributed via different distant channels (minitel, ATM , phone, etc). The storage, the processing and the transmission of data can be automated and accelerated. But the particular characteristic of banking technologies and the bank's IS doesn't permit to the bank to have all the benefits.

#### The particular case of banking technologies

At the beginning of data processing use, banks considered it as a mean to decrease the volume of superfluous papers exchanged between central services and agencies and to accelerate its transmission (especially accounting records, monitoring sheets, etc) (Loilier & Tellier, 2001). Banking leaders have found themselves in front of a difficult choice: how to benefit from the processing possibilities of PC's microprocessors without loosing the significant storage capacity of the centralized architecture computers? (Salzman & Dalloz, 2000). In spite of PC's success in the banking sector, the centralized information processing systems have been maintained. When the recent developments of the ICT have raised to Internet networks, the question of the integration of the two systems has become an essential technological problem within the bank. The existence of two data-processing networks which do not communicate each other is perceived as a factor of heaviness, cost inefficiency and time wasting (Loilier & Tellier, 2001; Lafitte, 2000). The problems of two data-processing architectures integration which correspond to two different networks limit the IS efficiency until the types of data used by centralized architectures and PCs are not sufficiently compatible to carry frequent exchange operations. This problem is likely to slow down the automation of the production process and to introduce stages of software and hardware adaptation before any real exploitation (Chetioui, 2002). We can formulate the following hypothesis: Hypotheses (1): High importance of centralized architecture negatively affects IB implementation

To implement an attractive IB site, it is necessary to give to the IS the capacities to deliver the same information by all the distribution channels whatever the place, the hour or the date of the access (Sahut, 2001). In front of this challenge, the bank has to select a multichannel strategy which corresponds to its online engagement level. The majority of the analyses relating to the banking Web sites classify banking services according to definite criteria. Diniz (1998) and Sahut (2001) present two comparable models of classification of banking services on Internet. These two models are based on the level of interactivity of the site (weak, average, strong) and on the type of opportunities pursued by the bank (informational, transactional, client relationship). Their researches specify that the type of technology to be used evolves with the interactivity of the Web site of the bank. For example, an informational site is primarily based on a brochureware model while an IB Web site which is oriented toward the management of client relationship requires more sophisticated technologies like customer access to videoconference consulting. This type of analysis is useful to set up a service cartography about banking Web sites. However, it doesn't facilitate the evaluation of IS coherence with the opportunities pursued by the bank (informational, transactional, client relationship). Mizrahi (2000) proposes a model of evolution in which IS integration depends on two variables: adequacy of the customer-channel relationship and capacity of managing simultaneously many distant channels (Figure 1).

**Figure 1**  
Evolution steps of IS integration inside a multichannel banking strategy

		Multichannel managing capacities		
		Limited	Medium	High
Adequacy of the customer-channel relationship	Limited	1. Specialized information for every couple "product-channel" 2. separated management of every channel (fragmented IS) → <b>Informational site</b>		
	Medium		1. Channel integration by sharing IS 2. Reorganizing channel's management → <b>Transactional site</b>	
	High			1. Real time access to information 2. Re-segmenting customers & redefining offer 3. Enhanced media and IT functions → <b>Client relationship site</b>

In fact, the integration of bank's IS before implementing IB creates a continuous flow of information with customers and could be a source of value creation. Zollinger and Lamarque (1999) note that one of the success factors of First Direct, the first British online bank, is due to its infrastructure which enable to integrate commercial data processing into the telephone platform. Other banks like Citibank have rebuilt all their systems on the basis of Internet technologies. The development of Internet activities needs deep changes in order to give high value to customer and long-term competitive advantages (Mathias & Sahut, 1999).

In light of the above discussion, we can assume that:

Hypotheses (2): Higher level of IS integration positively affects IB implementation

### **Organizational preconditions**

IB is an indirect source of many changes. Changes can touch the internal processes, the motivation level of personnel, customers and partners of the bank going online (Chaabouni, 2001). Indeed, the refusal of co-operation can emerge and compromise ICT introduction plans within the organization. The success of this type of plans is conditioned by the way the change would be managed and the implication level of the users in the implementation process (Mizrahi, 2000; Pillet & Rolle, 2002).

#### **Change management, organizational flexibility and Internet Banking**

ICT, and particularly Internet, provoke deep changes in the organization (Reix, 1990; Rowe, 1994; Porter, 2001). In fact, based on the contingency theory, Rowe (1994) analysed the general impact of ICT use on the French banking sector and showed the existence of new ways of organizational coordination, sharing information and creating added value. Also, Internet have important impacts on the market structure and competitive advantage especially in the banking sector (Porter, 2001). These changes need a quick strategic response in order to face threats and to consider potentiel opportunities (Loilier & Tellier, 2001). For example, some "brick and mortar" structure create new intern units to manage Internet activities or to rethink their hole working division (Chaabouni, 2001). Similarly, online activities like call centers or IB are considered as organizational innovations (Chetioui, 2002). However, adopting new models of organisation is conditioned by the degree of interaction between technical and managerial staff and the flexibility of work (Pigni & al., 2002). The organizational flexibility has always been considered, in the literature, as the sine qua non condition to enhance productivity and profitability of ICT (Solow, 1987). For example, one of the success reasons of First Direct, the full online British bank, is based on its flexible organisation (Zollinger & Lamarque, 1999).

Drawing from these arguments, we propose: Hypotheses (3): Higher level of organizational flexibility positively affects IB implementation.

#### **User's implication and resistance to change**

Executives, management staff, agents and customers are considered as the first users of IB services. Board executives have to consider the organizational challenges of implementing ICT applications -like Internet- and the necessity to have active participation from all hierarchical levels in technological choices in order to make them successful (McKersie & Walton, 1995). The implication of all the collaborators in the technological strategy is considered as a guarantee of profitability and permanent innovation (Osterman, 1995). Fabi & al. (1999) explains the failure of organizational transformations (after implementing a new technology) by: " The focusing of the Banking executives on financial and technical feasibility and not on organizational and social feasibility; " The projects committee's lack of expertise about organizational changes related to human resources management, empowerment, training and culture's characteristics of the company. Implementing Internet as a new banking distribution channel, which can be compared to the introduction of electronic commerce into a company, requires the formation of all potential users (Baile, 1997; Chaabouni, 2001; Pigni & al., 2002; Pillet and Rolle, 2002): " Decision-makers have to be prepared to build new strategies compatible with Internet environment; " Managers have to be involved in treatment process harmonization and to rethink the technological means of communication in an IS integration context; " Front and back-office agents have to be formed on new commercial orientations (especially valuable customer consulting, assistance and information in locations); " Customers have to be initiated to the Internet use as a distant mean of access on their account particularly for operations which do not require their presence in location. However, in many cases, the implementation of ICT and/or Internet activities can cause resistance to change (Fabi & al., 1999; Pillet & Rolle, 2002). Resistance to change can be defined as implicit or explicit negative reactions againt change, or restrictive forces opposed to any reorganisation of work process and new competences acquisition (Bareil & Savoie, 1999). In fact, inside the banks, an acute feeling of competition between distribution channels can appear, creating strong resistances against new technologies and difficulties of adapting control and commercial evaluation systems (Mizrahi, 2000). These resistances are related to the fact that agents in commercial locations think that the telephone platforms or the Web site are withdrawing to them part of their customers. Several fears can emerge: the reduction of operation number treated in locations is accompanied by an increase on consulting requests and releases time to high valuable commercial actions which raises many question about competences of front-office agent, job security, etc. (Beau & al., 1999). Face to these fears, several European and American banks have invested in the development of the electronic channels and in creating innovative formulas like dividing sales returns realised by electronic channels with commercial

agents. These formulas maintain a high level of empowerment and reduce the resistances to change (examples of Dresner Bank, Cr dit Suisse, SunTrust, KeyCop, etc. given by Mizrahi, 2000).

Building on these arguments we propose: Hypotheses (4): Higher level of user's implication positively affects IB implementation.

## Research methodology

The research model for this study investigates the technological and organizational factors which have an influence on the implement of IB.

The overall research issues and the model being tested are given in figure 2.

Our research adopts a single holistic case study design. Several sources of information were used such as company documents, sales brochures, observations, interviews and questionnaires.

Many researches on IB used a case study in order to focus on a particular context and analyse comprehensively one rich particular phenomenon:

" Ahmad & Buttle (2002) have studied the value of existing theories of customer retention in the particular case of a British bank;

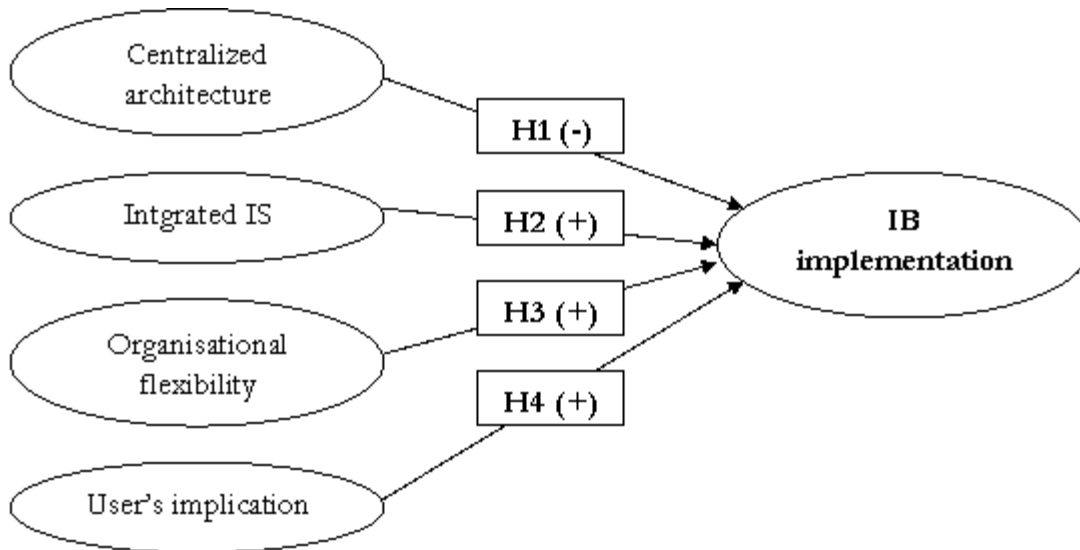
" Watson & al. (2002) have analysed technological, organizational and strategic changes in one American bank;

" Stamoulis & al. (2002) have presented an approach to assess the business value of electronic banking distribution channels in a Greek bank;

" Henson & Wilson (2002) have studied the strategic challenges facing to a small local commercial bank operating in New Orleans (USA).

**Figure 2**

Research model



### Overview about the bank

The Tunisian Private Bank (TPB) has been created in 1976 by joint venture between foreign and Tunisian capital of the private sector. For this reason, more than 40% of the bank's capital is held by foreign shareholders while the public and parapublic institutions hold only 1% of it. The TPB employs currently more than 2000 persons including more than 800 in its central services in Tunis. The major parts of our fieldwork have been conducted between December 2001 and April 2002. We have chosen TPB for many reasons: " TPB is among the four banks proposing an IB service in Tunisia ; " TPB is a leader establishment recognized for its innovativeness and its precursory role in the Tunisian banking market; " TPB is currently implementing an ambitious modernization program on managerial, organizational and technological functions which can have effects on IB adoption. This program has started in 1996 in order to reorganise location's network by redefining job description, rethinking the whole offer of products and services and changing

banking processes. A new type of locations appears called "New Concept Agencies" (NCO) and it is progressively replacing the "Old Concept" ones (OCO). For TPB, IB was a newly developed service that has not get major interest and resources. In fact, between 1999 (site Web creation date) and 2001, only four staff meetings has been dedicated to the Web site strategy and no communication actions has been taken to inform personal and customers about Internet services which resulted in very slow progresses during two years. In this particular context of first-step-implementation, TPB agreed to give us access to data and to assist in arranging internal and external interviews with its staff, commercial agents and customers. Table 1 shows investigation's steps.

**Table 1**  
Steps of investigation

<b>Step I</b>	Exploratory study on banking Web sites in Tunisia (8 banks). Non directive interviews with 6 Internet project leaders in 4 banks.
<b>Step II</b>	One month of full-time observation in IT Department at TPB.
<b>Step III</b>	Eight directive interviews with major actors of the IB TPB's project: service quality and productivity vice-president, IT VP, Communication VP, Organisation and IS VP, Planning VP, training VP, engineer-in-chief of Internet project and IS manager. Each interview lasted between 40 minutes and 2 hours and was audio recorded.
<b>Step IV</b>	Designing and filling 38 short questionnaires (17 items) by 11 location managers and 27 commercial agents.
<b>Step V</b>	Designing and filling 26 questionnaires (39 items) by subscribed customers to TPB's IB service.
<b>Step VI</b>	Data analysis.

### Sample selection, data collection and analysis methodology

Data collected in the two first steps (Table 1) have been used as a conceptual framework for interviews and questionnaires. Detailed descriptive statistics relating to the respondents' characteristics are shown in table 2. The interviews with staff members have been used to prepare locations and customer inquiries. Respondents have been asked to comment TPB's context, technological and organizational strategy. A particular interest was given to IS situation, organizational capacities and users implication level. This step aimed to demarcate ambiguities and to suggest other issues that could be considered. The inquiry questionnaire filled by IB customers aimed to compare the corporate strategy of the bank and the actual needs of the market. The TPB staff provided a list of 20 locations (14 in Tunis and 6 in Sfax which represent 20% of bank's total number of locations) and an internal introduction letter was sent to every location manager to invite them to cooperate to our research. As a result, 38 usable questionnaires were filled by 11 location managers and 27 commercial agents. An other list of 44 external customers was given to us by TPB which resulted in 26 filled questionnaires (59.09% of responding rate). Additional qualitative comments were gathered in those steps (IV and V). In order to analyse quantitative data, we have used crosstabs and measures of association between variables. The Pearson Chi-square test was carried out to test the independence of crosstabs rows and columns in the case of variables using a four-choice Likert scale. The null hypothesis ( $H_0$ ) for this test is that the row and column variable are independent of each other. Variables independence means that the probability that a case falls in a specific cell is the product of its marginal probabilities. The obtained Chi-square ( $\chi^2$ ) number is compared to the tabulated Chi-square value ( $\chi^2_{tab}$ ) for 5% significance level and 1 degree of freedom (df). If  $\chi^2 > \chi^2_{tab}$ , then  $H_0$  is rejected and variables are considered dependent. This test is very adapted in the case of little samples and exploratory studies (Evrard & al., 2000; Wannacott & Wannacott, 1990). Quantitative analysis was completed by qualitative material collected in previous interviews (steps I, II & III) simultaneously as inquiries questionnaires (IV & V).

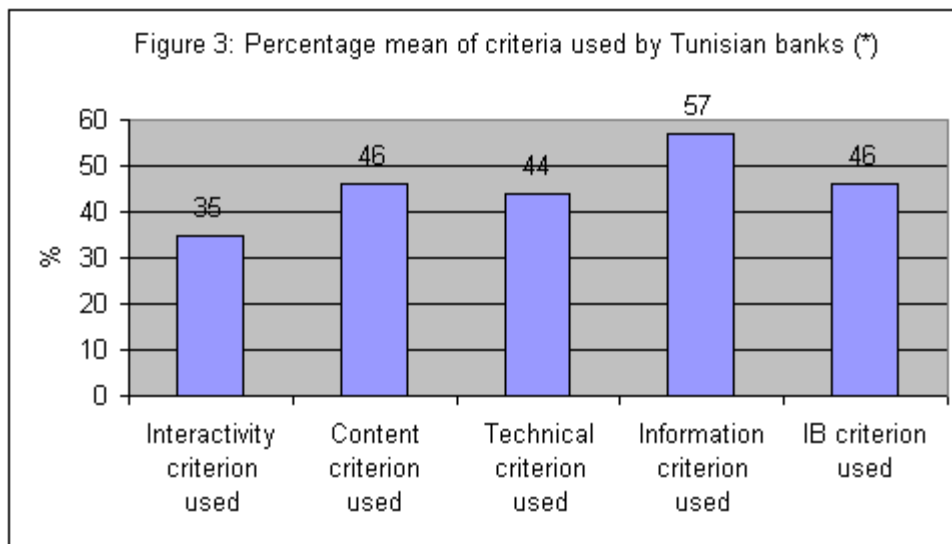
**Table 2**  
Descriptive statistics of respondent's characteristics

Mesure	Value	TPB Staff interviews		Locations inquiry		IB customers inquiry	
		n	%	n	%	n	%
<b>Gender</b>	Male	8	100	28	73.7	19	73.1
	Female	0	0	10	26.3	7	26.9
<b>Ages</b>	25-34	1	12.5	19	50	15	57.7
	>35	7	87.5	19	50	11	42.3
<b>Occupation</b>	<i>Inside the bank</i>						
	Vice-President	1	12.5				
	Director	5	62.5				
	Chief project	2	25				
	Location manager			11	28.9		
	Commercial agent			27	71.1		
	<i>Outside the bank</i>						
Engineer					21	80.8	
Entrepreneurs					5	19.2	
<b>Place</b>	Tunis	8	100	27	71.1	25	96.15
	Sfax	0	0	11	28.9	1	3.85

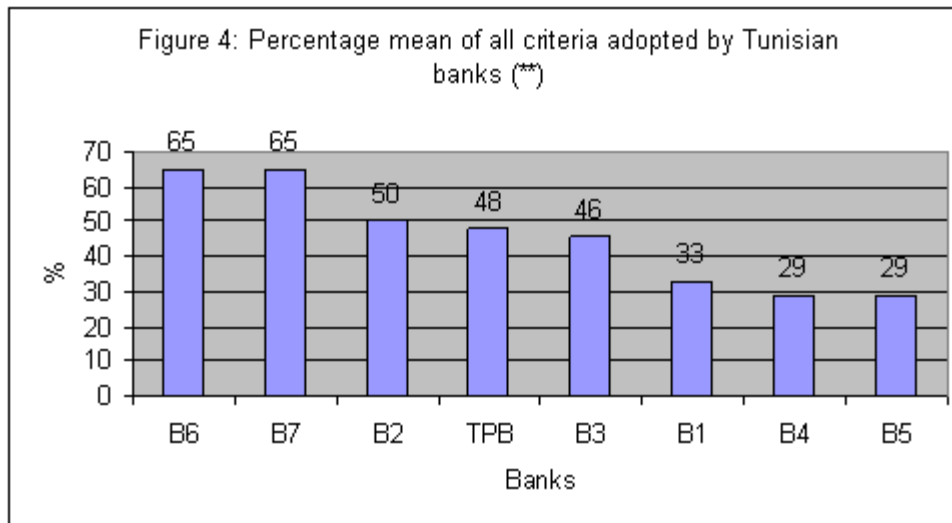
## Results

### Internet Banking in Tunisia: an overview

The analysis of the 8 banking Web sites of Tunisian banks was based on previous scoring frameworks developed in the literature (Diniz, 1998; Sahut, 2001; Chung & Paynter, 2002). This exploratory step aims to evaluate the progresses of Tunisian bank on the Web and the type of services offered. Four criteria have been used to evaluate banking Web sites: interactivity, content, technical and service (information services and IB services). "The Website evaluation results denote the Internet capabilities/offerings of a bank in an objective manner" (Chung & Paynter, 2002). Six interviews with Internet project leaders in 6 of these 8 banks have been conducted in order to analyse and compare strategies related to IB. Figure 2 shows that banking Web sites in Tunisia are informational-oriented (57% of informational criterion are used). In fact, we noticed the prevalence of commercial information about products and services and ways to contact the banks locations. Commercial banks give the priority to direct means to contact the customers (in locations or by telephone). Also, dynamic content, interactive graphics, discussion forums, chat on line and 'open an account on line' services are completely absent. This lack of interactivity shows that Tunisian banking Web sites are not made to retain a distant customer, but to help him to establish a direct physical contact with the bank. The date of the last update of these sites misses in 50% of the cases what predicts a lack of interest of the banks for these media and a feeling of sufficiency compared to what was already carried out (in spite of its low total level of interactivity).



(\*) The percentage mean of a criterion for all the Tunisian banks is obtained by the total number of presence of every sub-criterion divided by the number of banks.



(\*\*) The percentage mean of all criteria for one bank is obtained by the total number of presence of every sub-criterion divided by the maximum score.

Interviews have confirmed this tendency and the project leaders have explained that the Tunisian banks are not sure of the profitability of Internet as a distribution channel. Bank's staff are more confident in physical channels and don't consider Internet as a reliable and efficient media. So, the actual period is considered as a 'test-and-wait step' in order to verify that the positive responses from the market would justify IT investments on IB. Those arguments explain the technical simplicity of Tunisian banking Web sites using 'frames technique' (which makes possible to keep an always apparent menu with a reduced time loading of Web pages) and by inserting "JavaScript" whose reading is accepted by the majority of the browsers. This preoccupation of simplicity is valid as well for the in-house Web sites built (like the TPB) or those set up by professional media companies (Figure 2, 44% only of criterion used). The use of advanced tools remains limited, like cookies (which are used automatically to identify and track preferences of a connected customer). Technologies intended for mobile telephony (SMS, WAP) are provided only by B6. Despite their accessibility and availability for the banks, Internet technologies are faintly exploited to develop new ways of interacting with customers. All the banks propose a basic level of information, and only those which propose an IB access to account can be concerned with the use of Internet as a transactional channel. In the American and French banking market, the percentage of interactivity posted at the basic level are all close to 100% what is not valid for the Tunisian case (Diniz, 1998; Sahut, 2001). Figure 3 shows an important gap between leaders and followers (B6 and B7 have a score of 65% whereas B4 and B5 have only 29%). The leadership of B6 is done to its complete IB access and to its technical characteristics (frames, cookies, plug-ins, JavaScript, SMS alerts and



WAP mobile access). B4 and B5 have very poor static sites with no account access. The slowness frequently noticed at the load time of sites shows well the maladjustment of the communication infrastructure (the telephone lines are not adapted to data exchange) and the under-dimensioning of the information processing system of the banks (incapacity to treat significant flows of information). This subject was frequently approached by project leaders interviewed. In fact, all the banks have kept centralized architecture implemented in the early 80's. They reported that almost all the banks are planning to reorganise their IS and to adapt their software and hardware technologies to recognized international levels. In addition, interviews showed that only one bank have created an independent unit to manage its Web site (B2) which is a proof of little engagement on Internet.

## **Internet Banking services at TPB**

### **Organizational and technological strategy of TPB**

In 1999, the TPB launched an important project of modernization focused on location's network. Indeed, this project related to five principal axes: " Reorganizing the offer by carrying out a re-segmentation of the retail and corporate market according to customer's needs; " Optimising processes by realizing an inventory of commercial activities, defining its new operating modes and setting up a formal description of basic services and procedures related to the "New Concept" locations (NCO); " Defining and installing new commercial tasks and training location's teams; " Reorganizing commercial spaces by changing the location's design, zones of reception and self-service in order to provide a fast, personalized and confidential service; " Renewal of the equipment by integrating new technologies into the new concepts (self-service ATM, connection to Internet/Intranet, etc). The first NCO locations were opened in May 2000 and the generalization of the concept on the old locations (OCO) has started since the year 2001 . The TPB plans to set up extensible technologies to any electronic channels of distribution, to any type of media Browser and to operate the migration of existing technologies including operating system, data and process management. The replacement of "old technologies" necessitates a transformation of the processing data systems and rewriting of the software applications. Finally, the TPB's strategy foresees the development of new projects by 2003 such as Datawarehouse, Datamining, Marketing Automation (automation of marketing action plans, etc). Several other projects were planned but no deadlines were specified (example: "Electronic Commerce Project", "WAP banking project", "Call Center project", etc) .

### **The Internet strategy of TPB**

The TPB's Web site was created in May 1999 with exclusively advertising content by technical engineers in its IT Department. Since, many significant ads and improvements have followed progressively. Compared to other Tunisian banking Web sites, the site of the TPB has traditional informational content (presentation, location's network, offer of products and services) in addition to its account access content. However, the builder of the site has limited himself to scan the photos, slogans and posters available in all TPB's locations which indicate a voluntary negligence of the "graphical" aspect. This technique causes a very slow remote loading of the scanned pages, a low quality of presentation and a questionable contribution to public image of the bank. In the back-office side, information about currencies values and customer's accounts is updated manually using a data transfer application between the old processing centralized system linked with locations and the Web server. This difficulty to implement automatic linkage between the centralized system and the Web server caused a part of customer's dissatisfaction. In fact, the technical staff in charge of updating account information every morning could be busy and have no time to run the data transfer application for two days or more. Subscribed customers noted that they could rest till one week with an unchanged balance value. In that sense, a late information update is considered as a sign of low quality of service and could damage the image of the bank. Interviews with bank's director's show that the modification of the actual centralized system costs too much for TPB and the expected profitability is not clear enough because the actual system is doing well. The strategy of the bank is to wait and to see the evolution of the market needs and the electronic channels. The change of the actual technical infrastructure could be justified only if IB would be a short-term profitable channel. Thus offer support for Hypothesis H1.

### **The Information System of TPB**

The communication difficulties noted between the centralized system of TPB and the Web server seem to be an appearing part of an iceberg. In fact, the bank could not offer real time services and its IS is based on "batch system". So, locations have an independent processing system along the opening

days and the communication with the central system occurs only very early in the morning or sooner in the afternoon to receipt or to send data. Central processing is automatically done during the night and results are sent the morning after. It is clear that, for a customer who has two accounts in two different locations, the only available information is that of the day before. But the dissatisfaction against the banks IS is not specific to customers but it is also shared by location members. More than 55% respondent to the location's inquiry confirmed their dissatisfaction against actual technologies used by the bank. Frequencies crosstabs shows that OCO locations respondent are more dissatisfied compared to NCO because they haven't yet benefited from the same assets. Concerning the adequacy between existing technologies and their information requirements, location's personnel were less clearly divided. In fact, 52.6% of them do not agree that current technology is adapted to their needs. This percentage suspects the existence of a possible difference in technological facilities given to each one of these two types of locations (NCO and OCO). To analyse the relationship between the type of location and the situation of technology (item 1) as well as the adequacy between technology and information needs (item 2), a cross sorting then a chi-square test were carried out (see Table 3-6).

**Table 3:**  
TYPAGENC \* SITUTECH

		SITUTECH		Total
		A	B	
TYPAGENC	ACO	13	6	19
	NCO	8	11	19
<b>Total</b>		<b>21</b>	<b>17</b>	<b>38</b>

**Note:** TYPAGENC = location type (OCO or NCO); SITUTECH = satisfaction about the state of the technology (A: totally disagree or disagree; B: agree or totally agree)

**Table 4:**  
Chi-square test for TYPAGENC \* SITUTECH

	Value	df	Asymptotic sig. (2-tailed)	Exact sig. (2-tailed)	Exact sig. (1-tailed)
Pearson chi-square	2.661 <sup>b</sup>	1	.103		
Continuity correction <sup>a</sup>	1.703	1	.192		
Likelihood ratio	2.695	1	.101		
Fisher's exact test				.191	.096
N of valid cases	38				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.50.

**Test result:**

$[\chi^2 = 2.661 (df=1) < \chi^2_{\alpha} = 3.84 (df=1) \text{ and } \alpha = 0.103 > \alpha_{\text{crit}} = 0.05]$ ;  $H_0$  is accepted and variables are considered independent.

**Table 5:**  
TYPAGENC \* INFOTECH

		INFOTECH		Total
		A	B	
TYPAGENC	ACO	11	8	19
	NCO	9	10	19
<b>Total</b>		<b>20</b>	<b>18</b>	<b>38</b>

**Note:** TYPAGENC = location type (OCO or NCO); INFOTECH = adequacy between technology and information needs (A: totally disagree or disagree; B: agree or totally agree)

**Table 6:**  
Chi-square test for TYPAGENC \* INFOTECH

	Value	df	Asymptotic sig. (2-tailed)	Exact sig. (2-tailed)	Exact sig. (1-tailed)
Pearson chi-square	.422 <sup>b</sup>	1	.516		
Continuity correction <sup>a</sup>	.106	1	.745		
Likelihood ratio	.423	1	.515		
Fisher's exact test				.746	.373
N of valid cases	38				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.

**Test result:**

$[\chi^2 = .422 (df=1) < \chi^2_{\alpha} = 3.84 (df=1) \text{ and } \alpha = 0.516 > \alpha_{\text{crit}} = 0.05]$ ;  $H_0$  is accepted and variables are considered independent.

According to the results of the chi-square test, there is no dependence between the type of location (TYPAGENC variable) of the respondent and its perception about the situation of technology (SITUTECH variable) or the adequacy of technology with the needs for information (INFOTECH variable). This carries out to conclude that NCO locations are not better technically equipped than OCO locations. So, the investment effort of TPB on new technologies is not efficient or not significant. In addition, only 31 locations are considered NCO (on 99 TPB locations in Tunisia) which is very sparseness to affirm that significant changes have been done. The observation of equipments available in NCO locations have changed in term of machines number, type and capabilities shows that only the design of the locations changed. The old equipment (terminals, PC, printers, etc.) dating from the old concept have been kept in full. The significant investments made by the TPB in the development of the NCO do not lead to a significant technological differentiation with OCO. Indeed, centralized data processing is always the basis of commercial and decision operations. It is a constraining and rigid system with low information management capacities (Themistocleous & Irani, 2002; Mizrahi, 2000). Also,

coexistence of different data-processing platforms as well as the incompatibility of IS with various formats of data weaken the capabilities to make a profitable information strategy (Themistocleous and Irani, 2002). These observations are likely to compromise the level of IS integration. The weakness of IB service in TPB can be partially justified by a low level of IS integration. Thus offer support for H2 hypothesis.

#### **Organisational flexibility and Internet Banking adoption at TPB**

Our investigation shows that the data update of customers account subscribed with the IB is not an automated operation. Indeed, the renewal of the central system is a very recent operation and did not give the technicians of TPB yet time to carry out an application of automated data transfer. Unless the rewriting all banking applications and the harmonization of file format haven't been finished, such applications cannot be installed. This weak automation of a simple transfer operation can be interpreted as a proof of technological and organisational rigidity on behalf of the TPB (Reix, 1999). Also, the TPB did not create an autonomous unit dedicated to managing IB services. This shows the weak engagement of the bank in Internet and a lack of organisational flexibility. On the first hand, the majority of location managers and commercial agents who took part in the investigation estimated that the TPB is ready to exploit the Internet as a new distribution channel of product and services (57.9%). On the other hand, more than 73.7% of the respondent found that IB services can put in danger the future of locations by making them an indirect competition. These elements justify the prudence with which the board of directors seems to manage the IB project. If the strategy of the TPB could be considered as ambitious, the great specificity of its assets (especially the actual organisation and physical investments) is a factor which compromises the chances of electronic distribution channels. This factor is quoted by certain authors as being the principal barrier to the adaptation of the banking institutions to the fast developments of technology (Mols, 2001). Although the TPB is ready to adopt the Internet as a channel of distribution, the delay can be charged to the low acceptability of the "cannibalization" of the traditional channels as well by the commercial collaborators and the management board. This is regarded as a rigid attitude toward the emergence of IB services. Thus offer support for hypothesis H3.

#### **User's participation and resistance to change**

Location managers and commercial agents have been invited to classify the board of directors, the leading IB committee, the IT Department, location managers, commercial agents and customers of most concerned (ranked 1st) at least concerned (ranked 6th) by the IB project TPB. Each one of these actors is then considered as an ordinal variable characterized by a specific rank from 1 to 6. The test of Kolmogorov-Smirnov was used in order to compare the distribution of observed answers to a distribution defined a priori (Evrard & al., 2000, p. 332). The results of this test show that there is a significant difference in the classification of the board of directors and commercial agents. Indeed, the average classification of the board of directors is 3.53 with a high standard deviation ( $SD = 2.24$ ). This shows a strong dispersion around the average because the board of directors was classified 13 times as first concerned and 14 times like the last concerned about IB project. According to the talks carried out with Location managers and commercial agents, the board of directors is badly classified (19 times in the 3 last places) like a mark of protest or non agreement with its decisions. Other talks expressed, by a good classification of the board of directors (19 times in the first 3 places), their wish to conform to the procedure and the hierarchy. However, these attitudes differ according to several criteria. For example, the board of directors obtained an average classification of 4.18 ( $SD = 2.27$ ) in Sfax against 3.26 ( $SD = 2.21$ ) in Tunis. This is justified by the direct and privileged relations available to location managers and commercial agents in Tunis' locations profit from a geographic and organizational proximity of the board of directors. This geographical proximity results in frequent contact and, consequently, in better information compared to their colleagues of Sfax. Also, location managers and commercial agents in ACO give an average classification of 3.79 ( $SD = 2.35$ ) to the board of directors against 3.26 ( $SD = 2.16$ ) for those in NCO. This shows the negative perception of location managers and commercial agents in abandoned ACO locations who considered to be underestimated by the board of directors. All of these observations give support to a relative hostility to the projects set up by the board of directors without the consultation of collaborators in location (especially outside Tunis). This situation can be comparable with a form of resistance to change because, more the implication of the users is weak, more the reactions are hostile (Bareil & Savoie, 1999). Unlike the indifferent attitude of the board of directors, 36 respondents (94.7%) have considered that they were totally concerned by the IB project. Globally, location managers and commercial agents haven't appreciated the fact of not being directly implied in the IB project. However, they were ready to cooperate and support the project if they would be explicitly requested by the board of directors. Being unaware of the project's details and badly

informed they were hostile and doubt about its success near the customers. This negative and very critical behaviour can be considered as a form of resistance to change (H3 is accepted).

## Implications

In IB studies, the literature is limited to inquiries near customers and external analysis of site web considering IB as an external phenomenon. In fact, few analyses are interested in organisational preconditions of its implementation (Mols, 2001; Polatoglu and Ekin, 2001; Thornton and White, 2001). The conceptual framework for this study relied upon four technological and organisational preconditions to IB implementation. It gives a synthetic view for managers and practitioners about the critical bank's capabilities to develop in first in order to succeed in implementing IB. This framework showed the interest to conduct internal analysis based on both quantitative and qualitative material in addition to site Web description.

### Implications for practice

TPB seems to be a relevant example of bank's dilemma against IT in general and new distribution channels in particular. This case study has highlighted that IB has not been considered as an important dimension of bank's strategy. Investment heaviness and uncertainties about market response are impeding technologies renewal and IS migration. In addition, unavailability of a dedicated organisational unit to manage continually the IB project is delaying its definitive implementation. Only informational services are still offered to customers and recent informal contacts with some prospected directors showed that providing transactional services may take one or two years again. Unlike literature in IB field, the TPB case doesn't give enough elements to underline cost advantages, offer differentiation or improvement of service quality after the availability of IB informational services. Managers and practitioners have to be more proactive in introducing new technologies by offering value-added services very quickly in order to benefit from first mover advantages. A "wait-and-see" strategy could be justifiable in a high imitator sector like banking industry but, it could be dangerous in rapidly changing technological context.

### Implications for theory

The conceptual framework for this study shapes a small part of a whole system of relationships between different resources and capabilities of a bank. In fact, centralized architecture negatively affects IS integration and organisational flexibility. Also, organisational rigidity doesn't permit a deep implication of user's in innovation process. Prospective relationships could emerge if researchers identify other preconditions to implement IT channel of distribution. These preconditions are highly linked with resources and capabilities of banks. Their identification and development can confer a sustained competitive advantage and increase value performance of IT based investment (Melville and al., 2004). Recently, the RVB has been used to analyse the efficiency and competitive advantage implications of specific firm resources especially in IT context. Melville and al. (2004) built an "IT Business Value Model" and used the RVB to analyse whether and how IT may be associated with organizational performance. An extensive literature review by Wade and Hulland (2004) showed the usefulness of the RBV to conduct future research in IS field because it's focus on attributes and its recognition of the importance of resources complementarities. However, the RBV is not the "best-one-way". Zhu and al. (2003) analysed facilitators and inhibitors of electronic business adoption in Europe using innovation theory. They emphasis on the influences of technological, organisational and environmental context on firm's intention to adopt e-business. Also, innovation theory was used by Gerrard and Cunningham (2003) as the theoretical backbone of their research in IB adoption by bank's customers in Singapore.

### Implications for future studies

In this study, hypotheses were concentrated in only four technological and organisational preconditions to IB implementation. If a RBV-oriented analysis has been realized, further preconditions may have been identified and this may created additional results precision. Other alternative theoretical background could be used in order to contribute to the growing literature about IB development especially in emergent countries. In addition, new methods of conducting IB are becoming available such Internet-enabled mobile phones. The convergence of the Internet and mobile networks creates

new opportunities and threats. In fact, treating mobile business as simply an extension to the traditional web could result in missing out unique differentiated qualities for new value-added possibilities.

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## Annex 1

	TPB	B1	B2	B3	B4	B5	B6	B7	%
<b>II/ Interactivity Criteria</b>									
Search engine	0	0	1	0	0	0	0	1	25%
Calculator	1	1	0	0	0	0	1	1	50%
Interactive graphics	0	0	0	0	0	0	0	0	0%
Form	0	0	1	0	0	0	0	1	25%
Discussion form	0	0	0	0	0	0	0	0	0%
Chat	0	0	0	0	0	0	0	0	0%
Webmaster e-mail	1	0	0	0	0	0	1	1	38%
Commercial contact e-mail	1	1	1	0	1	1	1	1	88%
Phone number	1	1	0	0	1	1	1	1	75%
Traditional postal address	1	1	0	1	1	1	1	1	88%
Opening an account on-line	0	0	0	0	0	0	0	0	0%
%	45%	36%	27%	9%	27%	27%	45%	64%	35%
<b>III/ Content criteria</b>									
Arabic language	0	0	0	0	1	1	0	0	25%
French language	1	1	1	1	1	1	1	1	100%
English language	0	0	1	0	1	1	1	1	63%
Other languages	0	0	0	0	0	0	0	0	0%
Date of latest update	0	0	1	1	0	0	1	1	50%
FAQ	0	0	0	0	0	0	0	1	13%
Map of the site	1	1	1	0	1	1	0	1	75%
Guided tour	0	0	0	1	0	0	1	0	25%
Video	0	0	0	0	0	0	0	0	0%
Audio	0	0	0	0	0	0	0	0	0%
Logo, photo of the bank	1	1	1	1	1	1	1	1	100%
Colors	1	1	1	1	1	1	1	1	100%
%	33%	33%	50%	42%	50%	50%	50%	56%	46%
<b>III/ Technical criteria</b>									
Frames	1	1	1	1	1	1	1	1	100%
Cookies	0	0	0	0	0	0	1	0	13%
FTP	1	0	1	1	0	0	1	1	63%
JAVA/JAVASCRIPT	1	1	1	1	1	1	1	1	100%
Plug-ins	0	0	0	0	0	0	1	1	25%
Acrobat Reader File (*.PDF)	0	0	1	0	0	0	0	1	25%
SMS Alerts	0	0	0	0	0	0	1	0	13%
WAP Functions	0	0	0	0	0	0	1	0	13%
%	38%	25%	50%	38%	25%	25%	88%	63%	44%
<b>IV/ Service criteria</b>									
<i>1) Information services</i>									
Currencies/change	0	0	1	0	0	0	1	1	38%
Distribution channels	1	1	1	0	1	1	1	1	88%
Products and Services of the bank	1	1	1	1	1	1	1	1	100%
Prices and interest rates	0	1	1	1	0	0	0	1	50%
Investor's relations	1	1	1	0	0	0	0	0	38%
The bank's presentation	1	1	0	1	1	1	1	1	88%
Jobs	0	0	0	0	0	0	0	0	0%
<i>2) IB access</i>									
Fund transfert	1	0	0	1	0	0	1	1	50%
Third-party payments	1	0	0	1	0	0	1	1	50%
Account access	1	0	1	1	0	0	1	1	63%
Financial portfolio informations	0	0	1	1	0	0	0	0	25%
Costs of using IB's service	0	0	0	1	0	0	1	0	25%
Account balance	1	0	1	1	0	0	1	1	63%
Global Score	48%	33%	50%	46%	29%	29%	65%	65%	