

TOWARD A NEW THEORY OF THE CONTRIBUTION OF THE IT FUNCTION IN ORGANIZATIONS

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Appendix A

How the Theoretical Profiles Were Derived from the Extant Literature

Profile Name	Articles	Name given to profile in the article	Role/Orientation/ Mission of the IT Function	IT Activities	Skills	Relationship with business units & external partners	IT Governance	
							Accountability	Decision-making
Architecture Builder	Brown et al. (1996)	Technologist	Aims to develop a stable and reliable infrastructure; promotes organizational efficiency			Close partnership with various IS providers		
	Cross et al. (1997)	Infrastructure planner	Aims to reduce architectural complexity in order to increase business agility	Architecting, planning, and overseeing infrastructure; implementation of common systems	Business and industry, technical and people skills	Works with business unit in projects; proactive role in architecture management	IT is responsible for IT task completion in projects	Business units are responsible for the innovation process
	Agarwal and Sambamurthy (2002)	Platform	Aims to provide IT infrastructure and tools in order to enable business innovation across the enterprise	Delivery of scalable, seamless and flexible infrastructure; managing of enterprise-wide platform and capabilities		Liaises with account managers; favors innovation and sourcing network	IT is responsible for IT-related process; business ownership of innovation	
	Ross (2003)	Modular architecture	Aims to develop strategic agility with modular IT architecture	Developing an architecture based on customized or reusable modules	Technical skills; knowledge of the sector or industry	Partners with business units so as to understand their needs and develop appropriate architecture	Shared	IT executives take strategic orientation from senior management
	Brown et al. (1996)	Strategist	Aims to reengineer mainline business processes			Strong interpersonal relationship, shared vision, close communication and cooperation		
	Venkatraman (1997)	Service Center	Aims to deliver IT-enabled business capabilities so as to support current strategies	Redesigning business processes	Understanding of IT's role in the business strategy			
Partner								

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Partner	Clark et al. (1997); Earl and Sampler (1998)	Change-readiness IT function	Aims to be a partner for the business with a philosophy of continuous innovation	Continuous product and process innovation; creation of novel applications that sustain the firm's competitive position	Able to leverage IT knowledge into business applications; technical, methodological customer and project management skills	Proactive in projects; integrator manager roles	Accountability	Corporate IS units and IT management
	Ross (2003)	Rationalized data	Aims to provide significant business process optimization gains	Process standardization through the implementation of integrated technologies; securing data integrity	Optimization of high-value business processes	IT and business managers clarify strategy intent and critical IT capabilities together	Shared	Negotiation with senior management
	Agarwal and Sambamurthy (2002)	Scalable	Aims to provide flexible and scalable resources for the business units by using external network	Solution delivery and provision of services	Strong IT presence in business units; multisourcing arrangements	Business units		
Project Coordinator	Feeny and Wilcocks (1998a, 1998b)	Activities coordinator	Aims to coordinate activities between various outsourcing vendors in order to create business value	Managing external supply, eliciting business requirements; ensuring technical capability; coordination and leadership	Interpersonal (internal and external); technical; business skills			
	Peppard and Ward (1999)	Proactive, high-achieving	Aims to manage vendors' relationship in order to create value; investigates and evaluates advances in IT; encourage business units to take advantage of IT	Managing relationship with vendors and users; "help you [business units] to help yourselves"	Understanding of business world, relationship management	IT staff interact on a daily basis with users and management		
	Brown et al. (1996)	Innovator	Aims to provide IT expertise and systems that are unavailable in the organization by using outsourcing strategy			Cooperative partnering with external IT providers		
	Rockart et al. (1996)	Future role	Aims to ensure effective implementation of business units' IT strategies; to manage outsourcing relationships; to ensure that line managers understand IT's potential	Understanding and interpreting technology trends, educating business units; managing suppliers and vendors	Business knowledge; negotiation skills	Close partnership with business units, and with suppliers and vendors	IT-related issues (projects), assisting business units in implementing IT, business units are responsible for impacts on business	Business units are in charge of the decision-making process, somewhat assisted by IT

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Systems Provider	Brown et al. (1996)	Enabler	Aims to respond to the internal customers' needs			Responsive to the user community			
	Cross et al. (1997)	System provider	Aims to design and implement information systems	Development of systems	Understanding of technological capabilities and how to apply them to a given problem	Responsive to business needs	IT takes much of the responsibility regarding IT	Corporate IT and other executives	
	Venkatraman (1997)	Cost center	Aims to deliver IT products and services at the lowest cost	Managing IT infrastructure asset		Relationship with best-in-class outsourcers so as to reduce costs			
	Peppard and Ward (1999)	Reactive, Service provider	Aims to supply systems that support organization's needs	Deliver cost-effective solution	Technical; project management	Assisting as requested	IT is responsible for the specification of IT requirements		
	Clark et al. (1997)	Traditional	Aims to provide IT support for the company's products, services and operations	Maintenance; implementation of mainframe systems	Technical	Reactive			
	Ross (2003)	Standardized technology architecture	Aims to provide IT efficiency	Implementation of firm-wide technology standards	Application development; exception management and standardization			Senior management support of CIO	Corporate decisions
	Ross (2003)	Application silo architecture	Aims to provide local optimization	Development of IT applications that serve isolated business needs	Technology-enabled change management			IT unit is responsible for systems implementation	Business users are expected to generate benefits
	Vaast and Levina (2006)	SIT at ServCo	Aims to maintain and update existing systems, and to implement new systems gradually	Implementation of IT following a standardizing approach; documentation	Strong technical competencies	Liaison agents; communication standardized at project's milestones			Business units and IT

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Technological Leader	Reich and Nelson (2003)	Leader	Aims to identify opportunities for strategic reorientation	Implementation of innovative IT with high business value	Strong teamwork, collaboration and negotiation skills; ability to influence and lead; knowledge of the business and industry; ability to share IT knowledge	Proactive influencers; strong CIO-CEO relationship	Shared responsibility for business profitability and success	Business units and IT management
	Venkatraman (1997)	Investment center	Aims to proactively create IT-enabled business capabilities that shape new business strategies	Early experimentation with emerging technologies; identification of likely obsolescence of the current business model	Identifying and nurturing a portfolio of IT-enabled new business capabilities	Outsourcing support for scanning, technology licensing, joint R&D, etc.		
	Curley (2006)	Strategic business partner	Aims to be recognized as a key contributor to the firm's success; to fuel this success with outstanding strategic leadership and IT services	Implementing solutions that change the business; contributing to the creation of products and services that add value for the customer	Leadership, customer and adaptability skills	Proactive in responding to existing and future business needs	Value-creation of IT for profitability of the business; bonus of IT depends on business success	Co-funding
	Agarwal and Sambamurthy (2002)	Partner	Aims to be an active partner in business innovation	Value-innovation, relationship management and financial management processes		Vigorous collaboration between business and IS executives; leadership of IT in business units		

Appendix B

Coding Scheme

Dimensions of Ideal Profiles (Proposition #1)		
Constructs	Values or Properties	Definitions
Relationship with business units	Strong IT presence in business units	IT professionals have strong relations with business unit members. They interact frequently, and they interact formally and informally. They spend time in the business units, talking to people and trying to understand their needs.
	Limited IT presence in business units	IT professionals work at a distance from the physical business units. They meet only formally with business people and for specific projects. They don't spend time in the business units. They might use liaison agents and a help desk to structure interactions with the business units.
	Proactive	IT professionals are proactive in their interactions with users. They initiate communications and push information on to users. They don't wait for users to express specific needs, they anticipate them.
	Reactive	IT professionals are responsive to users' needs. They wait for users to express needs and then respond to their requests as quickly as possible. They don't push information on to business units' until a formal request in this sense has been made.
Skills and knowledge	Technical skills	Includes what are usually known as <i>hard skills</i> , such as hardware and software knowledge, programming skills and knowledge of development methodologies.
	Business knowledge	Understanding of the specific organizational context in which information technologies are deployed and the connection between IT tools and business processes.
	Industry knowledge	Knowledge of best-in-industry practices. Knowledge of the specific characteristics of the business's industry in relation to IT.
	Interpersonal skills	Able to interact with others, especially business people. Works well in a team, is a 'jargon-free communicator'. Able to convince people (negotiation skills), to understand business people and to be understood by them (active listening).
Governance – Who makes IT investment decisions in the firm?	Business units	A senior business executive or a group of senior executives, sometimes including the CIO, makes all the IT-related decisions for the enterprise. Sometimes IT will support them by preparing the appropriate documents.
	IT executives	IT investment decisions are made by an individual IT executive or a group of IT executives. IT investment decisions are usually based on established criteria.
	Business and IT (joint decision making process)	IT investment decisions are made following a two-party decision-making approach that involves IT executives and a group of business leaders representing the operating units.
Governance – How is accountability divided between IT and the business?	Shared for business success	IT and business units share responsibility for business success. This accountability goes further than IT projects and incorporates all the organization's activities. It's a management philosophy: "Everyone is in the same boat."
	Shared for IT project success	IT and business units share responsibility for IT project success. They are both responsible for IT-related and business-related issues.
	IT responsible for IT-related issues	IT assumes responsibility for IT-related issues only, while business units assume responsibility for the project's business impacts.

Constructs	Values or Properties	Definitions
Activities – importance	Critical	Activity “X” is one of the most important in the portfolio of activities of the IT function. CIOs put a lot of management effort into this activity. The activity characterizes the work of the IT function, or contributes to defining the IT function in the organization.
	Necessary	The activity is performed by the IT function and is part of its job. However, its importance in the portfolio of activities is not very important. Moreover, the activity does not define the IT function or characterize its work in the organization.
Contribution of the IT Function (Proposition #2a)		
Construct	Values or Properties	Definition
Nature of the contribution	Organizational productivity	Improving organizational productivity by initiating change in the organization and acting as a catalyst for business process reengineering.
	Organizational cost reduction	Reducing organizational costs through IT efficiency and selection of projects that will lower the organization’s operational costs.
	Organizational agility	Improving organizational agility and helping the organization to quickly seize business opportunities as they arise.
	Strategic IT capabilities	Creating IT-enabled business capabilities that shape new business strategies.
	Organizational flexibility	Supporting organizational flexibility with a flexible and efficient IT sourcing strategy.
Contingency Factors (Proposition #3)		
Contingency factors	Values or properties	Definition
CIO’s reading of how IT is perceived by top executives	Essential to corporate success	IT is perceived as highly strategic for the organization and embraced as essential to corporate success.
	Central to operational excellence in business units	Highly central to operational and tactical goals at the business unit level.
	Not at all significant	IT is perceived as not strategic, as an expense and an operating cost. IT is perceived as not at all significant unless required by external forces (industry standard, survival issue).
CIO’s own view of his or her strategic influence in the organization	High	The CIO feels he or she is influential, is respected by other executives or is considered an equal of the other executives with respect to the strategic orientation of the firm.
	Low	Although the CIO feels he or she is respected for technical competencies, he/she is not considered an equal of other executives in respect to the strategic orientation of the firm.
CIO’s interpretation of how IT literate top managers are	High	The CIO believes members of senior management in the company have extensive knowledge of technology, applications, systems development, and/or management of IT.
	Low	The CIO believes top managers’ knowledge of technology, applications, systems development, and/or management of IT is very limited.

Appendix C

Detailed Data Analysis Procedures (Proposition #1)

We began by applying the analytical procedure described below in order to validate the theoretical profiles of the IT function (presented in Table 1). For the purposes of this discussion, the ideal profiles taken from the literature are called *theoretical profiles*, and those described by our respondents are called *empirical profiles*.

1. We coded a first interview using a preliminary coding scheme consisting of the following dimensions: activities, skills and knowledge, relationship, and governance, as well as their associated properties. Then, we deconstructed it to further develop our coding scheme. This allowed us to ensure that no significant dimensions describing the IT function would be left out of the theoretical typology. The final coding scheme is presented in Appendix B.
2. Then, we coded all of the remaining interviews. In cases where the data fitted multiple properties, such as in the *skills and knowledge* dimension, each excerpt was coded according to its specific properties, using more than one property (for example, technical skills and interpersonal skills concurrently) when appropriate.
3. We then defined the various profiles of the IT function found in the interviews.
 - For example, the CIOs often compared a “before” situation with a “now” situation, which referred to the time of the interview. This is how the same interview generated two profiles of the IT function. Both profiles were coded and used in the data analysis phase.
4. The empirical profiles were then associated with the new theoretical profiles. This procedure was performed in two stages:
 - First, we began by examining individually each dimension (activities, skills and knowledge, relationship and governance) of each empirical profile, comparing them with the values or properties of each of the dimensions of the theoretical profiles. For example, the result for the relationship dimension of the first empirical profile (Company A) was compared to the values of the relationship dimension for each of the theoretical profiles (partner, systems provider, architecture builder, technological leader, and project coordinator). Then, for this dimension, the empirical profile was associated with one of the five theoretical profiles, once a corresponding value had been found. We went through the same process for each dimension and for each empirical profile separately. For constructs such as skills and knowledge where values/properties are not exclusive, i.e. data fit multiple properties, we made sure to consider all values of the empirical profile and then we associated them with the closest set of values presented in the theoretical profiles. This process was repeated for each dimension which characterizes the theoretical profiles. Examples of this pattern-matching process are shown in Appendix D.
 - Second, we associated the overall empirical profile with a comprehensive theoretical profile (Table 3). The following three groups were created:
 - Perfectly associated profiles: These empirical profiles were associated with all four dimensions of a single ideal theoretical profile.
 - Almost perfectly associated profiles: These empirical profiles were associated with three out of four dimensions of a single ideal theoretical profile.
 - Hybrid profiles: These empirical profiles were associated with two ideal theoretical profiles (two dimensions each).

Appendix D

Examples of Pattern Matching (Proposition #1)

Profile #	IT Activities	Code	Relationships with Business Units	Code	IT Skills and Knowledge	Code	IT Governance	Code
5	“Based on the business plans, we identify the challenges, build a budget and make an assessment of resources. The business units are responsible for the changes made to business processes. Our main activities involve developing and maintaining applications that meet the needs of users.”	SP	“We are in response mode; we respond to user requests. The business units assess their needs and share them with the IT function, which develops appropriate applications. Above all, the IT function carries out orders. Communications take place through formal mechanisms, such as a help desk. Users generally have little involvement in IT projects.”	SP	“In IT, we have limited knowledge of the business environment and existing processes in the business units, but we have good technical skills. Our IT specialists are able to translate needs into programs.”	SP	“The IT function is responsible for delivering quality applications, on budget and on time. It’s our Number 1 objective. Users are responsible for the business impacts, but they aren’t measured. Very often, decisions on IT investments are made by the business units themselves.”	SP
19	The CIO exercises considerable influence in the organization, particularly in terms of strategy. “Here it’s the IT function that gives direction to the organization. We take it further; we use IT to take the company where it deserves to be. Technology monitoring is important to us as a way to test innovative uses of IT. For us, being able to innovate is very important.”	TL	“Our IT function is very proactive. It finds product ideas for the company, and management is comfortable with that. The function is actively involved in identifying needs in the business units, and the solutions it proposes are often accepted by users. Our relationships with the business units are excellent, very close and based on respect for each others’ skills. However, IT controls this relationship.”	TL	“In IT, we have excellent knowledge of the business environment and existing processes. Another strength is our ability to communicate well and influence decision makers in the business units. We think strategically, and we are a creative group. For example, we are able to imagine new products that integrate emerging IT.”	TL	“Here, the IT function is accountable for not only the success of informatics projects but also for overall organizational performance, at least IT-related performance. Investment decisions are mainly directed by our group, but they are ultimately approved by the management board, which includes the CIO.”	TL

Appendix E

Illustrations of Pattern Matching (Proposition #3)

Profile #	CIO's interpretation of how central IT is seen by top management		CIO's own view of his/her strategic influence		CIO's perceptions of top-managers' IT knowledge	
	Empirical Evidence	Code	Empirical Evidence	Code	Empirical Evidence	Code
20	"In our company IT is perceived as strategic. We are very much on the cutting edge in terms of our technology. IT stimulates strategic thinking in the management team."	Imperative	"The CEO is my immediate superior. We have a very close working relationship...I am an active member of the organization's management committee....This group has great respect for my opinion.... Each year we prepare a five-year plan... and I'm still talking about a business plan, not an IT plan. We prepare a five-year strategic plan for the company, and IT is an integral part of that plan."	High	"The Executive VP is a computer buff, and our president loves anything to do with computers. That explains much of the technology monitoring we do in my department."	High
1	"Here, the goal of IT is to improve business processes in each of our departments and, more and more, to integrate business processes across the entire company."	O/T level	"I report directly to the President and CEO and I am on the management committee for the company as a whole. So we talk a lot about business strategies in our team."	High	"In my company the executives don't know all that much about IT. They feel that it's the CIO's job to know IT, and I believe that I'm good at it. Also, they trust me."	Low
22	"Top management considers IT a necessary evil. Our executives would prefer not using it...It's seen as an expense, nothing more."	Not significant	"I report to an American CIO. My boss has been in the U.S. for 3-1/2 years now. But my direct contact is the CFO...I am not a member of the company's executive committee."	Low	"In technology, we're really not on the cutting edge. It's a decision that was made by the managers, most of whom are not very computer literate."	Low

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