Returning the 'I' in the 'IT' Education of MScIS/MBA Professionals

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Abstract

To succeed in the global marketplace, companies must reposition themselves to tap the sources of sustainable growth. After failing to connect information technology investments with business performance, successful senior managers today know that 'effective use of information' does not equal merely a new IT solution. Instead, business performance can only be improved with an excellence at using information proactively, sensing and processing information appropriately, and deploying IT for management support. The knowledge workers, on whom every company depends since the success depends on how fast they utilize proper information, should be the focus of information use in organizations.

The paper presents three information capabilities that form information orientation, a high-level idea of senior managers, which embraces expectations of the business community regarding business-information systems professionals. Based on that presentation, a framework of topics for MScIS/MBA educational programs is developed. Findings can serve as a guideline when building, revising and endorsing contemporary and relevant curricula for mentioned programs.

Keywords: business-information systems education curriculum, information orientation, information management, IT, productivity paradox, MScIS courses

Introduction

The last couple of decades are being labeled as the "information age", in which productivity is no longer associated with manufacturing and distribution, but is more likely to be "the result of 'knowledge workers' who process information rather than raw materials" (Drucker, 1993). Companies in today's turbulent and ever-changing environment cannot stay put: opportunities, threats and risks they continually face require their managers to stay focused "on acquiring the appropriate knowledge and information to steer and manage the business in new directions" (Marchand, Kettinger & Rollins, 2001a). Competition is fierce, there is less and less time to act and re-act properly. For doing their job right, knowledge workers must have the right tools to work with; that means giving them information they need to do their job is of vital significance. Likewise of crucial importance is what they do with information. IT vendors and consultants claim to have panacea for every possible business 'situation'.

Yet too many companies, who yearly spend billions on new and new technological solutions, struggle to understand how to put information to work so that it would support business and improve business performance.

The reason for sparse harvest is "technological obsession" (as suggested by

Davenport, 2000). Namely, observing the rapid technological progress and being exposed to powerful marketing of hardware, communications and software companies, it is easy to accept the hope of buying the information effectiveness, even though in reality it might be just a fiction. "Even the most rigorous economists have difficulty finding correlations between IT spending and productivity, profits, growth, revenues or any other measure of financial benefit." Additionally, "surveys of managers suggest that they feel the information they get today is no better than it ever was," (Davenport, 2000).

The way out, according to a research that studied over 1000 senior managers from 98 companies operating in 22 countries and 25 industries, is multilayered: combining excellence in investing and deploying technology with excellence in collecting, organizing, processing and maintaining information, and with getting the people to embrace the right behaviors and values for working with information (Marchand et al., 2000). And such is also their view on information systems professionals. The Chief Information Officer (CIO) of the new age has to be a "hybrid" business and information systems manager (Burn & Ma, 1997) who can play a major role in strategy formulation for effective use of information technology, who does not neglect the human side of the information equation, and who does not forget that information has to be managed like any other resource and thus puts the 'I' back in the 'IT'.

The question that poses itself and this paper will attempt to answer is what are the skills needed by a CIO and what kind of tertiary educational programs can sustain a high degree of relevancy to the needs of the business community. It will do that primarily by taking a close look at those needs. Senior managers distinguish what a company needs to be strong at in order to realize superior business performance. They perceive three information capabilities: Information Technology Practices (ITP), Information Management Practices (IMP) and Information Behaviors and Values (IBV), as different and complementing views on how IT and information use may be linked to business results. Hence, the skills expected from every business-information professional have changed and if not already, many universities will be forced to reconsider their curriculum in MBA and MScIS studies.

Returning the 'I' in the IT

In the eighties, the information technology was thought of as the silver bullet of strategic value for organizations and potential strategic benefits of IT were discussed quite in great extent (Cash & Konsynski, 1985; McFarlan, 1984; Porter & Millar, 1985).

The next decade was a cold-shower period – practitioners and academia were not certain anymore whether technology can be the main source of competitive advantage. "In spite of theoretical arguments and professional belief in favor of a positive relation between investment in IT and superior financial performance, empirical evidence on this relation has been inconclusive." (Stratopoulos & Dehning, 2000). Numerous studies have examined the market and financial returns to investments in IT and have found little evidence that companies that spend relatively more on IT outperform others significantly (Barua, Kriebel & Mukhopadhyay, 1995; Dos Santos, Peffers & Mauer 1993; Hitt & Brynjolfsson, 1996; Tam, 1998).

Next leverage emerged in late 1990s with the 'dotcom' era. IT developers and vendors, backed up by management consultants and sometimes even higher education curricula, made exaggerated claims about the abilities of the available or next generation of computers. Managers were constantly exposed to news and adverts about the latest, newest, flashiest and fastest IT developments and how they will make their companies more efficient, more innovative and more competitive. Organizations worldwide made significant investments in new 'e-'products and solutions like Customer Relationship Management systems (CRM), Supply Chain Management systems

(SCM), Enterprise Resource Planning systems (ERP Systems), and Knowledge Management systems (KM) for knowledge capture, manipulation and management, to name a few.

Yet too many companies, who spent and still spend billions of dollars on new and new technological solutions, struggle to understand how to put information to work so that it would support business and improve performance. Reviewing the popular press and academic literature for an explanation, a picture starts to emerge that the benefits of investments in IT are particularly difficult to measure (Bharadwaj, Bharadwaj & Konsynski, 1999; Davis & Riggs, 1999). "Paul Strassmann, the US academic and writer who is perhaps the world's leading authority on the relationship between IT and business economics, is also one of the most passionate believers in our over-spending" (Davenport, 2000, referring to Strassmann, 1990a; 1990b; 1997)

It looks like the primary manifestation of information age has been in the deployment of, and attention to, IT in organizations, rather than how people use information to achieve organizational purposes. One of the most descriptive representations of this issue in the literature can be found in (Davenport, 2000):

> "Imagine a world obsessed with plumbing. In this bizarre place, hundreds of magazines and books, and even a few TV channels, cover the plumbing industry, celebrating the newest advances in valves, fixtures and pipes. Cocktail party conversation is dominated by the issue of whether one brand of sink drains faster than another. Plumbing equipment magnates are on the cover of business and even general interest publications, and become the world's richest citizens. Companies pay millions, billions, trillions to connect all their plumbing devices and ensure that pipes reach every desktop, every home office, even every car.
>
> Only one plumbing-related issue is overlooked in this strange world – water. Is it clean and fresh? Is water even what consumers want to drink? Are they thirsty? Oddly enough, a similar situation prevails in our own world. We need only substitute computers for plumbing fixtures and networks for pipes," (Davenport, 2000).

Just as plumbing technology overshadows water in our imaginary world, IT overshadows information itself in the real world.

> "Although good water can easily be obtained from a clear mountain stream, good information is rarely synonymous with advanced IT," (ibid.).

There were quite some attempts to connect IT with the bottom line figures, yet recent studies only established that the mismanagement of IT assets can downgrade company's performance and competitive position (Bharadwaj, 2000; Stratopoulos & Dehning, 2000).

Started in 1998, a 28-month research study called "Navigating Business Success" that seems likely to provide a way to resolve the IT productivity paradox was conducted at IMD, Lausanne, Switzerland, in conjunction with Andersen Consulting (Marchand et al., 2000; 2001a). Trying to resolve the gap between spending billions on IT with no clear link to improved macroeconomic productivity or business performance, authors of the research surveyed over 1,000 senior executives from 98 privately and publicly held companies operating in 22 countries and 25 industries. The results showed that only a strong combination of excellence in investing and deploying technology, excellence in collecting, organizing and maintaining information, and getting the people to embrace the right behaviors and values for working with information, can lead to superior business performance. According to the research, senior managers possess a higher-level idea, 'Information orientation', which embraces three basic information capabilities that managers associate with effective information use: Information Technology Practices (ITP), Information Management Practices (IMP) and Information Behaviors and Values (IBV). Each of the areas was recognized as important in the past by academia and practitioners. However, they were considered separately in isolated, nearly 'cloistered' schools of thoughts. According to the research, "a company must achieve competence and synergy across all three information capabilities of effective information use as a precondition to achieving superior business performance," (Marchand et al., 2000; 2001a).

In following sections we will take a closer look at each of the mentioned capabilities, as understanding them could help in closing the wide-open gap between corporate performance and ex-

pectations that senior executives have on the basis of their IT investments. Thus, understanding them will also help in attempt to set up the relevant education curriculum for hybrid CIO business-information managers.

Information Technology Practices (ITP)

This is the realm of software, hardware, telecommunication networks and technical expertise, supporting everything from the tasks of lower-skilled workers to the creation of innovative new products and the analysis of market developments and creation of strategy.

The IT school, which started emerging in the 50's with influential works of Herbert Simon (1946; 1960) (he classified decisions as structured, semi-structured and unstructured) and Robert Anthony (1965) (he authored Anthony Pyramid of Operational Control, Managerial Control and Strategic Planning), flourished with Gorry and Scott Morton's framework (1989) which defined how information systems and IT should be deployed in organizations (Gorry & Scott Morton, 1989). Their framework classified the types of decisions for each of the three hierarchical levels and therewith suggested what kind of IT support should be deployed to strategic planning level, management control level and operational control level.

Taking into account the rate of IT development in the last decade and increasingly information intensive competitive environment, Marchand et al. (2001a) modified and updated the Gorry and Scott Morton's framework. The 'original' strategic planning level and management control level are integrated in top-level 'IT managerial support'. The new, 'IT Practices Capability Framework' includes two new levels – business process support and innovation support. The research showed that senior managers perceive these four separate and distinct dimensions of 'IT support' idea: IT for operational support, IT for business process support, IT for innovation support and IT for management support.

> "ITP are capabilities of a company to effectively manage appropriate IT applications and infrastructure to support operations, business processes, managerial decision making, and innovation," (Marchand et al., 2001a).

'IT for management support' focuses on the principal strategic decisions managers face, such as market positioning, competitive analysis, and exploration of business opportunities. Thus providing information needed to defend market position and for proactive marketplace response, con-

Table 1: IT Practices support overview

	IT practice support	Types of knowledge workers	Decision making levels	Application examples
Making better things	IT managerial support	Executives / senior managers	Strategy Resource allocation Management control	Executive information systems (EIS), Decision support systems (DSS), Data mining, On-line analytical processing (OLAP), Group decision support systems, Financial management systems
Making better things	IT innovation support	Professional workers (R&D, engineering, product design)	New products / services Improve creativity and exploration	Groupware (e.g. Lotus Notes), Computer-aided design, Graphical simulation tools, Product modeling systems, Geographic information systems (GIS)
Making things better	IT business process support	Process managers	Project and process management across demand / supply chain	Enterprise resource planning systems (ERP) (e.g. SAP); Production, distribution, inventory, and sales management systems; Workflow automation systems
Making things better	IT operational support	Operational workers and supervisors	Transaction processing Direct operations	Payment systems; Order processing systems; Policy management systems; Accounting, payroll and personnel systems; Checking, credit cards systems...

ducting analysis of business situation, and ensuring that highly skilled people can share information and ideas, are managers' top concerns. Regarding the 'IT for innovation support', the key ideas are facilitating creativity and speeding up the creation of new products and services. Managers expect the IT will improve efficiency of operations and control operations ('IT for operational support'). Finally, managers perceive that IT has to support business processes with improving cross-functional process management and by connecting business processes with those of suppliers and customers. Table 1 shows the main features of IT Practices.

As can be seen in Figure 1, in order to become IT-mature, organization has to develop each IT capability due to their interrelations. For example, improvements to IT for operational support have a positive effect on both IT for business process support and IT for innovation support. IT for business process support directly affects IT for management support, just as does IT for innovation support (Marchand et al., 2001a). In order to develop the IT for management support capability, company has to excel in all other capabilities, as their outcomes serve as support to the capability. Consequently, this is the most difficult dimension to control and develop, yet it is necessary to be developed when a company wants to achieve competitive advantage. Namely, IT for operations support and IT business process support can serve only to solve structured and semi-structured decisions, meaning that the real information asymmetry starts with appropriate IT innovation support and IT management support capability.

INFORMATION TECHNOLOGY PRACTICES (ITP) The capability of a company to deploy appropriate IT applications and infrastructure in support of operational, decision-making and communication processes

IT for management support includes the software, hardware, telecommunication networks and capabilities that facilitate executive decision-making. It facilitates monitoring and analysis of internal and external business issues concerning knowledge sharing, market developments, general business situations, market positioning, future market direction and business risk

IT for innovation support includes the software, hardware, telecommunication networks and capabilities that facilitate people's creativity and enable the exploration, development and sharing of new ideas. It also includes the hardware and software support to develop and introduce new products and services

IT for business process support focuses on the deployment of software, hardware, telecommunication networks and technical expertise to facilitate the management of business processes and people across functions within the company and externally with suppliers and customers

IT for operational support includes the software, hardware, telecommunication networks and technical expertise to control business operations: to ensure that less skilled workers perform their responsibilities consistently and with high quality, and to improve the efficiency of operations

ITP maturity

Figure 1: The Information Technology Practices maturity model

It is so due to the fact that in today's business environment, providing superior IT for operational and business process support that focus primarily on structured and semi-structured decisions (i.e. transaction processing, supply chain management…) will not provide strategic competitive advantage, as they are merely necessary to operate business and follow the competitors. One step in providing greatest information asymmetry is to ensure that IT capabilities ensure support not only for control but also innovation – in other words, support for both planned and emergent strategy (Mintzberg, Ahlstrand & Lampel, 1998). The other steps for achieving industry leadership require excellent information usage behaviors and good information management practices.
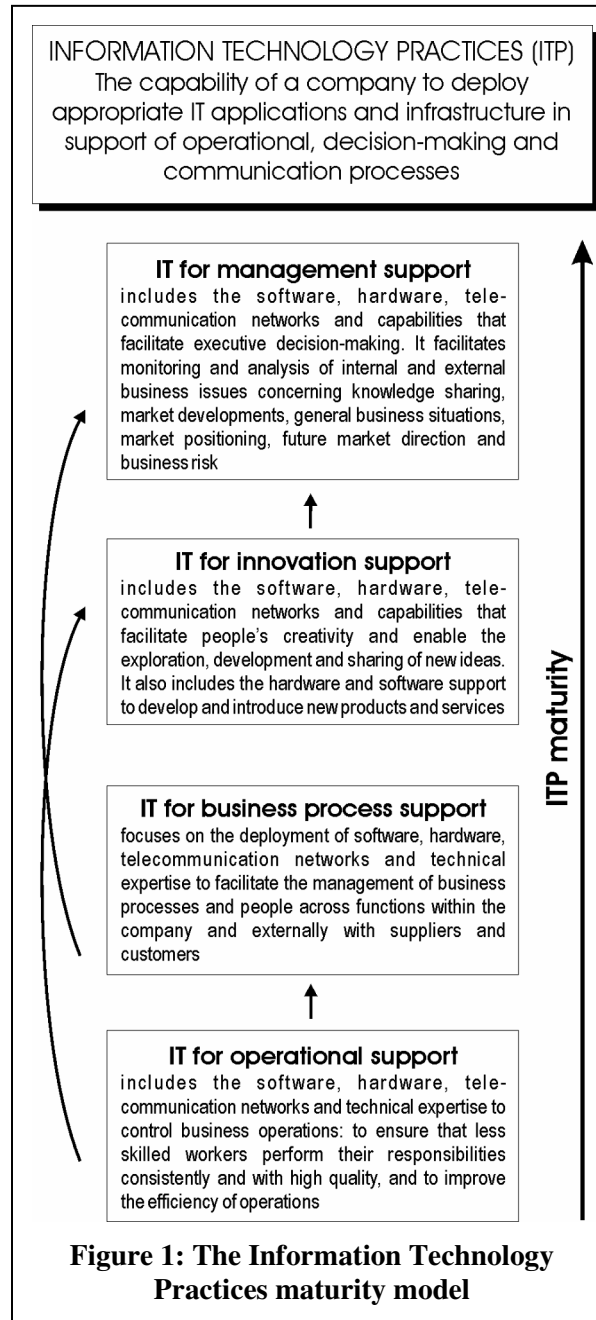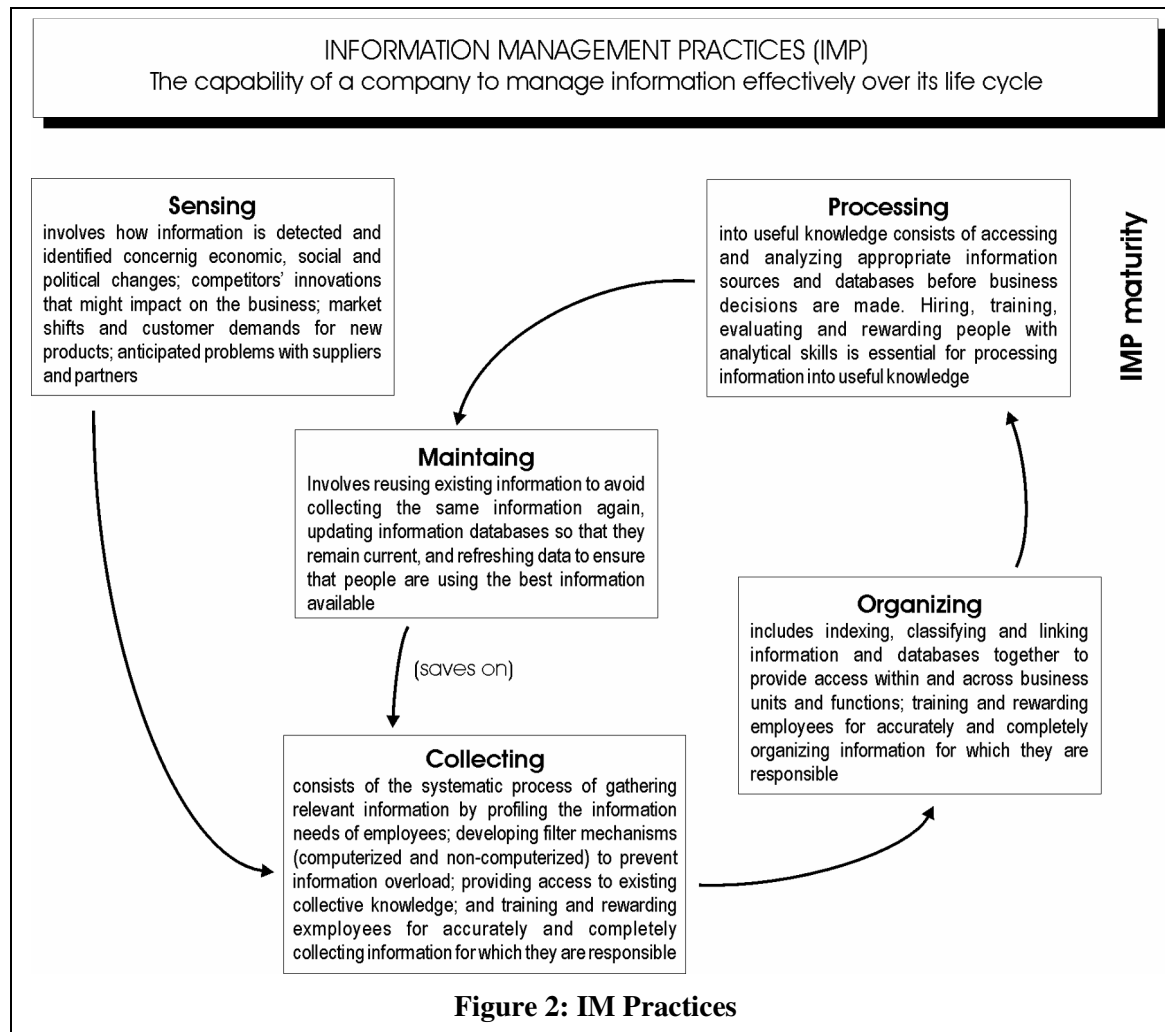
Information Management Practices (IMP)

 "Information Management Practices (IMP) are capabilities of a company to manage information effectively over the life cycle of information use including sensing, collecting, organizing, processing, and maintaining information," (Marchand et al., 2001a).

The theoretical basis of IM School lies in "resource management". Specifically, Horton (1968) was concerned about treating information as important organizational resource, and better managing the proliferation of media and technologies which were being introduced in corporations and government agencies. IM view focused on information management as a life cycle of information, yet it failed to draw tight link between improved information resource management and better business performance. This was mainly due to the fact that either IM professionals focused strictly on librarianship (and forgot about IT that could help them), or IM professionals started over-using IT solutions (and focused mainly on IT). Also, it was due to the fact that with little authority they had little impact in the broader information management practices and people behaviors that shape how information is or should be used in the company to improve business performance. After the first 'boom' and no real results, IM practice was in many cases delegated even further down the hierarchy, almost to the operational level. Recently, the information management has returned in form of 'knowledge management', whose advocates have tried to raise awareness about practices surrounding how people can use and show their knowledge in a business organization (Marchand et al., 2001a).

If IT practices refer to the management of IT applications and infrastructure, IM practices focus on the company's capabilities to effectively manage the *use* of information over its life cycle in support of coordination and control, tactical problem solving and strategic decision making. The costs of acquiring, storing, processing and maintaining information are high, and if organization's information management is not adequate, following flaws are commonly visible: failures to respond in a timely way; duplication of effort; failures to exploit information that is already available in organization because of lack of communication between operational units (departments, geographically dislocated units etc.), who deal with the same (or similar) information each in their own way (Swash, 1997). Also because of proliferation of information products and delivery methods of information, organizations suffer from information overload, having difficulties separating important and unimportant.

Today senior managers who feel that better information practices will improve business performance hold attention to the ways in which organization is identifying and gathering important information about what is happening inside its boundaries (information about operations, processes); what is happening in its 'outside World' of customers, members, clients, competitors, suppliers, markets, supporters, donors, institutions and individuals it needs to influence; how a company organizes, links and analyzes information; and how the best possible information from 'outside and inside World' about relevant aspects of business is maintained and re-used in organization (Marchand et al., 2001a; Orna, 1999).

The research (Navigating Business Success) showed that executives have clear notion of good information management practices as being a cycle with five interrelated phases. They are described in the Figure 2; also, the linkages between them are presented with clear visual path, beginning with sensing, and moving in a circle from collecting to maintaining. *Sensing* is essential to high level of IMP maturity as companies must continuously identify events, trends and changes in business conditions and make sense out of them to collect appropriate information, develop new strategies, or make decisions. It is one of the most difficult practices to develop; yet according to managers, it is one of the most wanted and critical ones, as it ensures that a company stays in touch with its environment. It has a direct influence on the type of information individuals collect for themselves and for other members of the organization. *Collecting* is the practice of systematically gathering relevant information, as changes are detected in business conditions.

INFORMATION MANAGEMENT PRACTICES (IMP)
The capability of a company to manage information effectively over its life cycle

Sensing
involves how information is detected and identified concernig economic, social and political changes; competitors' innovations that might impact on the business; market shifts and customer demands for new products; anticipated problems with suppliers and partners

Processing
into useful knowledge consists of accessing and analyzing appropriate information sources and databases before business decisions are made. Hiring, training, evaluating and rewarding people with analytical skills is essential for processing information into useful knowledge

IMP maturity

Maintaing
Involves reusing existing information to avoid collecting the same information again, updating information databases so that they remain current, and refreshing data to ensure that people are using the best information available

(saves on)

Organizing
includes indexing, classifying and linking information and databases together to provide access within and across business units and functions; training and rewarding employees for accurately and completely organizing information for which they are responsible

Collecting
consists of the systematic process of gathering relevant information by profiling the information needs of employees; developing filter mechanisms (computerized and non-computerized) to prevent information overload; providing access to existing collective knowledge; and training and rewarding exmployees for accurately and completely collecting information for which they are responsible

Figure 2: IM Practices

Albeit IT advancements have significantly improved the ability to collect data, senior managers remain concerned as relevancy is the critical issue. Only the right type and amount of information is acceptable to avoid over- or under-load; knowledge residing in employees must be identified and made explicit; information behaviors and values need to be trained and rewarded as employees tend to perceive collecting of information they don't directly use as low priority part of the job. *Organizing* information depends, firstly, on decisions made during the sensing and collecting phases, and secondly, on good IT support (such as proper business process support upheld by suitable database model with organization-wide-agreed terminology). In processing, analysis of data is a critical step, since decision makers evaluate available information and choose which information is appropriate for business decisions. Data is transformed into information which, with meaning added, transforms into knowledge that is used by most of employees today to perform their everyday jobs. *Processing* is, besides sensing, one of the most critical aspects of information management, as at this point people evaluate the relevance and importance of information to their needs and, accordingly, determine whether information is to be maintained for the future use or discarded. Special attention has to be paid to hiring, ongoing training, evaluation and rewarding of employees to ensure that organization has hired the right people to process information into knowledge. *Maintaining* involves reusing and refreshing existing information to avoid double collection. Reusing is also one of the difficult tasks in achieving IM practices maturity, mostly because of the human attitudes. People assume that old information is stale; they might not be

aware that information exists; managers sometimes redefine decisions and encourage new data collections; the information might be difficult to re-access due to bad information organization; people might be reluctant to use information they do not 'own'. Again, proactive information behaviors have to be developed and encouraged.

The linkages demonstrate the information life cycle and in order for a company to achieve IMP maturity, all IM practices need to be built up. Improvements to sensing will have a positive influence to the way information is collected. That will improve the way information is organized. Moving on, better organization of information leads to better processing of information for better business decisions. Better processing creates improvements to information maintenance, which, finally, affects the collection of information, "saving on the need to recollect the same information over and over again, and closing the path of information life cycle" (Marchand et al., 2001b). Yet, the relationships are in circular, not linear form and it is difficult to say where the life circle begins or ends. Holistic approach and not step-by-step (linear) approach is recommended, since sensing and processing are the most critical practices, yet on the other hand all others should not be left behind.

Information Behavior and Values (IBV)

"IBV are capabilities of a company to instill and promote behaviors and values in its people for effective use of information," (Marchand et al., 2001a).

Unlike IT and IM School, there is no comprehensive theory on instilling effective information usage behaviors. Two views are known in the literature, the Human resources view and the Management control view. The first emphasizes the importance of recruiting, motivating, leading and managing people yet it does not address the relationship between the management of people and how people use information to
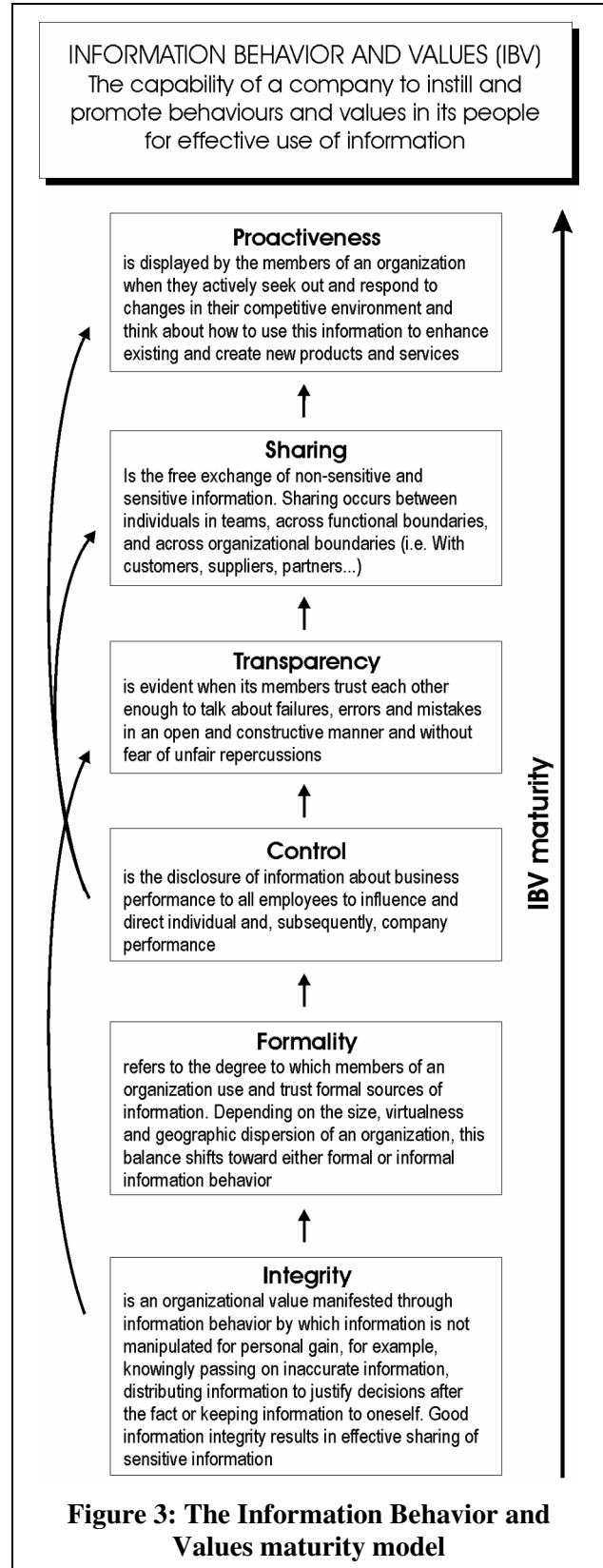

INFORMATION BEHAVIOR AND VALUES (IBV)
The capability of a company to instill and promote behaviours and values in its people for effective use of information

Proactiveness
is displayed by the members of an organization when they actively seek out and respond to changes in their competitive environment and think about how to use this information to enhance existing and create new products and services

Sharing
Is the free exchange of non-sensitive and sensitive information. Sharing occurs between individuals in teams, across functional boundaries, and across organizational boundaries (i.e. With customers, suppliers, partners...)

Transparency
is evident when its members trust each other enough to talk about failures, errors and mistakes in an open and constructive manner and without fear of unfair repercussions

Control
is the disclosure of information about business performance to all employees to influence and direct individual and, subsequently, company performance

Formality
refers to the degree to which members of an organization use and trust formal sources of information. Depending on the size, virtualness and geographic dispersion of an organization, this balance shifts toward either formal or informal information behavior

Integrity
is an organizational value manifested through information behavior by which information is not manipulated for personal gain, for example, knowingly passing on inaccurate information, distributing information to justify decisions after the fact or keeping information to oneself. Good information integrity results in effective sharing of sensitive information

IBV maturity

Figure 3: The Information Behavior and Values maturity model

achieve organization goals. The second view recognizes the role of information and control in steering people towards organizational objectives.

Fundamentally, people use information in organizations and therefore it seems odd that IT and IM disciplines did not try to deal with improving the information usage behaviors and values of the employees. This is primarily due to the fact that IM and IT were "operational level support functions" and they had little influence on changing people. Besides, influencing people requires very different skills and is much more difficult than dealing with new software. It is ill-fated circumstance for the IBV practices to be an informal and underdeveloped discipline, as business organizations involve relationships among people, and how they choose to contribute their knowledge to achieve organizational or group purposes. According to Simons (1995), people are constantly balancing their own interests with organization's interests in deciding whether, and how, to contribute their personal expertise, experience, skills, and information to the welfare of the organization. A challenge for managers is to define a relevant context, or orientation, to channel human attention, information use, and human knowledge and learning into creative ideas and information of value to achieve organizational success.

In the mindset of senior executives, there are six IBV capabilities, which are closely related (Fig. 3). *Integrity* acts as the basis for information use, setting appropriate boundaries for ethical information behavior, and influencing directly the formal use of information within an organization. Ability of a company to use *formal* sources of information improves the reliability and quality of information used (Rogers & Agarwala-Rogers, 1976), provided that organization possess integrity to validate its veracity and usefulness. Formal information use means that business organizations "will push to establish formal processes and information flows to achieve predictable business results, to assure appropriate controls are in place, and to deliver products and services in consistent matter" (Marchand et al., 2001a) . Improvements to formal information use will have a direct impact on the ability of a company to provide information *control*, which is the use of performance information among managers and employees at all levels of the company. As everyone knows how (and why) a company is doing, information about performance stimulates open discussion of problems and emergence of new ideas to improve performance at all organizational levels. *Transparency* is evident when members trust each other and talk freely about failures and mistakes. *Sharing* of sensitive and non-sensitive information is facilitated by transparency and control, as open discussion about known problems is treated as opportunity to learn, not opportunity to whitewash the managers and punish the employees. *Proactiveness* is the most wanted practice that managers strive to encourage in their companies. Executives see it as how well people in organization think about using information to create or enhance products and services, and how promptly they respond to business changes they foresee. Among organizational members, managers have to develop a sense of 'urgency' in sensing information that is useful, and sharing it effectively among other employees in teams and across functions.

Evidently, one of the major managerial implications regarding IBV concerns organizational change. Creating an environment to effect change in people's behaviors is difficult; changing behaviors and values in a company requires gradual adaptation and acceptance by people over months and years.

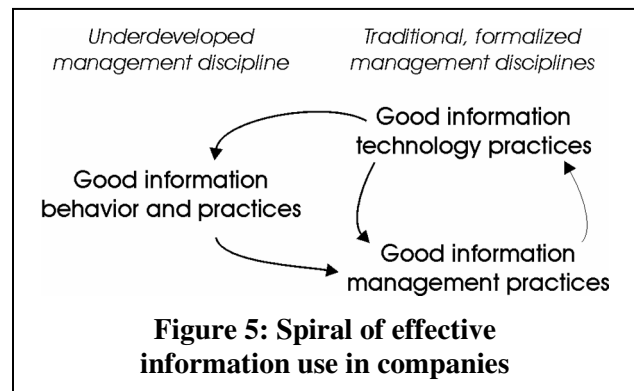## *Information Orientation: 1+1=3*

The IO maturity model (Figure 4) shows how each of the fifteen competencies (within the mentioned three information capabilities that managers associate with effective information use) influences each other. In example, within the IBV capability the proactive information behavior is influenced directly by control and sharing; outside the IBV capability it is influenced by the 'IT for management support' dimension. Proactiveness, in turn, has direct effect on information management practice of sensing, which influences both IT for management support and sensing. Both

Figure 4: The IO maturity model: cross-capability linkages
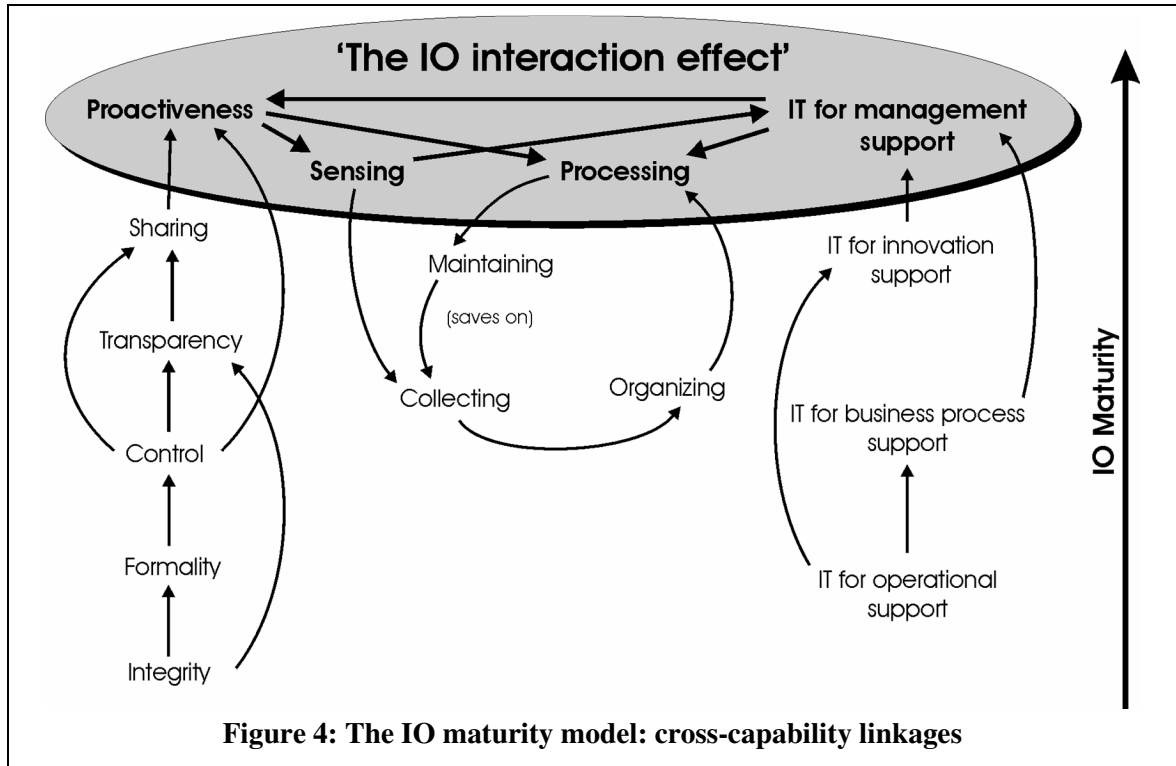
proactiveness and IT for management support directly influence processing practice, etc. As seen in the shaded area of Figure 4, more mature IO companies work on these key dimensions simultaneously and create powerful "spiral" effect among the three information capabilities which leads to better business performance (Marchand et al., 2001b). Deficiency in any of the dimensions will lead to inverse spiral effect, leading to worse performance.

Senior managers recognize that successful companies must be good at all three information capabilities to reap the substantial benefits from cross-capability interactions involving using information proactively, sensing and processing information appropriately, and deploying IT for management support. Good information usage behaviors and values drive better information definition and management; this improves the capability of a company to use IT to support decision making and problem solving, which in turn reinforces good information usage behaviors and values (see Figure 5). "When one of these links is derailed, the recursive aspects of the spiral are disabled and a company is less effective in using information," (Marchand et al., 2001a).

Thus, in contrast to 'traditional' views on information in organization, information use in organization on an aggregate level is people-centric. It is based on the decision-context and the tasks that people must execute to achieve organizational purposes. It not only involves how people use IT and manage information to help improve decisions, but rather how they behave with information based on organizational values associated with effective information use.

Figure 5: Spiral of effective information use in companies

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MScIS / MBA Education Issues

The breakdown of 'information orientation', considered in previous section, leads to new aspects of how information, people and IT are leveraged to increase business performance. Deficiency in any of the three key information orientation capabilities: information technology practices (ITP), information management practices (IMP) and information behavior and values (IBV), will lead to inverted spiral effect and thus worse business performance. Such aggregate view is senior managers' view on information systems and business professionals. The Chief Information Officer (CIO) of the new age has to be a 'hybrid' business and information systems manager who can play a major role in strategy formulation for effective use of information technology, who does not neglect the human side of the information equation, and who does not forget that information has to be managed like any other resource, and thus puts the 'I' back in the 'IT'. Some authors (see i.e. Earl & Scott, 1999; 2000; Greco, 1999) even propose a new name for such a hybrid: 'Chief Knowledge Officer', yet it seems it is only a new name for a 'proper' CIO.

Putting the 'name debate' aside, senior managers recognize that successful companies must be good at all three information capabilities to reap the substantial benefits from cross-capability interactions involving using information proactively, sensing and processing information appropriately, and deploying IT for management support. Good information usage behaviors and values drive better information definition and management; this improves the capability of a company to use IT to support decision making and problem solving, which in turn reinforces good information usage behaviors and values (see Figure 5). "When one of these links is derailed, the recursive aspects of the spiral are disabled and a company is less effective in using information," (Marchand et al., 2001a).

Hence, in contrast to 'traditional' views on information in organization, information use in organization is based on the decision-context and the tasks that people must execute to achieve organizational purposes. On aggregate level it is people-centric and does not only involve how people use IT and manage information to help improve decisions, but rather how they behave with information based on organizational values associated with effective information use. In practice, a successful CIO is far from being merely 'a technological geek'. According to a research (Earl, 2000), the most important qualities of knowledge workers, especially CIO, are: a shared vision of changed business and ability to work closely with peers and superiors; both a willingness to pay attention to day-to-day IT performance and excellent understanding of business process; and finally, ability to consult and lead organization when going through significant changes encompassing technological and human side of the change that lead to desired behaviors and values of all employees.

As known from the human-resource-management and organizational theories, the 'human' side of the organization, especially values, can take months and years to change. This is why it is so important to have higher education institutions with proper and relevant curricula. It is often the case that higher education MScIS study programs put forward topics that are 'native' to lecturers. Or, as IT and IM schools are well developed disciplines, it is quite simple to go astray and forget about the information behaviors and values, which in turn – as we have seen – are essential part of mature information capabilities of organization. Thus it is of vital importance to deliver such MScIS/MBA curricula which include topics that cover each of the three information capabilities. It is obvious that old IT (or in a little better case, IT/IM) programs do not sustain sufficient degree of relevancy to the needs of present-day business community. The skills expected from every business-information professional have changed and if not already, many universities will be forced to revise or even rebuild their curricula from scratch. Below a few guidelines are set to help check and re-build the curricula.

Regarding the content of the study program, a framework of topics in education of future business-information systems professionals is presented in the Figure 6 (adapted from Maes, 2003). As shown, a contemporary education program should cover a proper mixture of business, organization and human resource management, information, and information technology topics – in strategic, structural and operational aspects. We see again, that there is no direct business-IT link (as it was, in example, influentially proposed in 1992 by Henderson & Venkatraman, or in 1997 advocated and used to design an educational model with by Burn and Ma) and that information management and information behavior and values should be very important part of the education. The model presented enables a clear positioning of the actual problem (and research) area, or better said, topic, in the framework of educational program. Also, there should be a final-year-module(s) or project(s) that deal with implementation or/and change issues, encompassing all of the aspects as a whole.

Figure 6: The framework of topics in contemporary education of business-information systems professionals
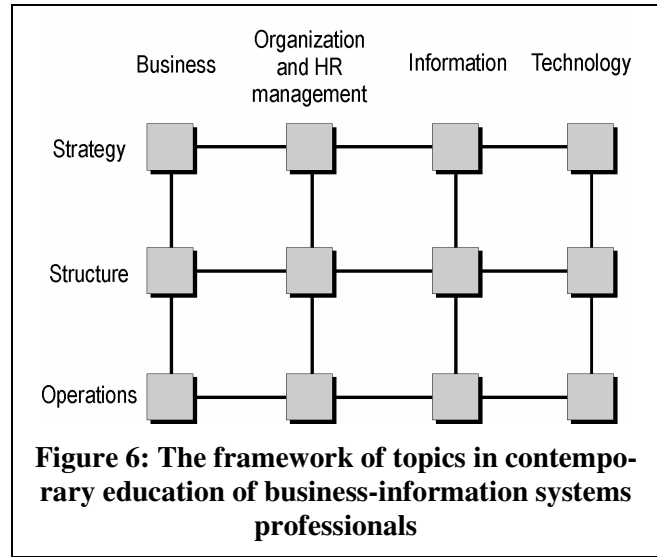
According to Bruce (1999), the teaching/learning model, firstly, should be *theory-based* as 'innovative variations' have to be based on firm anchors. Also, doing theoretical research for assignments improves students' abilities like collecting and organizing the information, making sense of information, deciding which information is important and which not, etc. Secondly, it should be *action-oriented*: if possible, real-life projects from business world should be undertaken, as "care for organizations should be integral part of any managerial learning process, just as patient care is part of any medical training program," (Maes, 2003). Important behavior skills and values can be improved by that, such as functioning as a part of a team, trust-building, communication about mistakes, taking responsibility for them and dealing with them, sharing of information (instead of hoarding), etc. Both mentioned ideas, the theory-based and action-oriented education, emphasize conceptual skills and intellectual agility. Third, the faculty of the education institution should be complemented with *external practitioners* to ensure that practical relevance of the program exists.

The most important thing for educators and policy makers to constantly keep in mind is that the observable learning outcomes in real-life are not written assignments nor grades or course credits earned: they are demonstrations of 1) what the student knows, 2) what the student can actually do with what s/he knows, and 3) the student's confidence and motivation in demonstrating what s/he knows (Bouslama, Lansari, Al-Rawi & Abonamah, 2003). These outcomes are immediately put up against senior managers' expectations when our graduate hits the 'real life' and therewith our education program can be evaluated.

Conclusion and Further Research

We live in the 'information age', in which knowledge workers are one of the most precious 'assets' of an organization. Competition is fierce and they are the ones that have to deal with and utilize the information to perform their work and act properly and promptly. The information is so considered as a key organizational resource, because it is the key tool that workers have to rely on and act upon.

For quite some years, it was believed that a) only technology or b) only information management can improve business performance and a) IT or b) information is the most important currency in building and maintaining a competitive edge. Yet, a research (Marchand et al., 2001) in the field of effective information use proved that using information is too important to be left solely to IT and/or information specialists. The Chief Information Officer (CIO) of the new age has to be a 'hybrid' business and information systems manager who can play a major role in strategy formulation for effective use of information technology, who does not neglect the human side of the information equation, and who does not forget that information has to be managed like any other resource and thus puts the 'I' back in the 'IT'. Only a strong interaction of people, information and technology (and not just technology, just people, or just information, as believed in past) can improve business performance.

As organization has to be equally good at using information proactively, sensing and processing information appropriately, and deploying IT for management support, and as information orientation has to be people-centric by default, proper curricula is expected from MScIS/MBA educational institutions. The expectations of the business community were presented in the paper; the description of information capabilities and ideas, developed in the last section can serve as a guideline when building, revising and endorsing curricula. Study programs should be reviewed whether they really offer students a complete (and relevant) set of topics and if they are taught in relevant teaching manners, such as interdisciplinary theoretical research, dealing with case-studies, and working on team projects.

Further research to investigate the field is planned. The same research methodology as in the "Navigating the business success" will be applied and a research in Slovenian companies will be carried out in Slovenia. Then, the results will be compared with the results of original research. We think that Slovenian top executives and managers feel similar about the information orientation and that they expect an excellent combination of the three information capabilities from their CIOs. The framework of topics for MScIS/MBA educational programs (presented in Figure 6) could be questioned and validated whether it provides future professionals with relevant topics and skills. Also, exact curriculum, topic-by-topic, and subject-by-subject could be set for specific higher education institution, that is, for specific educational program. An analysis of Slovenian MScIS/MBA educational programs and their comparison with international educational programs could be performed.

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Biography

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