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An Integrative Perspective on Information Management

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An Integrative Perspective on Information Management

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Abstract

Information management is an integrative discipline, connecting all information-related issues of an organization. Its integrative nature is investigated through a generic framework linking strategy and operations and also business and technology. The core issues of information management and the position of the CIO as the integrating agent are discussed. Future perspectives on information management are delineated and an appeal is made for responsible information management in organizations as well as in society in general.

This PrimaVera working paper is a compilation and actualization of previously published working papers on the “Amsterdam framework for information management”. It is intended for publication in the first book in the series “Perspectives on Information Management”, to be published by Elsevier in autumn 2007.

*„Problems are solved, not by giving new information,
but by arranging what we have always known“*

*Ludwig Wittgenstein,
Philosophical Investigations*

1. Introduction

Despite the fact that information has always been a primary organizational resource and even been called “the unique feature of the market economy” (Drucker 1993), information management (IM) is still a rather indistinct discipline, both in academic research and in practice. It deals with the management of information as a business resource and, hence, encompasses all the processes and systems within an organization for the creation and use of information. Further, given the ubiquitous nature of information and communication technology (ICT), the business - ICT relationship has traditionally been a point of particular interest in IM.

The indefinite identity of IM is reinforced by reminiscences from the past, where the term IM was claimed by the library sciences¹ (see, e.g., Macevičiūtė & Wilson 2002), and by the advent of adjacent and even partially overlapping disciplines such as knowledge management². This struggling with its own identity is also due to the handover of the discipline to ICT-people, who approached the organizational use of information in a one-sided “technocratic-utopian” (Davenport *et. al.* 1992) way. Facetiously spoken, IM resembles a discipline in its puberty: it is reacting against its technology-coloured interpretation, but has at the same time difficulties in finding its own identity and its right place in the organization.

Notwithstanding this disorientation, the importance of IM has only increased. Reasons for this are numerous, but can be brought back to the following:

- By ICT becoming more mature, transaction costs associated with information have substantially decreased. Because of this, organizations are more and more information-dependent; they are at the same time struggling with information over-load and with

¹ Information management is in this discipline nowadays quite often equivalent to “content management”.

² A discussion on the differences between both disciplines can be found in Bouthillier & Shearer (2002). An extremely critical review of what is new in knowledge management compared to IM offers Wilson (2002).

information under-use. The combination of these seemingly contradictory effects is a serious motive for managing information as a resource.

- The maturity of ICT makes it possible to exploit scale. ICT can be managed as a normal resource, i.e. based on its output, and can eventually be put at a distance from the organization (hence outsourcing and off-shoring). Contrary to the information supply side, its demand side is highly immature: organizations all over the globe are struggling with a serious lack of deep understanding of their information processes, apart from their technical components. Reasons enough to look after targeted IM.

Visions on IM are too often first and foremost based on the underlying technologies (the “how?”), whereas one simultaneously continues to stress the importance and strategic impact (the “what?”) of information. The aim of this article is to discuss IM in an integrative way and, because of this, to cover the full scope of the management of information as an (inter)organizational resource. To this end, we first ponder its fields of influence, after which we present an integrative framework that enables us to discuss actual and emerging issues in IM as part of an advancing discipline. The same framework allows us to interpret the role of the Chief Information Officer (CIO) and to look out for future developments in the field of IM.

2. Information management: between the devil and the deep blue?

IM has traditionally been a discipline in between business and ICT, in academic terms in between the management discipline and information systems, if not computer science. The image of the business-ICT relationship has been that of “a troubled marriage in need of guidance”(Ward & Peppard 1996); I prefer René Magritte’s painting “Les Amants” (“The Lovers”) as a metaphoric representation, where both lovers are dying to kiss each other on the mouth but are severely obstructed by their heads being fully wrapped up. Similar distressing remarks have been made regarding the relationship between the business and ICT *departments*, where miscommunication and even non-communication are said to be the main source of misalignment (Coughlan et. al. 2005). It has, however, been emphasized that creating value out of these relationships is basically a general management responsibility, exceeding IT management (Tiernan & Peppard 2004).

“Strategic alignment”, prominently introduced by Henderson & Venkatraman (1993), has since been the key word to open up and manage the business-ICT relationship (Hirschheim & Sabherwal 2001 and Avison et. al. 2004), though it has been criticized as being only a purely rational top-down ap-

proach (Simonsen 1999) and hence only partially effective (Chan 2002), lacking practical handles and therefore in large measure irrelevant (Sauer & Burn 1997) and even inconvenient and harmful (Ciborra 1997). Despite all this, it is still high on the hit parade of any CIO survey of pressing questions. I believe, in line with Hussain et. al. 2002, that strategic alignment is used to mean a variety of things and is consequently a misleading term, as it implies e.g. both the ultimate destination and the road leading to it (though driving this road is pretended to be badly understood, Smaczny 2001 and Sabherwal & Chan 2001). What's more, it suggests that a perfect alignment is ideal. Therefore, we'll argue in the next section in favour of "managing in mutual accord" without any direct connotation of equilibrium, purposiveness etc.

An imminent gap much less noticed and discussed in the scientific literature than that between business and ICT, but mentioned by leading practitioners³, is the one between strategy and operations. This phenomenon might be partially due to the growing disinterest of the Board for ICT in general, in resonance with Nicolas Carr's "IT doesn't matter any more" (Carr 2003), or to their disenchantment with the ICT department's inability to deliver the pretended "motor for innovation". ICT is, in that case, a cost factor and candidate for savings. Another, in many instances more evident explanation, has to do with the general economic climate where Boards of large organizations are operating in a context far away from day-to-day operations, the latter being only of strategic (i.e. related to the stock prices of the company or, in the case of governmental agencies, to the political impact) importance when confronted with emergencies catching external attention. IM is, in that respect, caught between delivering effective and efficient support for the existing and new businesses and the pending requests originating from strategic moves such as mergers, acquisitions, etc. Many years' investments in streamlining the organization's ICT along a certain ERP software package, might, e.g., be overruled by the acquisition of an overseas competitor.

The resulting view on IM is shown in figure 1. We'll argue in what follows that full IM operates in each of the four resulting quadrants and derives its identity precisely from its integrative nature. The relative importance of each individual aspect is context-dependent and, as a consequence, the interpretation as well as the realization of the concept of IM is subject to contingency factors.

³ One of the outcomes of a number of explorative meetings with leading Dutch CIO's.

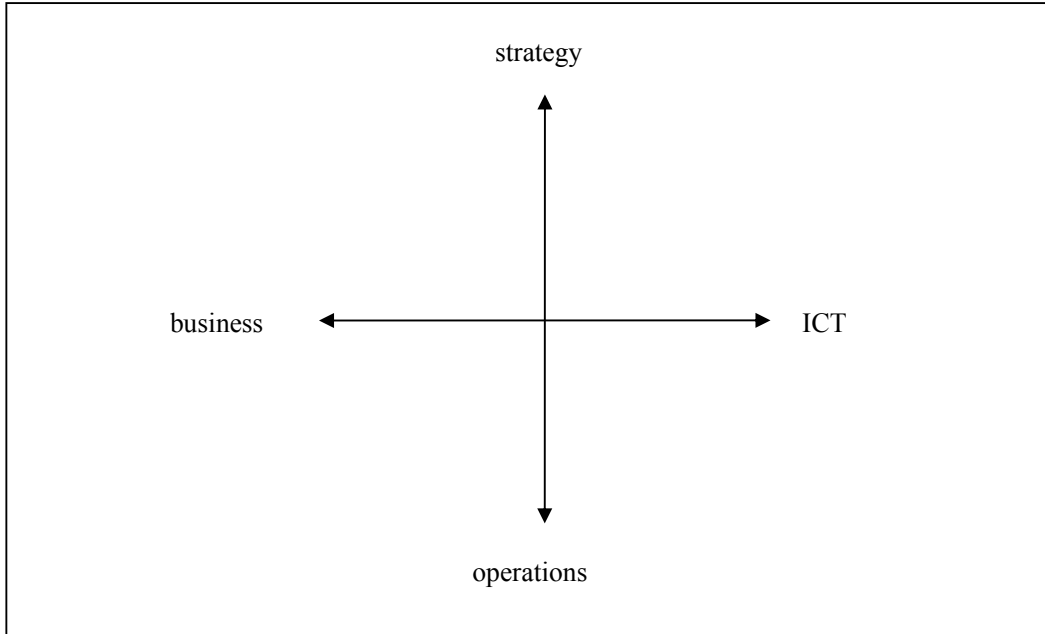


Fig. 1: IM's double splits

3. An integrative framework

Departing from figure 1, IM can tentatively be circumscribed as the integrative discipline connecting business, ICT, strategy and operations. Along these lines, the four quadrants, business strategy, ICT strategy, business operations and ICT operations are its obvious areas for special attention. A company confronted with a myriad of overlapping information systems, e.g., might opt for a short-term almost exclusive concentration on its ICT strategy⁴, whereas a company struggling with its turning over towards a customer-oriented organization might temporarily focus on streamlining and reorienting its business operations. As a matter of course, all four quadrants will generally spoken be part of an organization's IM orientation. Not surprisingly, these quadrants coincide to a large extent with the building blocks of the strategic alignment model of Henderson & Venkatraman (1993).

The most intriguing part of this rather classical interpretation of IM is what is not explicitly addressed, particularly the vital role of the factor information as the linking pin between the four components of figure 1. Indeed, ICT is only *indirectly* influencing the business, viz. by the information generated, the communication supported etc. The quality of information *use* is seriously filtering the impact of ICT and, as a consequence, is a key control lever to be taken care of in any serious attempt to delineate IM

⁴ This particular ICT strategy, involving dramatic reductions in systems in existence, was called by one of the CIO's a "surgical strategy" as opposed to an often more comforting "homoeopathic" one.

in its full amplitude. Similarly, the information *infrastructure*, in Henderson and Venkatraman's model part of the internal, operational domain, is the linking pin par excellence between strategy and operations; this structural variable is responsible for the flexibility or the rigidity of the organization and its services.

The resulting integrative framework, represented in figure 2, is in itself the outcome of a long process of elaboration and validation (Maes 1999, Maes 2003 and Maes 2004) and has favourably been compared with other alignment models (Avison *et. al.* 2004), despite the fact that it is only meant to be an integrative *positioning* framework, allowing to frame and discuss the different aspects of IM in their mutual dependence without any reference to full alignment or whatsoever managerial imperative.

Based on this framework, we can describe IM as the integrative, balanced management of the different domains represented in figure 2. It concerns strategic, structural and operational information-related issues (the vertical dimension of the enneahedron of figure 2) and relates the (external and internal) information and communication processes and their supporting technology to general business aspects (the horizontal dimension). The central axes of this figure don't correspond to subordinate or even disregarded aspects of IM, as the latter is the case in Henderson & Venkatraman's model, *yet to the core itself of IM*.

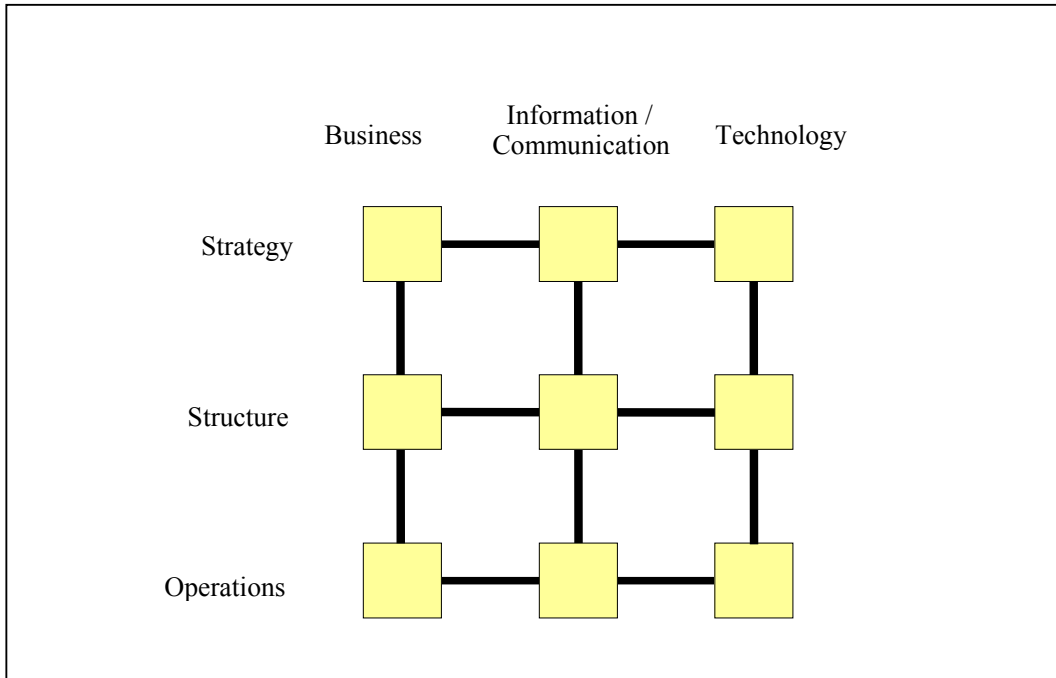


Fig. 2: an integrative framework for IM

A number of elucidating interpretations and similarities can be derived from this figure, referring to its three columns:

- From right to left, we *produce*, *interpret* and *use* information. In the right column, we call it *data*, in the middle one *information* and in the left one *knowledge*. IM has to do with all three of these designations.
- For each of the columns, clearly distinct expertise is needed: from left to right respectively domain expertise, information expertise and technology expertise (distinction taken from Choo 1998). IM is concentrating on information expertise, without neglecting the other two.
- Technology (right column) can be considered as introducing a new *syntax*, while business (the left column) is constituting the *pragmatics* of a given problem. As a consequence, the very heart of IM (the middle column) is dealing with sense making, *semantics*.

- There is a striking similarity with the concept of “information orientation” as introduced by Marchand c.s. (Marchand et. al. 2000 and Marchand et. al. 2001) in order to indicate an organization’s quality of dealing with information. They subdivide this standard in three sub standards: “information technology practices”, “information management practices” and “information behaviors and values”. These sub standards coincide respectively with the right, the middle and the informational aspects of the left column.

IM is supporting the primary identity and activities of an organization; therefore, the natural *scope* of the framework will, generally spoken, be the corporate or (strategic) business unit level. As a matter of fact, assuring the integrity of IM at different organizational levels is one of the essentials of IM; it can be done with the assistance of the framework at each of these levels, including, if relevant, at the level of inter-organizational networks.

A vast number of large organizations is using the framework as a guideline for analyzing and organizing their information services. The framework has proven to be a practical instrument for general managers, information managers and ICT managers, specifically in sharing their mutual understanding of the situation. It helps them in evaluating the current situation and in steering future developments through mapping both on the framework. Indeed, a completed framework details the position of the organization, in terms of business, information and technology, from a strategic, structural and operational perspective. Gaps in some of the domains indicate either a poor understanding of these parts of the organization or an effective lack of provisions, often leading to re-allocation of project resources.

More in detail, the framework is used as follows:

- *Descriptive/orientating*: in this case, the framework is functioning as a “lingua franca” for all parties involved in IM (ranging from business people to IS people). The different information-related problem areas are indicated on the framework. Experience shows that especially the differentiation between information/communication and IT (the latter one inclusive information systems), but also between (infra)structure en operations are fruitful to consider. The framework is stimulating the participants to converse about information services without recurring to technical jargon and to position the areas for special attention in their mutual relationship.
- *Organizing/designing*: a number of organizations, e.g. the Dutch Police Services, is using the framework to redesign their overall information management, especially in the case where the

IT facilities themselves are concentrated or outsourced. Used in this way, the framework is useful in delineating the areas of concern and responsibility of the CIO and the information managers, as will be shown in the next section. Remark that the framework is not a diagram of the organization, but an indication of the domains of attention and their interrelationships.

- *Prescriptive/normative*: yet other organizations (including their consultants) are using the framework as a diagnosis tool, e.g. to define and further investigate the “blind spots” in their information services. Traditionally and dependent on the “information maturity” of the organization, the central axes of the framework are serious candidates for this. Giving harmonious and mutually aligned attention to the different domains of the framework, including the links between the domains, is raised to a rule in these organizations.

4. An integrative perspective on information management

IM entails the balanced management of the domains represented in the enneahedron of figure 2. The same framework allows us to arrange the hot issues in IM anno 2007⁵, as is done in figure 3. These issues, though inherently interrelated as is indicated in the framework, require some separate reading.

⁵ These issues originate from ample survey sessions with CIO's and information managers, e.g. in the context of the Executive Master in Information Management program of the University of Amsterdam.

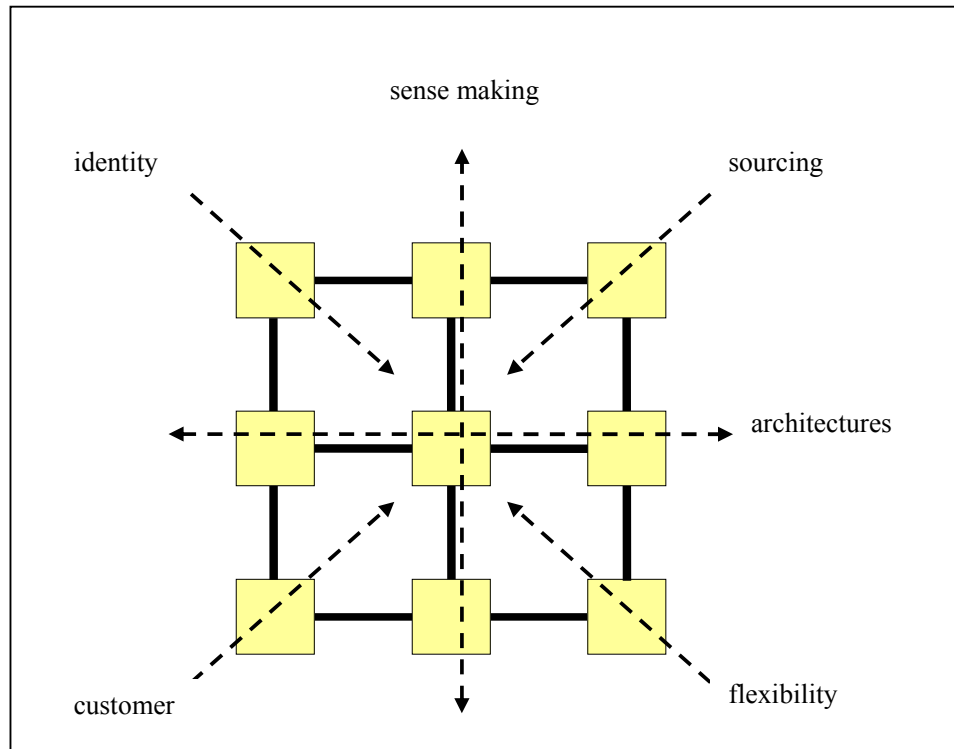


Fig. 3: hot issues in IM

Organizations, companies and governmental institutions alike, are confronted with their very *identity*, mainly but not only under the influence of major macro-economic shifts: globalization, virtualization, socialization, customization etc. are only a few of the highbrow terms wandering around to indicate a common phenomenon: organizations are no longer the center of their own world, as they used to perceive. The advent of Internet was one of the determining sources of this revolution. More and more, organizations are judged on (and eventually punished for) the quality of their information resources. Housing cooperatives, e.g., are supposed to play a major role with regard to safety in the neighborhoods, but discover much to their surprise that they have almost no useful information on their tenants.

Similarly, many organizations are confronted with the value and costs of their ICT. This is partly due to the economic squeeze in which they are supposed to operate and partly to the advent of alternatives, e.g. in offshore countries. *Sourcing* issues, whether in the form of shared services or of outsourcing, are still high on the agenda of many a CIO.

Organizations are further supposed (and even obliged) to deliver customized products and services, even in business sectors as power supply, post delivery etc. Transforming their product-oriented systems and databases into integrated *customer*-focused ones, including the business intelligence needed, but even more the transformation of the organization as a whole into full customer-orientation, is a major operation and a hot issue in many of them. As a matter of fact, organizational agility is a major asset for organizations operating in volatile environments, as almost all do; it requires continuous devotion to the *flexibility* of the systems base.

These hot issues, connected to the four vertices of figure 3, are interrelated through the topics covered by the central axes of the framework, in themselves at the same time instruments and points of particular interest for CIO's. The structure-related horizontal axis, is the natural playground of the enterprise architect. The use of the term "*architecture*" here is rather confusing, as almost everything is called a (preferably: "service-oriented") architecture nowadays, and to a great extent still dominated by technological thinking: the logic of ICT architectures is easily extended into the direction of organizational architectures. The result is remaining and even rising misunderstanding between the ICT division and the rest of the organization. What is basically missing in many organizations is a clear vision on their information and communication architecture, i.e. on the (preferred) information exchange patterns inside the organization and between the organization and its environment. Social network analysis is a more effective technique to support this than the traditional data modeling techniques taken from database design.

The latter omission has to do with the underestimation and neglect of the world behind the central, information/communication related column of the framework. The interpretation of reality, and hence *sense making*, is at the heart of this column. It links the objectivistic ("data") view on information, coinciding with the management of the supply side, with the inherently subjectivistic ("knowledge") view of the business. Information governance, i.e. care for the appropriate use of information based on a deep understanding of the information culture (Choo *et. al.* 2006), is the instrument par excellence in this area. These ideas will be worked out in section 5, where I deal with future developments in IM, as they are still embryonic in their practical application.

5. The CIO as the integrating agent

Much of what has been written on the role of the CIO is in terms of evolution: “the evolving role” (Ross & Feeny 2001), “CIO 2.0: the changing role” (Deloitte 2004) etc. One common denominator is the emphasis on the shift from IT manager to strategic business partner initiating and promoting innovation (Watts & Henderson 2006, Prewitt & Cosgrove Ware 2006, Harvey Nash 2007). Referring to figure 1, this means that the CIO function is basically shifting from the quadrant “IT strategy” to that of “business strategy”. Strikingly no noticeable allusion is made to the central role of the CIO in the management of information (instead of ICT) as a business resource (the central column in the framework and advanced as the heart of IM); one could, aphoristically speaking, say that “the CIO is not (yet) a CIO in the real sense of the word”.

In fact, many uncertainties and even confusion exist related to this function as it is exercised in practice:

- The *job* diverges along the quadrants of figure 1, though on average, of course, all quadrants are part of a CIO’s job anno 2007. In some organizations, e.g. struggling with overlapping and hence significantly superfluous information systems, is the CIO mainly and temporarily dealing with specific IT strategic issues such as the reduction of these systems, concentration of ICT facilities and eventually sourcing. In other, in the main highly information-dependent organizations, the CIO has become a true partner in strategy. Some other organizations, wrestling with customer satisfaction and flexibility, have CIO’s who are predominantly dealing with the lower quadrants of figure 1.
- The *profile* diverges, not always parallel to the job description, from a general manager with an affinity for ICT issues to an (ex-) ICT manager with an affinity for business issues. It should be obvious that a modern CIO should bring his wide domain expertise to the job. It is further clear from the discussion in the previous sections that special knowledge and sense of specific (ICT-independent) information issues is a growing requisite for future CIO’s.

Some organizations simply call their IT manager (the CTO) their CIO; it should be apparent from the previous discussion that this is not only confusing but, more importantly, inconvenient for organizing the *demand* side of their information services. Organizations without a clear vision on the CIO function expose themselves to a double risk: (a) the mere existence of the function blurs the fact that IM is, after all, a much broader general management responsibility (“the CIO as the new loincloth for general management”) and (b) the function appears high in the list of “responsibility: yes, authority: hopefully, power: no”. In both cases, CIO effectively stands for “Career Is Over”!

The integrative framework allows to offer a graphical interpretation of the different *roles* of the CIO (and his team) as the primary responsible for IM in an organization, as is done in figure 4. The natural “operating base” of the CIO is the strategic information/communication domain (top level of middle column). From there, we can derive the following global roles for the CIO:

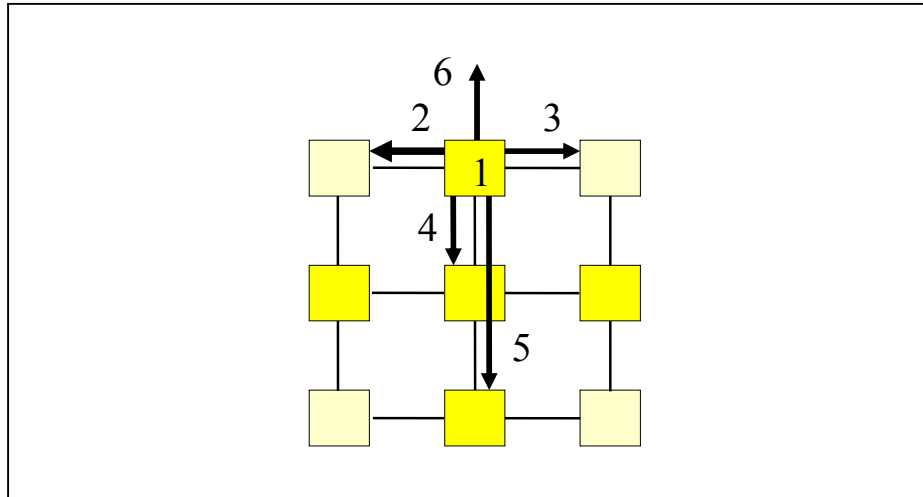


Fig. 4: the different roles of the CIO

1. *Information strategist*
The direct area of responsibility for the CIO. Central to this role is the definition and control of the information strategy, taking into account the business requirements and the ICT opportunities. Here, fully exploiting information as a business resource is vital. Outlining the organization of IM itself is also part of this sub-role.
2. *Co-creator/advisor business strategy*
In information-intensive organizations is the CIO co-defining and co-structuring the business strategy, where his primary line of approach is strategically making the most of the information factor and of the business opportunities and risks of ICT. He can do this as a member of the Board or as advisor to the Board, depending on the situation on hand.

3. *IT portfolio manager*
The CIO is responsible for the relationship with the (external or internal) ICT provider(s). To this end, he defines a long term strategy for ICT services and he is in charge of the control of performance and costs of the existing suppliers. As a matter of fact, he keeps up with the developments in the ICT supply market.
4. *Enterprise architect*
The CIO and his team develop the overall, integrated architecture covering the three columns of the framework. Especially the information architecture, a blueprint for the information/communication power of the organization, is asking for special attention as this is an almost always neglected domain. The CIO is ensuring a flexible and scalable infrastructure and is steering the migration planning.
5. *Business advisor*
Quite often, this role is neglected. The success of a CIO, however, is to a high degree dependent on his “peer” relationship with the business unit managers and his inspiring and coordinating power towards the information managers at business unit level. Together, they assist in redesigning business processes, developing business cases, roll-out, training etc. etc. The CIO and his team should be considered “as part of the business”, not as separate entities with separate agendas.
6. *Trend watcher*
Last but not least, the CIO keeps himself informed about the external world: he keeps a close track of developments in the use of information both at the organizational level and at the level of society as a whole, he assesses ICT developments for their true value etc.

6. Future perspectives

In the past decades, IM has grown as an integrative discipline linking business and ICT as well as strategy and operations. It has become a core activity in information-based organizations and in the information society in general. Its future will be determined by the evolving vision on the role and position of ICT and, to an even larger extent, on the very nature of its basic ingredient, information itself.

The perception of *ICT* is rapidly developing from a product into a service, as is proven by the advent of the Service Oriented Architecture (SOA) movement (Allen 2006, Marks & Bell 2006). *ICT* is getting more and more a facilitating and hidden character, thereby becoming transparent. The emphasis is shifting into the direction of the former “user” now becoming a “consumer” of *ICT* (Dahlbom 2003). In terms of Marchand *et. al.* (2000 and 2001): “information technology practices” are asking less and less managerial attention for the benefit of “information management practices” and “information behaviours and values”. This evolution is illustrated and accentuated by the concentration of *ICT* in (if so desired: outsourced) shared service centres. Metaphorically speaking: the right column of the framework of figure 2 is shifting away from the other two columns and, as a result, information/communication is becoming more a general management concern than it used to be in the past, covered as it was by the *ICT* department.

A further shift in the perception of *ICT* is determined by its infrastructural nature. Many information processes are crossing the borders of organizations; we call it supply/value chain integration, process integration etc. The information infrastructure involved is supposed to support these interdependencies (Wisse 2007). The likely consequence is to start from an inherently inter-organizational and even societal view on infrastructures. Despite this clear trend, we naturally continue to define IM within the boundaries of a single organization; inter-organizational IM is generally limited to cooperation at project level, a concise system of understanding and if necessary a club of information managers meeting on an occasional basis. I foresee a situation where we define IM at the level of society or at least at that of a broad common area of attention and where IM at the level of an individual organization is fitting in (instead of the opposite situation nowadays).

In addition, I am convinced that our vision on *information* is still in its preliminary phase.

The vision presupposed in IM is that of a business resource. This is basically an economic perspective: information can be traded (and becomes more and more tradable through digitalisation) and complies with specific economic laws (Shapiro & Varian 1998). More generally speaking, this is the underpinning of the so-called information economy. A distinctive feature of this type of economy is that organizations, but sectors and economies as well, derive value from the *immaterial* aspects of their activities. Terms like knowledge economy, experience economy, attention economy etc. refer to this phenomenon.

In addition to this exclusively economic perspective, one can study information also from a socio-constructivistic point of view: here, information is a social construct that derives its value from and gives value to the (subjective) context in which it is used: "*Information is not just affected by its environment, but is itself an actor affecting other elements in the environment*"; hence, information has "*an enormous power in constructing our social (and ultimately physical) reality*" (both citations: Braman 1989). As a consequence, information could be considered as a design variable both at the level of organizations and of society. From this angle, information is a source of continuous interpretation and sense making. Here too, dematerialisation plays an important role, but now pointing to a growing significance of sense making, interpersonal communication, learning processes, emotional interpretation, trust (Nevejan 2007) etc. The management of information, once in essence a management of facts, is becoming the management of mechanisms that give meaning to these facts (Introna 1997). In other words, IM can no longer concentrate itself on the delivery of data (the right column in the framework), but is becoming the management of their interpretation. IM is transforming into *management of meaning*.

Both perspectives are complementary, but at this moment apparently incompatible. Information has, e.g., in the economic perspective high fixed costs and variable costs tending to zero, whereas about the opposite is true in the socio-constructivistic perspective. When to apply which perspective is not at all an open-and-shut case, as isn't the role of ICT in this respect: too often the ICT world is pushing an objectivistic world view which can then be bought in one or another software package. Maybe we cannot solve this dichotomy at the level of an individual organization as we ultimately need "information management for society", as is also alluded to by the growing interrelationships between organizations and between their infrastructures. Indeed: "*The first decision that must be made is about the shape of the society that is desired*" (Braman 1989).

7. Conclusions

The integrative perspective presented in this article is a (possibly necessary) stepping stone for a more comprehensive view on IM. Ultimately, IM is more than the integrative discipline linking business and ICT, respectively strategy and operations of an organization. Not only has it in its very essence to do with the construction of meaning for an organization, it also contributes to the meaning of the organization for its environment: IM is about the identity of an organization (Maes 2005).

If information is as important as we pretend it to be, then the IM community cannot limit its span of attention to on the one hand the organizational level, on the other the way in which we produce information. Knowledge regarding information, communication and ICT must be brought together in harmony with sense making, societal and ecological visions in order to be able to clarify the question of acceptability of business practices. One important step in this achievement could be the combination of the economic and socio-constructivistic perspectives on information. For this to happen, researchers and reflective practitioners should fully cooperate; together, they can devise a common frame of concepts, not only bridging the gap between both perspectives, but also between theory and practice.

Knowledge of ICT is, given the ubiquitous character of ICT, absolutely indispensable for CIO's and information managers alike, but as absolutely insufficient. After all, information governance is more important for their success than ICT governance, superior information use more important than increasingly sophisticated information production and understanding organizational and societal ambiguity more important than understanding technical complexity. Still, their attitude and their behaviour are more vital than their knowledge: successful information managers are "infopreneurs", hyper sensitive to the disclosive nature of human activity, contributing to the reconfiguration of their organization's and society's practices and embodying this in their professional and personal life (Maes 2005).

Sensitivity to context, to relationships, and to consequences are key aspects of the transition from mindless development to design mindfulness (Thackara 2005). Mindful IM should be responsive to the justified aspirations of all parties involved, mindful information managers should feel responsible for the outcomes of their interventions. The aim of IM is to deliver value to people, not to deliver people to systems. This appeal for mindful IM may sound naïve and for some even illusory, but isn't CIO for a long time the acronym of "Chief Imagination Officer"?

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