

Chapter 2

An Information Management Approach Emphasizing on the ‘I’ in IT

Abstract In Chap. 1, issues related to Information Technology Business value were explored. In doing so, issues related to the impact of IT on organizational performance and competitive advantage were analyzed. Moreover, Chap. 1 introduced the relation between Information Technology and Information Management. Chapter 2 continues the discussion on information management and it pays attention to Information. Information and the mechanisms for delivering it are the glue that holds together the structure of businesses. This chapter explores also the evolution of information management as well as issues initially introduced in Chap. 1 and related to organizational performance. In an attempt to better analyze these issues, Chapter 2 reports three different approaches namely: (a) IT-centered approach, (b) Information-centered approach and (c) People-centered approach. In addition to these, Chapter 2 introduces Knowledge Management and knowledge management practices.

Introduction

Imagine the Information Technology (IT) industry passionate about delivering the right IT solutions to their clients. In this industry, hundreds or thousands of magazines, books, web sites, and even television channels, covering and celebrating the latest technological innovations in the IT industry. Conversations dominated by the issues of whether ‘X’ company technological solution is more effective and efficient than ‘Y’ company. IT companies invest millions, billions and even trillions to connect all their technological devices and to ensure that their network reaches every desktop, every home office or possibly even every car. Perhaps among others one particularly significant issue is overlooked in the IT industry – Information.

Is this information consistent and transparent – or can it be considered as good information? Due to technological advancements and the wide dissemination of information, many companies suffer from information overload. Thus, they need to

apply Information Management (IM) to deal with this information chaos in the digital world. Most of the time, this information is stored in computer hardware in an unorganized way, spread in databases, rendering access to relevant knowledge difficult, and compromising employees' productivity on their daily activities.

Consequently, many several business enterprises lack a global view of their own data and information – thus, it can be said that information technology outshines information itself in the real world and or good information is rarely synonymous with advanced IT. As a result, it is time to focus on the 'I' rather than the 'T' in the world of business IT.

The indications of the obsession with technology are everywhere. Companies and consumers spent several billion dollars a year on IT. About half of the capital expenditures in the US go to IT. Information Systems (IS) departments in corporations focus very nearly exclusively on acquiring, connecting and maintaining computer hardware, software and communication networks.

What is the aftermath of this obsession? The return on their investment is depressingly unsatisfactory. Even the most rigorous economists have difficulties in finding correlations between IT spending and yield, profits, growth, revenues or any other measure of financial benefit. Surveys of several managers suggest that they feel the information they get today is no better and consistent than it ever was.

Since companies have many technological solutions, they tend to drift towards the form of information that is most easily addressed with it – that is highly structured transaction data. Companies gather automated data on almost every aspect of their operational activities and new enterprise systems are particularly effective at processing and gathering structured transaction data. However, this structure data cannot be considered as information and or is rarely transformed into information and knowledge.

The transformation of data into something much constructive requires substantial human consideration with concentration and intelligence but most companies view the issue only in technological provisions. Terminologies such as data, information, knowledge and intelligence also often generate legitimate scepticism. For example, these terminologies are recurrently used loosely and as though they are interchangeable. Figure 2.1 illustrates the possible association between data, information, knowledge and intelligence.

Whatever the detailed explanations, they represent a spectrum ranging from single facts, numbers, signals about human events and activities, through more organized and meaningful concepts. These concepts contain facts, relevance and purpose or human interpretation and contextualisation of data in a given context (information), to concepts that comprise real reasoning. This reasoning allows new information to be generated. It can only reside in one's mind and is the result of human experience and reflection. The reasoning is based on a set of beliefs that are at the same time individual and collective (knowledge) and lastly, intelligence as a more active component than data, information, or knowledge.

It is the application of knowledge expressed in principles to arrive at prudent, sagacious decisions about conflicting situations or in simple terms as the ability to understand and to apply knowledge. In the subsequent section, this chapter does not

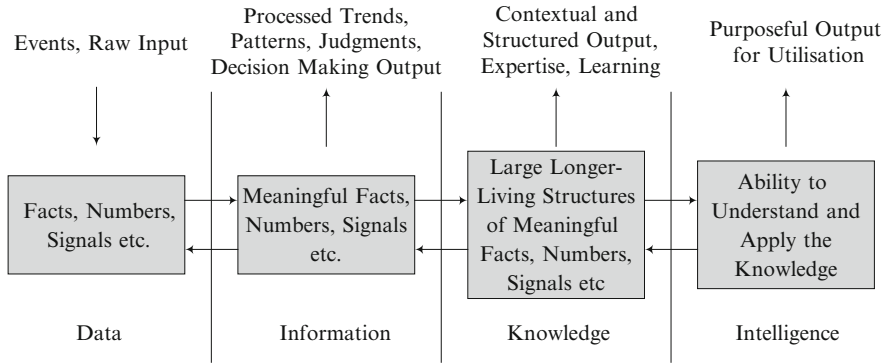


Fig. 2.1 The links between data, information, knowledge and intelligence

focus on illustrating the differences between different terminologies but seeks to review the information management literature and its approaches in emphasizing the importance of ‘I’ – information in the business IT world. In addition, reviewing the knowledge management literature and identifying different variables through which the knowledge management practices can be analysed. The chapter commences the debate by focusing on the role of information as an organizational resource to defining and explaining information management and its approaches to define and analyze Knowledge Management (KM) practices through different variables.

Role of Information as an Organizational Resource

The word ‘information’ is often used to signify what is processed and provided by the computers and other electronic devices and in turn provides a certain meaning in some context for its receiver. That is, when information is entered into and stored in a computer, it is generally referred to as data. After processing (e.g. formatting, editing and printing), output data can again be alleged as information.

It can be said that information as a concept bears a diversity of meanings, from everyday usage to technical settings. The concept of information is closely related to the notions of constraint, communication, control, data, form, instruction, knowledge, meaning, mental stimulus, and pattern. The aforesaid observations illustrate that information is a resource on its own that can be managed, as well as an asset to others.

On the other hand, the role of information as an organizational strategic resource can be considered in three areas: (a) to make an impression of change in an organizational environment, (b) to generate contemporary knowledge for transformation, and (c) to make decisions about the courses of action. These seemingly manifest processes are in fact corresponding pieces of an outsized canvas, and the

information behaviours analysed in each approach interleave into a richer rationalisation of information use in organizations.

For example, taking into consideration information as a strategic resource for an organization, can be compared with capital – a relatively equivalent ingredient of success (to information) and as another significant resource for an organization. Like capital, information is received or acquired and transmitted or utilised in and out of the organization.

Organizations can be 'information affluent' or 'information deprived' and organizations have set rules that constraint as to how information can be manipulated. Conversely, there are also discrepancies between information and capital resources. There is a general conformity as to what constitutes capital amount for an organization. With capital, there are constraints, such as when organizational associates are given a certain amount of budget of a clearly defined size.

Organizational accounting information systems and budget holders can keep track of each financial transactions. If for say, the chief executive officer or the finance director are the budget holders, they can keep track of the amount of capital spent and the residual. They can estimate how much will be needed for planned disbursements and or identify what amount of capital they 'own' and distinguish their capital from 'owned' by others. By contrast, what constitutes information can comprise almost whatever thing.

For example, a packaging assistant notices that an invoice is not attached to the completed order and informs his/her senior warehouse manager, a shop assistant while receiving their weekly product deliveries finds out some missing items in the delivery but highlighted in the invoice and tells the delivery driver for missing items – this can be termed as to have and provide *information*.

Anderton (1991) also gives some useful examples which illustrate that there are subtleties associated with the idea of information and its communication with others. For example, a motorist is travelling at 30 km/h. The speedometer indicates 30 km/h. Does the motorist have information about his/her speed? Apparently, yes. But actually the mechanism is stuck and although the indication happens to be correct, *the driver receives no information*.

Another instructive example is that – a traveller plans to fly to another country but can do so only if s/he is free from smallpox. S/he has some medical tests in the afternoon and arranges with her doctor that if the results are positive the airport desk will be called before 5 p.m. At 5 p.m. s/he checks with the desk and finds that no message has been received. S/he thus receives the information that s/he is free of smallpox. Yet *no physical event has occurred*, nothing, apparently, has carried the information.

These examples illustrate different types of information, much of it there for anyone to collect. The aforementioned conceptions illustrate that information can be regarded as formal (and or informal), compressible (and or expandable), substitutable, textual (and or pictorial), transportable (and or storable), diffusive, shareable, quantitative (and or qualitative), verbal (paper based and or electronic) and individual (and or aggregate).

The list of information dimensions although may be comprehensive, but it also suggests that an effective approach to information management must be sufficiently broad and flexible to cater for all these different dimensions of information. Information management is too all pervasive and diffusive to be subject to normal management practice. But information can be effectively and efficiently managed.

From Information to Information Management

Information is a fundamental constituent of nearly every activity in an organization, so much so that its function has become translucent. Without a firm grasp of how it creates, transforms and uses information, an organization would lack the coherent vision to manage and integrate its information processes. While it is also factual that most of the organizations rely on several different information technologies to support their information processes, managers may be aware that there is also a large amount of information and knowledge that is not captured by or represented for example in computer-based information systems.

In this regard, managers in particular should make decisions and choices about their potential future operations appropriately. Recurrently, the decisions made by the managers are based on imperfect information and this is due to the unavailability of complete information in due course. *What may be considered necessary here?* – In such situations managers must use their accumulated knowledge and expertise to evaluate and deduce imperfect information in choosing the best course of action in the light of their organizational objectives. In most of the organizations such decisions made by the managers will be supported by information of varying degrees of accuracy and usefulness gleaned from the organization's information systems. However, all such systems have fundamental limitations (e.g. lack of seamless interoperability of systems and not able to provide consistent information).

It is conceivably, thus, that the majority of information that managers draw upon is not embedded in computer systems – rather, it is principally in the minds of the employees. This is particularly the high-level information that is knowledge about the information that resides within the organization. Examples of high-level information (i.e. knowledge) might include knowing:

- Where to find the required internal data,
- Who may be responsible for a specific information (does the responsible person have the ability to comprehend the information?)
- Where to source external information in order to prepare a financial report
- Who in the organization last tackled a similar problem that you are asked to solve.

It has long been recognised that the majority of managers acquire most of their information by having conversations with people, either face-to-face, or exchanging informative views through communication devices i.e. on the telephone.

This reflects the fact that, although managers do deal with some relatively well-defined and structured issues (e.g. planning budgets and other financial matters), many of the issues that they deal with are poorly structured. It has also been noted that most managers have little understanding of: (a) how people relate to information and (b) what type of information people do need. Even those managers that understand the human side of the information do not necessarily act upon their knowledge.

As US consultant and author Tom Peters once noted, success in managing information is 5 % technology and 95 % psychology – but most companies do not even spend 1 % of their information management time and expense budgets on psychological or human issues. Perhaps, the reason why organizations do not really manage information is that there is lack of appropriate managerial skills and awareness of what life would be like if they did. Managers do not know what approaches to take or what benefits would result.

They have possibly never seen examples of focusing on information rather than technology. In other words a manager's life is mainly about shades of grey rather than black and white. Such gradation is typically lost when information is put into writing or stored in a computer. But people are highly skilled in conveying such information, not only with the words they use but also by their tone of voice, their facial expressions and even their bodily gestures they adopt. Because it is difficult to express and communicate to others, and practically impossible to express in any code, implicit knowledge is difficult to represent in computer systems. Information that is not captured in computer-based information systems is especially relied upon decision-making processes. Information is also fundamental for business strategy, not only in industries based on information, but more broadly in every industry.

Organizations and other administrative bodies have looked for ways to process and manage information in an organized way, just as they processed and managed raw materials to produce goods, as from this interpretation it can be said that the ultimate goal of information management is to ensure that information is stored and retrievable.

Information Management Evolution

The concept of data mining or extracting specific data from huge fields of information is usually used along with information management. This allegory highlights the beginning of the industrial revolution in Europe. Industrial economic growth expanded and companies increased in complexity. One of their first issues was to record and transmit ever-larger and increasing amounts of information. Given the simplicity of technology availability at that time, solutions tended to be manual. In retrospect of this view, since the end of the nineteenth century, information management has tried some conceptual and practical changes.

Until the 1980s, information management passed through seven different stages. In the first period, the dilemma was the physical control of information containers

that, after the turn of the century i.e. earlier in the twentieth century, tended to mechanisation, simplification, and replication of these information containers, originating the first efforts to control the proliferation of information containers, essentially on paper. The 1920s and 1930s saw the third stage of records management, focusing on information containers management in a more organized and wider perspective.

With the advent of the computers in the late 1930s and early 1940s e.g. the well known examples are the Electronic Numerical Integrator and Calculator (ENIAC) built by John Mauchly and J. Presper Eckert at the University of Pennsylvania in 1943–1946, Eniac weighing 30 t and eventually developing the first commercial computer – Univac in 1951, began the fourth stage, represented by the management of automated information technologies. The fifth phase was characterised by information explosion and use of computers and other technologies such as microfilms, microfiches, punch cards, and optical devices. At the end of the 1960s, the idea of management information systems evolved and constituted the sixth stage of information management.

Dias (2001) referred information management as a transformation process of data into information used by the decision hierarchy of an enterprise. Management Information Systems (MIS) is able to supply more consistent information to decision-making, providing a contextual view of the present and the past, and allowing top managers to elaborate more realistic prognostics.

MIS can improve productivity and quality, reduce operational costs, decentralise decision-making process and facilitate information access, among other benefits. In the 1970s, information management was often termed as information resources management, an innovative strategy for managing relevant and necessary information in an organization. Most of the modern companies are experiencing this seventh stage of information management, although a new concept has already appeared recently – knowledge management – the eighth stage of information management.

In classifying information management, academics, intellectuals and scholars have traditionally defined information management as the process by which relevant information is provided to decision makers in a timely manner. It has become an important tool that helps build organizational competitive advantage in today's globalised and turbulent environments.

Information management can also be seen as the conscious process by which information is gathered and used to assist in decision making at all levels of the organization. This definition illustrates several points of interest. First, true information management is a conscious process. Information management just does not transpire. It has to be envisaged or thought about.

This implies that it has to be planned, systematic and structured. A second point is that the purpose of information management is to assist in decision-making. Information is not gathered for its own sake (although that sometimes it seems to be the case), but it is gathered to be used. Information management therefore works best when the conscious planning process not with information but with the decisions those have to be made. However, although information assists

decision-making, it should not determine totally what decisions are made. The scope for professional expertise, intuition and discretion remains.

The third point is that information management is for the benefit of all levels of an organization. In many organizations, information management is often perceived as being a control mechanism for the benefit of senior managers or shareholders. Information management should be as much about aiding decision making across and between all levels of the organization as it is for senior planners and decision makers. A final point is that information management is as much about paper-based systems, or even human voice-based systems, as it is about technology-based systems.

It is a popular misconception that information management is only concerned with information technology management. Over the last 4 decades, the rapid expansion in the use of IT has created a raft of management concerns with respect to the use of this new technology. While it is true that some of these concerns form part of the information management agenda, there is a plethora of wider issues concerned with managing broader information resources which transcend the narrow focus on simple technology management. Table 2.1 highlights some of the definitions with some different perspectives on information management in the normative literature.

Based on the definition of Rowley (1988), Butcher and Rowley (1998) proposed the '7 R's model of Information Management'. In this model, the 7R's represent the information cycle, from information reading to recognition, reinterpretation, reviewing, release, restructuring, and finally, retrieval as depicted in Fig. 2.2. This cycle may be observed in any information environment, including digital world. The corporate portal, in its wider conception, is considered a tool that satisfies the whole information management cycle, because it incorporates technologies, which are able to implement, individually, each one of the functions mentioned, from information reading to information retrieval.

The *first phase* of the information management cycle occurs when a person reads and acquires relevant data recorded electronically in documents, e-mails, web pages, reports. Such data is presented by the corporate portal web interface on the computer screen. Once read, this data becomes information and is absorbed into the cognitive framework of each person. Information is then converted into subjective knowledge, when the contents of the document read match the user's concepts during the cognitive process (*Recognition phase*). The next phase entitled *Reinterpretation* occurs when subjective knowledge is transcribed to another document, becoming public. This transcription, in the digital world, can be facilitated by word processors, spreadsheets, presentation software, etc., which are stored in or retrieved by the collaborative processing component of the portal.

The following phase, *the Reviewing*, is the validation or evaluation of what was transcribed by an individual, and may be supported through office automation and groupware software. Groupware users are able to suggest changes, correct mistakes, cite other authors, establish links to other documents that deal with the same subject, etc. Once validated by the group, knowledge reaches public domain during the *Release Phase*, that is, it becomes widely available to any person of that

Table 2.1 Information management definitions

Definitions	References
IM relies on codified knowledge (symbols, standards, and algorithms) to represent information entities that allow process automation, decision-making, information retrieval, etc.	Cronin and Davenport (1991)
IM is able to identify, coordinate and exploit information entities in an organization, using the characteristics of these entities to add value to existing information and to gain competitive advantage over competitors	Taylor and Farrell (1992)
IM is used as a synonym for information systems, information technology, data management, systems engineering, among other expressions. In fact, information management is more than that. Modern information management uses information technology, cybernetics, systems engineering, concepts of information and computer sciences, management information systems, engineering, office automation, business and management principles, to plan, manage and control one of the most important resources for survival of an enterprise on the current market Information	Dias (2001)
IM a discipline that includes organization-wide information policy planning, development and maintenance of integrated systems and services, optimization of information flows, and harnessing of leading edge technologies to end-users requirements, regardless of their status or role in the organization	Rowley (1988)

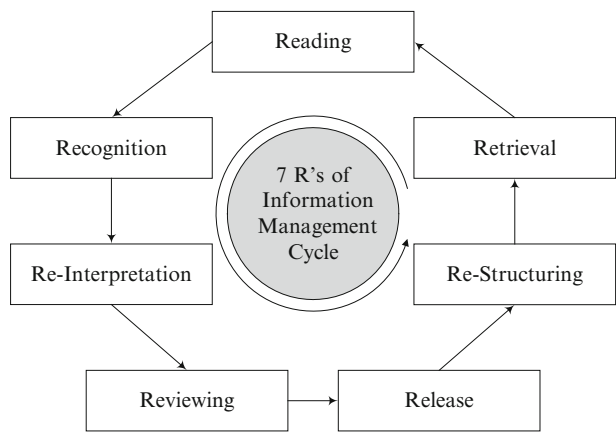


Fig. 2.2 Information management cycle (Adapted: Butcher and Rowley 1998)

community. This knowledge release or distribution, inside the enterprise, may be conducted through its internal communication network or Intranet, e-mails, virtual journals, electronic news bulletins, etc. When using a corporate portal, the *Release phase* takes place via its personalised web interface available through the Intranet.

The enterprise that maintains this knowledge domain certainly needs to manage this set of resources, selecting, collecting and providing access to the information considered relevant for its business goals. In a medium-size or large enterprise,

besides textual documents, it is usual to generate and store the daily information manipulated by enterprise personnel in operational databases, using different kinds of systems, applications and transactions. For business decision making, however, the information considered relevant and strategically is extracted from these operational databases and loaded into the decision processing system, that is, it is reorganized or restructured, by extraction, transformation and load tools into the data warehouse.

The data warehouse is a great repository of data, whose purpose is to support the strategic decision-making process in the enterprise. Precursors of this technology the data warehouse is a subject-oriented, integrated, time-variant, and nonvolatile collection of summary and detailed data used to support management decisions. Its main goal is to satisfy the users' needs, storing useful and relevant information for business management.

Finally, the *Retrieval* of relevant knowledge to each user, available on this collection or repository, may be carried out by ordinary retrieval tools such as:

- Customised tools, focusing the real needs of the users
- Tools that use metadata and eXtensible Markup Language (XML)
- Business intelligence (e.g. intelligent systems that help companies in their strategic planning process)
- Analytical tools that compose the portal decision processing system, capable of generating reports and analyses to be distributed to users through corporate network, e-mail or portal web interface.

Improving Company Performance

Many senior executives have a decidedly negative opinion of the relationship between IT and business performance. They are dissatisfied with the investments and practices related to IT and information used in their companies. Ironically, this stream of dissatisfaction runs alongside widely held expectations that IT has the potential to transform economies, industries and businesses. Over the past several years, many surveys in Western Europe and North America have shown that the main concern of Chief Information Officers (CIO) – the senior managers responsible for IT in their companies – has been the alignment of IT investments with corporate strategies.

At the same time, senior executives have been concerned with getting business results from their investments in IT. Neither group seems to have found what it is looking for. Economist attempt to explain this gap as the “IT productivity paradox” – companies spent billions on IT worldwide with no clear link to improved macro-economic productivity or business performance. Marchand et al. (2000) have uncovered three different approaches of how IT and information use may be linked to business performance such as the: (a) IT centered approach, (b) information-centered approach and (c) people-centered approach. These approaches are explained in the following sub sections.

The IT-Centered Approach

Ironically, the most widely held view is that IT practices will increase business performance if IT priorities are properly aligned with the business and if the IT function works effectively with the business to deliver IT applications and infrastructure. Senior managers expect IT to improve business performance in four key ways:

First, IT should improve the efficiency of business operations. Most manufacturing companies are busily upgrading their software and systems in finance, manufacturing and distribution. This is being done not only for the sake of Y2K and Euro compliance but also to increase operational control, speed, and flexibility with the customers.

Second, IT should improve communications in support of smoothly functioning business processes. For example, companies such as ABB and General Electric are using collaborative software and networks to improve networking and information sharing among employees in diverse locations. They are also using advanced technologies to link their business processes with suppliers, distributors and customers.

Third, IT should facilitate managerial decision making by providing appropriate information for market forecasting, managing business risks, spotting new customer trends or simply helping people to locate and share knowledge. While the history of executive information systems and decision support systems has been mixed, many senior managers continue to feel that using IT in support of these applications will improve decision-making and business results.

Finally, IT should support innovation in new product and service development and facilitate growth and new initiatives.

The Information-Centered Approach

Senior managers who subscribe to this view contend that good IT practices are necessary but not sufficient to improve business performance. They hold that careful attention to the ways in which information is sensed, collected, organized, processed and maintained is also essential to improving both IT and business performance. According to this view, the way that people turn data into information that can be used to improve customer relations, product innovation, sales, marketing, operations and financial control is critical to improved performance.

In case this view is correct, managers need to examine more carefully their information practices. At the center of this view is the perception that a company's information practices are critical for turning data into information knowledge to improve performance. Many managers who are interested in knowledge management are supporting efforts to accelerate the use of information, knowledge and expertise in their companies to obtain business results.

The People-Centered Approach

For this approach, executives believe that the main reasons why IT has not lived up to its many promises or why information and knowledge are not shared, come down to the way employees behave and to the company's cultural values. If the company is becoming more dependent on sharing and using information and knowledge, then senior managers should pay careful attention to the cultural values and behaviors associated with information and IT use in their company. When it comes to information management, companies try to increase their information endowments using three different mechanisms such as: (a) data mining, (b) signaling and (c) screening. These mechanisms are explained in the following paragraphs.

Data Mining

Contemporary organizations are inundated with data. However, they have little information, even less knowledge, and perhaps no wisdom. Several companies simply hold data in record or archive format, thus, potentially. Valuable information hidden within these databases remains untapped. The absolute volume of data held in corporate databases, in particular, is already too great for manual analysis and understanding, and as the information within them grows, the problems are similarly compounded. Previously, organizations failed to solve business problems due to the deficit of available data, however, to date the problem has been reversed, as there is a plethora of obtainable data in many of modern organizations.

Manufacturing environments are extremely costly and time-critical locations in general, as a result of the difficulties in maintaining process control and identifying parameters responsible for variance. Similarly, a vast amount of data, information and knowledge is collected on each individual manufacturing operation, generating a complex information management situation within the scenario. Accordingly, the challenge is to find ways of distilling and managing these large volumes of data and transforming them into valuable information and additionally exploring the use of techniques to improve information and process management to maximise manufacturing benefit.

Data mining mechanisms possess the potential to enhance process improvement, information management and communication within the manufacturing environment of this case study, on a global basis. For example data mining, finding meaningful patterns in a torrent of data, already plays a crucial role in the algorithms behind the Google search engine.

Improving process control to enhance performance, ameliorate product quality and increase productivity is an important consideration within any manufacturing industry. Accordingly, it is critical to find efficient methods of both performing and achieving this insight. For example, in a case study by Gibbons et al. (2000), the fabrication and production of components carried out within the manufacturing

facility required a vast number of complex and meticulous processes. Such extensive manufacturing operations are often carried out in clean-room environments and employ continuous quality and precision controls. A major difficulty with process control in the manufacturing industries in general is the extensive quantity and complexity of data and procedures involved within the fabrication process.

Often, process data is collected from more than one database. Hence, problems analysis and decomposition are laborious tasks. The complexity and magnitude of operations performed in the fabrication process, inevitably impacts information management and process control, making them cumbersome procedures. Current methods of process management employed within the manufacturing consortium, such as the Statistical Process Control (SPC) and feedback control models, have proved to be inefficient in providing adequate information management and process control improvement. This has caused a reduction in product quality and productivity within the individual plants in this case study, as engineers are unable to exercise controlled changes due to the limited real-time framework involved. As a result, temporal and monetary detriments have increased in this high cost, time critical environment. The current situation within this domain area highlights the need for new process improvement and information management methods. Thus, it can be said that data mining entails looking for patterns in detailed data that may be correlated with customer profitability or with changes in profitability.

Signaling

Signaling actions are performed by potential customers to indicate their profitability or desirability. For example, a couple who have a small child and who want to rent a furnished home might volunteer to pay a double – or even triple – sized security deposit to signal their confidence that they are unlikely to damage the house or its contents. In another illustration, Akerlof (1970) showed in his classic lemons example that in a situation where buyers could not ascertain the quality of products (e.g., certain used cars markets), markets would collapse because of buyers' eventual reluctance to buy.

Spence (1974) demonstrated that in such markets, reestablishment of effective exchange could be achieved if 'above-average' quality product sellers could engage in some costly effort to signal their quality to the market. Such signals are important because of their information content. They reveal information about unobservable characteristics to an uninformed agent. Thus, Spence considers signals as those "activities or attributes of individuals in a market which by design or accident, alter the beliefs of, or convey information to, other individuals in the market" (Spence 1974, p. 1). For these signals to be effective, they have to provide information about the quality of the unobservable attribute(s).

Screening

Screening mechanisms are in many ways similar to signaling, except that they are designed by the seller. If the screening mechanism is properly designed then the buyer's selection of a particular action or package of options will correctly indicate his or her profitability to the seller, and will permit accurate pricing. The normative literature highlights a classic example of screening mechanism is differential pricing of insurance coverage on the basis of policy exclusions and the size of deductibles. The idea is that a customer willing to accept a high deductible of £400 or more is signaling a sincere belief that he or she is unlikely to be involved in a traffic accident. Screening provides an incentive for customers to reveal their desirability to the company accurately through their selection among product and service offerings. Ideally, the bundle of offering should be designed so that all customers would be profitable under the terms of the offerings they selected.

From Information Management to Knowledge Management

Moving from information management to knowledge management is far from being well-articulated in the normative literature and this is compounded by the confusion around the concepts of information and knowledge. According to Koenig (1997), there is no consensus regarding the claim that knowledge management is a new field with its own research base, since much of the terminology and techniques used, such as knowledge mapping, seem to have been borrowed from the area of information management and librarianship. Knowledge management is considered by some as the business salvation.

On the one hand, Gourlay (2000) presents knowledge management as an emerging discipline from information management. The knowledge management expression was created in 1986 by Dr. Karl Wiig in his book on, *Knowledge Management Foundations*. On the other hand, other authors, claim that companies and information professionals have been practicing for years on knowledge management related activities.

Streatfield and Wilson (1999) argue that the concept of knowledge is oversimplified in the knowledge management literature, and they seriously question the attempt to manage what people have in their minds. Nevertheless, there is a real interest and enthusiasm in moving from information management to knowledge management as revealed by the increasing number of publications relating to the topic since 1995.

Looking at the business community, there is also a strong interest for knowledge management. A survey conducted in 1997 related to 200 large US companies revealed that 80 % had knowledge initiatives (KPMG Consulting 2000). Technological innovation has been cited as a major reason for the current interest in knowledge management. In the high-tech sector, as well as consulting firms, the

stakes are particularly high because knowledge is considered as perhaps the only meaningful economic resource.

Private sector organizations are not the only ones embracing knowledge management. The systematic sharing of knowledge is assuming a larger role in all kinds of organizations around the world. Some of the recent knowledge management initiatives in the United Kingdom (UK) include the creation of the post of knowledge officer at the British Council and the appointment of a Chief Knowledge Officer (CKO) at Natwest Markets. Claims of the potential benefits of knowledge management abound and range from improving productivity, decision making, customer service and innovation.

Davenport and Prusak (1998) report that although many knowledge management programs are acknowledged in the business literature, what is actually entailed in these programs remains indistinct and ambiguous as there are several interpretations of knowledge management. Recently, the lack of a clear distinction between information management and knowledge management has been recognised as a major issue in the knowledge management literature.

Gourlay (2000) suggests that knowledge management practices focus mainly on knowledge representations not on knowledge per se, making the distinction between information management and knowledge management even more blurred. There is indeed a fine line between information management and knowledge management at both the conceptual and practical levels.

Defining Knowledge Management: A Good Information Management or Another to Information Management

In the Post-Industrial economy, sometimes termed the knowledge economy, the concept of knowledge management has become an emerging discipline that has gained enormous popularity among academics, consultants and practitioners. It has been argued that it is no longer the traditional industrial technologies or craft skills that drive competitive performance but instead knowledge that has become the key asset to drive organizational survival and success.

To the uninitiated reader, the multitude of offerings on knowledge management in books, journals and magazines can appear rather daunting and confusing at first. The fact is that it is a relatively young discipline trying to find its ways and reorganizing that it has roots in a number of different disciplines. The normative literature on knowledge management is heavily information systems oriented, giving the impression that it is little more than information management.

Other literature looks more at the people's dimension of knowledge creation and sharing, making the subject more akin to human resource management. These are the two most common dimensions and there is often little cross over between them. Each world fails to comprehend the other as the language and assumptions of each

Table 2.2 Knowledge management definitions (Source: Jashapara 2004)

Definitions	References
Knowledge management draws from existing resources that your organization may already have in place – good information systems management, organizational change management, and human resource management practices	Davenport and Prusak (1998)
... any process or practice of creating acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and performance in organizations	Swan et al. (1999)
The explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organizing, diffusion, use and exploitation, in pursuit of organizational objectives	Skyrme (1999)
... all method, instruments and tools that in a holistic approach contribution to the promotion of core knowledge processes	Mertin et al. (2000)
The achievement of the organization's goals by making the factor knowledge productive	Beijerse (2000)
... improving the ways in which firms facing highly turbulent environment can mobilise their knowledge base (or leverage their knowledge "assets") in order to ensure continuous innovation	Newell et al. (2002)
... the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environment to enhance and organization's intellectual capital and performance	Jashapara (2004)

discipline very significantly. However, it is precisely these inter-disciplinary linkages that provide the most rewarding advances in this field.

Jashapara (2004) highlights that given the inter-disciplinary nature of this emerging field, conventional academic demarcations in traditional subject areas do not help. For example, it is relatively rare for computer or information science graduates to gain sufficient grounding in human resource management and vice versa with traditional business management students. This impasse is often based on fear on both sides about the nature and relative merits of their respective skills and expertise. Beyond these two dominant dimensions, there are some additional prospective within the knowledge management literature. It is not surprising there is little coherency between these offerings as many authors orientate the subject area to their singular discipline prospective. Given the multidisciplinary nature of knowledge management, it is not surprising that the variety of definitions comes from a number of different perspectives, as illustrated in Table 2.2. some come from information systems perspective while others suggest a human resource perspective. Few definitions adopt a more strategic management perspective, recognising the importance of knowledge management practices for gaining competitive advantage.

From the definitions of knowledge management in Table 2.2, it is clear that any advancements in this field need to adopt an integrated, interdisciplinary and strategic perspective. The strategic purpose of knowledge management activities is to increase intellectual capital and enhance organizational performance. There is a human dimension of developing knowledge in individuals, teams and organizations

and this fundamentally occurs through different learning processes. Once knowledge is created, the sharing of knowledge remains one of the fundamental challenges in this field. As human beings, we need support to help us explore and exploit knowledge (tacit – knowhow – and explicit – knowwhat) more fully. There is a wide variety of tools, technologies and systems that can fulfil these functions, such as the continuous cycle of knowledge creation, capture, organization, evaluation, storage and sharing. Knowledge management tools and organizational processes are insufficient in themselves to achieve success.

Knowledge Management Practices

Despres and Chauvel (2000) illustrate that knowledge management practices can be analysed taking into account four different variables: (a) the process of cognition, (b) the type of knowledge (tacit or explicit), (c) the level of activity (individual, group or organizational) and (d) the context in which the knowledge is applied. These variables define a map on which company's activities can be plotted. Moreover, companies can use the map to understand their position and identify future developments.

Process

Though does not spring into existence out of nothing, it is the result of a series of factors that come together over time. Of course, cognition is a highly interconnected, multi-causal process but it can be simplified to extract the issues relevant to knowledge management. Despres and Chauvel (2000) report that various strands of the cognitive sciences have untangled the complexities of their subject by outlining a process of cognition that is, the critical steps and elements that lead to the accomplishment of some act. In extracting a synthetic process appropriate to the concerns of knowledge management, it is possible to specify an event chain that – from a linear and structural perspective. While this representation greatly simplifies the interconnected and multiply-causal nature of cognition, it appears to fit many of the issues addressed in this field. Despres and Chauvel (2000) defined six key events in the process of cognition as below:

Mapping: Individuals and organizations function within information environments of their own making. Most agree with the truism that we scan for information but fewer acknowledge that (a) these environments are actively constructed and (b) they are multiple – not singular. This has important implications. If a formalised business intelligence system monitors Environment X, for example, the weak signals in Environments Y and Z are likely to be absent from the radar screen. Recent history suggests that this can be disastrous. There is a

balance to be struck between divergence (which can be costly) and convergence, which focuses attention on a delimited field.

Acquire/Capture/Create: From these information environments, information is corrected or combining the elements that are judged valuable. This has feedback and feed forward loops with the *mapping* phase since much of what people search for at Time 1 is what they expected to find at Time 2. A large part of the creativity literature is centered on developing new inputs during this phase by opening horizons in the former. A significant body of research that investigates the filtering and distortion of information, which is pertinent to this phase, is also finding its way into knowledge management.

Package (or bundle): At a mundane level this involves the media that bundles information such as paper, electronic, voice, multimedia and so on. There is obviously much to be said for the effective packaging of information at this level. More important, however, is the matter of codification and representation. Before information can be transmitted it must be codified by the author (who seeks to infuse it with meaning) and once this is accomplished, a representation is launched into a public space. Characters on a page, numbers, maps and balance sheets are all representations. The critical issue, of course, is the meaning that one extracts from them and this is anything but a given. This phase is founded in the semantics and semiotics of communication.

Store: Store individuals and organizations stockpile information in memory systems of various kinds. These range from the mysterious chemistry of synaptic response in the brain, to recipe cards, hard disks, filing cabinets, libraries and data warehouses. The identification and retrieval protocols associated with stored information are equally important: little benefit is derived from information that exists but cannot be accessed. Some of the origins of applied knowledge management are located in this phase (data warehouses, search engines) and the foci of work appear to remain technology-dominated.

Apply/Share/Transfer: Implicitly, the field of knowledge management recognises that information is inherently social. There is, in fact, no way of recognizing a stimulus as information or knowledge outside a social (not a psychological) process of some kind. This means that knowledge must be communicated and the many forms and functions of this basic fact abound in the literature like knowledge cafes, groupware, virtual teams, communities of practice, and so on. The field is also beginning to validate the notion that the value of knowledge is known only through action.

Innovate/Evolve/Transform: Finally, knowledge must evolve in step with changes in the environment, else it risks losing its value. This implicates product development programs that build on experiences in the marketplace, R&D processes that adapt basic science to a products' needs, creativity processes that broaden intellectual horizons and so on. In the language of systems theory the issue is change – the extent to which an individual or organization is satisfied to remain in stasis.

Type

The field of knowledge management struggles with the fact that knowledge is not a simple, stable quantity. Different schools of philosophy and sociology give different accounts. Currently, the importance of tacit and explicit knowledge is recognised by managers and is a subject of considerable work within knowledge management.

Tacit knowledge seems to be the primary concern of knowledge management writers and has been a great deal of discussion in the literature about its nature. Tacit knowledge is defined as action-based, entrained in practice, and therefore cannot be easily explained or described, but is considered to be the fundamental type of knowledge on which organizational knowledge is built. Although most knowledge management writers cite Polanyi (1962), who drew a distinction between tacit and explicit knowledge, they often overlook a part of his writings emphasizing the personal character of knowledge and knowing.

For Polanyi (1962), tacit knowledge cannot be expressed because (we know more than we can tell). Thus, it cannot be articulated what we know with words because we are not fully conscious of all the knowledge we possess. It resides and remains in the human mind. Polanyi (1962) illustrates this with the example of a medical student learning how to read X-ray pictures by listening to experts reading them. Exposure to empirical material and specialized language combined with the learning of medical knowledge will enable the student to become an expert, but tacit knowledge remains tacit. For Nonaka and Takeuchi (1995), tacit knowledge can be transmitted through social interactions or socialization, and made explicit through externalisation-although they agree with the idea that tacit knowledge is somewhat hidden.

Explicit knowledge, unlike tacit knowledge, is defined as knowledge that can be codified and therefore more easily communicated and shared. Knowledge management writers view explicit knowledge as structured and conscious and therefore it can be stored in information technology (Martensson 2000). This type of knowledge is often equated with information, providing the argument that knowledge management is simply another terminology for information management. The concept of information however, is far from clear-cut. "Information is a vague and elusive concept susceptible of being understood in a variety of ways" (Gourlay 2000, p. 3).

Considering that the concepts of both information and knowledge are unsatisfactorily defined and that the notion that tacit knowledge can be transformed into explicit knowledge is troublesome, some authors have suggested that the expression "knowledge management" is perhaps misleading. Gourlay (2000), for instance, argues that knowledge itself cannot be managed and it is "knowledge representations" that are the actual focus of knowledge management. Given the complexity of knowledge, the depiction of types of knowledge, such as tacit and explicit, as mutually exclusive categories might be also misleading and prevent researchers to see the interrelated dimensions involved in the process of knowing.

Level

The idea that companies have three levels of social aggregation – individuals, groups and organizations – is familiar in management studies. Individuals are the fundamental building blocks, particularly in knowledge – intensive systems, but most individuals accomplish their work in groups, using resources provided by the organization. Business management has adopted this thinking since its inception. Individuals are the fundamental reality of organization and this is particularly true in knowledge-intensive systems that draw their primary resource from the individual. Individuals accomplish work with and through others: groups confer an identity, physical and psychological resources, organizational power, and a sensemaking ground and so on.

Organizations are complex systems in which individuals and groups are the foundational elements. Even a quick review of the knowledge management literature reveals that all three levels are the object of programs and problematics. Some knowledge management applications seek to relate each of the levels while others work exclusively within only one. Separating matters at the level of individuals, groups and organizations provides greater clarity and disentangles the various approaches to applied knowledge management.

Context people and groups work within a company context. It is true that humans think and act within a context but also that (a) their thinking and action create that context, and (b) the identity boundaries we fix around legal entities are social fictions—contextually speaking—given the wide-ranging work interactions we all have. This is a complex and subtle matter. The importance of an organization's culture, for example, is increasingly cited in the knowledge management literature relative to the expectations that lie therein and the systems and structures it animates.

A deeper importance lies in the seldom acknowledged reality that nothing has any meaning outside of a context. That is to say, black has no meaning absent white, neither has any meaning apart from a color scheme, color schemes are inherently culture-bound and so on. The relevance for knowledge management is that a datum may or may not be meaningful as a consequence of its context. The implication, which has anecdotal support in the knowledge management literature, is that initiatives should begin by specifying their meaning-making context(s) and build from there. Among others, Carayannis (1999) goes a step beyond to explicitly include the stakeholders outside an organization's boundaries (industry/interorganizational context), the importance of which has clearly been demonstrated by institutional theory and elsewhere. In the discussions that ensue, several authors also recognise that the cornerstone of knowledge management is the individual, and that the organization-level knowledge is a fiction.

Context

The importance of organization's context – which influences its systems, structures and expectations – is increasingly sited in the knowledge management literature. More fundamentally, nothing has any meaning outside our context – hence,

whether a piece of information is meaningful or not depends on its context. Knowledge management efforts should begin by simplifying their meaning – making context(s) and build from there.

To introduce a broader view of the idea of context, consider Pierre Teilhard de Chadrin who at the beginning of the previous century conceptualised a web of determinate human knowledge he termed the *nöosphere* and announced that it enveloped human consciousness on Earth (1947). He beleived that this knowledge web gave substance to physical and social phenomena and that without it we were senseless as to the phenomena of gravity, rainfall, or the displacement of matter that constitute achitecture. Business is to knowledge managementbt what the *nöosphere* was to de Chadrin's concept of life on this planet. Several authors recognise that a business context anchors their knowledge management devices, but they do so differently, varying from the firm's strategy to human interaction, group dynamics and technological infrastructure.

While some clearly set the boundaries of a context, others are more elusive. That said, all make reference to the context of knowledge management in some way or the other, but because of the lack definitional agreement, it is viewed as a secondary structuring device.

Summary

This chapter focuses on issues related to the first word of the term '*Information Management*'. The word '*Information*' is used to signify what is processed and/or provided by computers and it is the result of data processing. In the first part of the chapter, issues related to information management were introduced followed by a discussion on the role of information as an organizational resource. The evolution of information management and the transition from information to information management are then presented. In doing so, the 7R's information management cycle is analyzed in detail. The 7R's refer to the phases Reading, Recognition, Re-interpretation, Reviewing, Release, Restructuring and Retrieval. The chapter also investigates the linkage between information management and knowledge management and at its last sections it reviews knowledge management practices and examines variables such as process, type, level and context.

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