1

IS Stakeholders

THE FUNDAMENTALS.–

1) Technological developments stimulate change to organizational models while at the same time changing production models.

2) The issues raised by an IS involve all human actors within organizations, because they are at the heart of every goods and services production and distribution process.

3) The interface between human actors and technical tools calls for a complex, global approach to IS.

The ubiquitousness of digital tools in both our professional and our personal environments makes the concept of IS stakeholders difficult to grasp. Indeed, a corollary of the widening scope of digital transformation is the increase in the number of stakeholders involved. Thus, when we talk about IS stakeholders, we are referring not only to those responsible for the creation and maintenance of information services but also to all users whose roles and significance have grown steadily along with the development of information and communication technologies (ICTs). By facilitating horizontal operating models, ICT has brought about a profound change in the relationships between the human actors within organizations. ICT has led to a greater decentralization of operations, a peer-to-peer operating model and a decrease (or even disappearance) of middle management who in theory are responsible for supervising those involved in production. We may have talked about the "flattening" of organizations through the generalized use of ICT, with a reduction in the number of reporting levels required. IS users (no matter what their role is within the organization) become key stakeholders in IS governance. In the same way, ICT has helped empower end users by involving them in the production of IS services. The widespread adoption of the so-called "agile"

methodologies can be cited as proof of this. But when considering IS stakeholders, we must also take into account the technological tools deployed within organizations. Because they are closely interwoven into the heart of production processes, information reporting and audits, these tools are fundamentally linked to the business activities of today's organizations. As such, these tools have the potential to influence the cognitive capacity of the human actors and to change the way they perceive their environment. It can thus be seen that the concept of stakeholders in ISs, and how to define them, is complex. After describing the development of the technological environment of IS stakeholders, we will seek to show the impact of this development on organizational management. We will then be able to start categorizing IS stakeholders and define the unit of analysis required in order to conduct appropriate IS management.

1.1. The technological environment of IS stakeholders, and its development

Four successive "technological waves" have marked out the history of IS and a fifth is on the way. In the 1970s and 1980s, the IS was centered around what we call "proprietary systems" whose application code was inaccessible to the user. Workstations were slave terminals with no local resources, connected to a central computer (mainframe or "host") on the master–slave model. This earliest period can therefore be described as "host-centric".

The years 1980–1995 were fertile in innovation. The integration of organizational IS led to new, networked patterns of work organization and production. These innovations included, for instance, the emergence of client–server (C/S model) applications. From that point on, the C/S model combined two approaches: client-centric (where resources are managed locally) and server-centric (where resources are centralized). The C/S model assumes implementation of departmental computer systems based on workstations connected to each other by a local network (the invention and rapid adoption of Ethernet technologies). The C/S model was also contemporaneous with the development of relational databases and their associated methodologies (entity–relationship model, SSADM, Prince, Merise methodology) and the advent of the first EDI (Electronic Data Interchange) applications (the birth of Business to Business or B2B e-commerce) using extended networks. The development of EDI was a precursor to the progression of organizational IS into inter-organizational IS, supporting the coordination of logistical flows of increasingly networked businesses [PAC 06].

The years 1995–2010 built upon the previous wave's widespread adoption of ICT. This marked the beginning of the network-centric era. This period was founded on the significant development of networking technologies and the commercial

coming of age of the Internet, already firmly established in academic circles. The era was characterized by the birth and growth of intranets (for internal communications and subsequently for all business processes) and extranets dedicated to the opening up of IS to external stakeholders on a massive scale (introduction of business portals). The environment became fully distributed, and the work on the internal integration of the company's IS was effected in the context of wide area networks, in terms of both technology (networks) and economics (networking), boosted by the widespread availability and massive adoption of Internet technologies. This period saw the appearance of entirely new and innovative relationships between the organization and all its stakeholders, in the form of the openness of IS and connectivity with customers (e-commerce with consumers, Business to Consumer – B2C), partners (B2B), partners as stepping stones to clients (Business to Business to Consumers – B2B2C), employees (Business to Employees, B2E), administration (Business to Administration – B2A) and so on, not forgetting shareholders and the general public, through dedicated institutional websites.

From 2010 to 2025, we will continue to see the commercial development of cloud computing. Using a combination of virtualization architectures and distributed operating models, these technologies led to growth of the market for advanced services. Packages on offer were varied and allowed for graduated outsourcing of services. The SaaS (Software as a Service) model is the best known, but other packages were available: Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). The cloud-centric period is oddly reminiscent of the initial host-centric period. There is no need for the user to have significant local resources. The service provider supplies users with all of the resources they need and centralizes them to satisfy the requirement for user integration, with the added conveniences of rolling out the service and providing basic training, which did not exist in the initial period, but which is now made possible by the higher speeds offered by telecommunications.

The next few years could see the arrival of a new type of infrastructure based on a new technological ecosystem linking Web 3.0, the Internet of Things, blockchain and Artificial Intelligence (AI). With these technologies, it is indeed possible to envisage a highly decentralized and user-centric architecture [CHO 22]. The challenge of this change is to give users back control of their private data by freeing them from the control exercised by an oligarchic set of multinational corporations and superpowers. Web 3.0 is defined as the third stage of the World Wide Web. Historically, the first stage gave the Internet user the content of web pages in read-only format. The second gave the user the power to create content (linked to tools like blogs and Wiki pages). This Web 3.0 stage is that of the semantic Web which concerns the interaction between machines and data (IoT, AI), and in which the user is the main agent for value creation and exchange. In this configuration, the user is hybrid and shaped by the complementarity of interventions among human

and nonhuman actors. Transactions are secured in peer-to-peer relationships via the blockchain.

This astonishing technological evolution, significant in terms of its vastness, its intensity and its rapidity, has had three major consequences for organizations: a profound redefinition of IS and their impact, an astonishing shift in the uses of computing and a radical change in the computer–user relationship. This is the aspect which we will now consider.

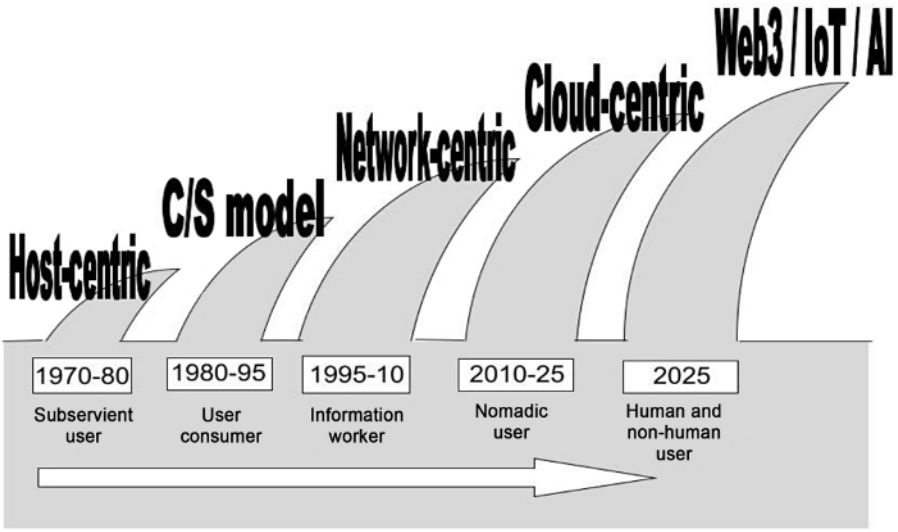

Figure 1.1. *The technological waves*

1.2. Impact of the developing technologies on organizational management

The technological waves discussed above led to IS undergoing a significant evolution in the extent of their impact at the organizational management level. The flexibility and the networking focus of IS for many stakeholders made it possible to manage far-reaching organizational change, stemming from the shifts in policy and strategy adopted by companies from the mid-1980s on: extended business strategy [ALB 09], refocusing on core business activity/activities, a new definition and structuring of the company's business activities, inter-organizational cooperation, outsourcing, offshoring, spatial redeployment of production-related activities, customer focus, seeking a higher return on capital invested and so on.

The evolution of IS is multifaceted, with these facets becoming increasingly complex. The first wave facilitated improved local exploitation and a more extensive integration of tools; the second wave supported the achievement of full internal organizational integration and led to the introduction and subsequent widespread adoption of a new set of management processes, including the appearance of extended IS. The birth and growth of extended IS are directly connected to the new policies of outsourcing and changing the company's value chain, calling for delicate inter-organizational coordination of production in an environment characterized by a fast flow economy (just-in-time, on-demand manufacturing, lean manufacturing, etc.). The setting up of extended networks (network-centric) brought the ability to embrace and sustain more radical developments, such as the redefinition of business networks (B2B, B2C, B2B2C) and the redefining of the company's spheres of operation against a background of global integration (internal and external – the appearance of cooperative IS) [ALB 12]. The most recent wave has consolidated the outsourcing of services and job specialization, developing the concept of the servitization of IS. At the same time, it is weakening local management, insofar as skilled operators are gradually losing control over developments in the environments they use. Cloud computing is another contributory factor in the form of consumerization through growing the market and massifying the range of services on offer. New forms of a collaborative economy are appearing, empowering consumer to consumer (C2C-type) models. Today, in the age of online platforms, new business models (e.g. B2C2C) are being developed and are calling the traditional models [PAR 17] into question. This is for instance the case with printing platforms for 3D engraving and artwork, where the company provides printing services and lets its designer clients liaise with buyer clients.

This evolution in the levels of impact of IS seems remarkable and is important to note, because it both leads on to new forms of value creation and to its analysis. It also brings another consequence, in that it augurs a radical and irreversible change in the area of IS. Henderson and Venkatraman show that the first two levels (local operations and internal integration) can be an incremental evolution, but the subsequent levels bring sudden change, which has implications in terms of managing this change [HEN 91; HEN 93]. However, the greater the degree of transformation, the higher the potential profit which the organization stands to gain (taking the example of Netflix which started out by renting analogue content, evolved into a streaming platform and then became a digital content producer).

In other words, the highly innovative nature of IS goes hand in hand with potentially significant value creation. The notion of breakthroughs being associated with sudden change is based on taking more notice, not of the content of the IS, but of its level of usage and the crucial significance of this level of usage. And this level of usage is linked to the relationship that exists between the user and the IS.

The first level of usage (host-centric) began with the quest for efficiency, with the processing of transactions being automated from the initial computerization of the organization (computer-assisted manufacturing – CAM), and progressed to the second level with the introduction and development of personal and group computing during the client–server era, such as enterprise resource planning (ERP) software packages. The quest for strategic efficiency in the third era leveraged networked computing (network-centric) capable of integrating all approaches so as to simultaneously serve as a powerful operational tool for users, a reporting and decision-making tool for management, and an inter-organizational cooperative tool to support the company's business processes. The growth in IS usage levels and the changes in value creation resulting from this are thus included within the three phases of the computer–user relationship characterized by three operational targets.

In the 1970s and 1980s, the operational objective was the automated processing of the organization's basic operations. The end-user was "subservient" (behaviorist and Pavlovian theories) to the IS, or at least could appear so. Between 1980 and 1995, in parallel with the introduction of client–server architectures, the notion of the subservient end user was gradually replaced by the "stakeholder" concept and made way for an individual who was part of a distributed logic, both personally and as a group, where the user ultimately becomes an IS consumer. Individual consumers of a distributed system interact more and more directly with the IS, and they can be external stakeholders. By the end of 1995, the end user was regarded as being a manager of business activities or processes whose independence was assured by the system which from this point on was dependent on them, making them an "information worker". The customer is an internal and/or external stakeholder. This approach takes into consideration the opening up of the company supported by the "network-centric" phenomenon. In this environment, organizations interact via numerous interfaces. The development of this kind of environment is connected to Internet usage. The end user is an information worker, having a more or less constant relationship with computer tools. This update of the relationship with the user operating the IS, and of the strategic nature of this customer relationship in the process of value creation, has certainly impacted on the development of Chief Information Officers (CIOs). It has strongly influenced IS managers to organize and structure their management in line with the provision of a customer-focused service. From 2010 to 2025, the cloud-centric model will continue to promote freedom of action for the stakeholders and lower the barriers to entry. Small businesses (and even individuals) will be able to access advanced applications and high-level expertise. This will upset the previous equilibrium and restimulate the potential for action at the entrepreneurial as well as the intrapreneurial level.

1.3. Understanding and categorizing the human stakeholders in IS

To categorize a stakeholder, that stakeholder must first be given a title. In the first analysis, it is interesting to note the semantic shift that has occurred during the last 30 years in the job title of the person in charge of the IS. Successively, this person has been called: "Computer Manager", "Data Processing Manager", "IT Manager", "Systems Manager", "Systems Administrator", "Information Development Manager", "Chief Digital Officer" and "Digital Technology Manager". These various job titles – and we could find other variants – cover a rise in the hierarchical positioning of the role within the organizational structure. The evolution of the IT function within organizations has in fact progressed in significant stages. Each stage is characterized by value creation connected with a specific computerization of tasks. We can identify three great strides in the historical process.

1.3.1. *The days of the pioneers*

The first step relates to the 1960–1980s. It begins with the exploratory work of the pioneers (Figure 1.2). Punched card data processing is a set of mechanical techniques which enabled companies to start the industrial processing of information. This process was based on the use of punched cards or tape in purpose-built technical devices. The head of the punched card department (PCD), later known as head of the administrative and punched card department, has staked a place in the annals of history for having automated repetitive tasks, and specifically, for establishing accounting, payroll and invoicing in a role that generally, rather oddly, answered to the Chief Accountant. By the end of this first stage, the Systems Manager had the job title of Computer Manager. On the organizational chart, more often than not, they were placed under the Finance Director. From the point of view of instruments offered by the IS, the Computer Manager implemented applications that everyone readily accepted as complex and advanced.

Value creation was then obtained by optimizing IT resources for each business function taken in isolation (sales, manufacturing, purchasing, etc.), for each level of decision-making (strategic, tactical, operational). The creative and innovative vision of ISs was thus "internal" and limited, but well-suited to the functional structure model implemented by the vast majority of companies. This conceptual approach in silos led to the development of adapted IT tools and also to the implementation of IS that were virtually hermetically sealed (see Chapter 5, Anthony's Pyramid). The era of the pioneers was marked by two phases, leading to the stakeholders in the IT function seeing the importance of their role recognized in hierarchical terms. The appearance of a computer manager liaising directly with the financial management

team and the creation of the first team of computer operators to cover data input operations, previously overseen by the Chief Accountant, illustrates this.

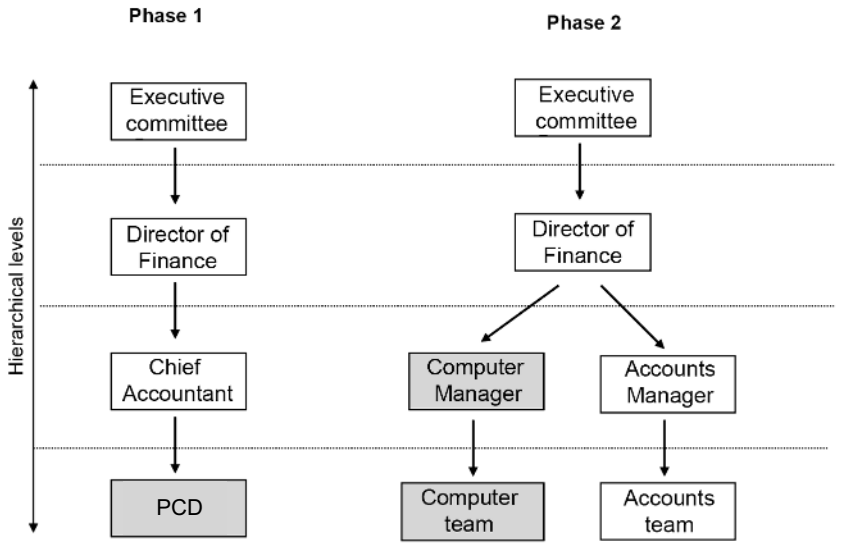

Figure 1.2. *Evolution of hierarchical levels in the days of the pioneers*

1.3.2. *The birth of the IS manager, a change in status*

The second stage happened between 1980 and 1995. This stage saw the advent of the "Systems Manager" or even the "Systems Administrator". This role involved working with operational users towards achieving an IS with application functions that would contribute to making an improvement in working conditions. IS were in demand especially for their capacity to provide a basis for decision-making (advent of decision support systems (DSS), or intelligent decision support systems (IDSS)). Value creation was achieved in this case by improved performance by the organization in its market(s). The "internal" vision of the IS of the 1960s to the 1980s extended to the notion of improving external performance. Massive use of an IT and telecommunications structure is proof of this and resulted in the emergence, followed by rapid and massive roll-out, of ICT in every organizational function within the business and all levels of the hierarchy. The attachment of the IT function to upper management shows the extent to which the role in itself had evolved: the IS manager, promoted to operations director, sits on the Executive Committee on a fairly regular basis.

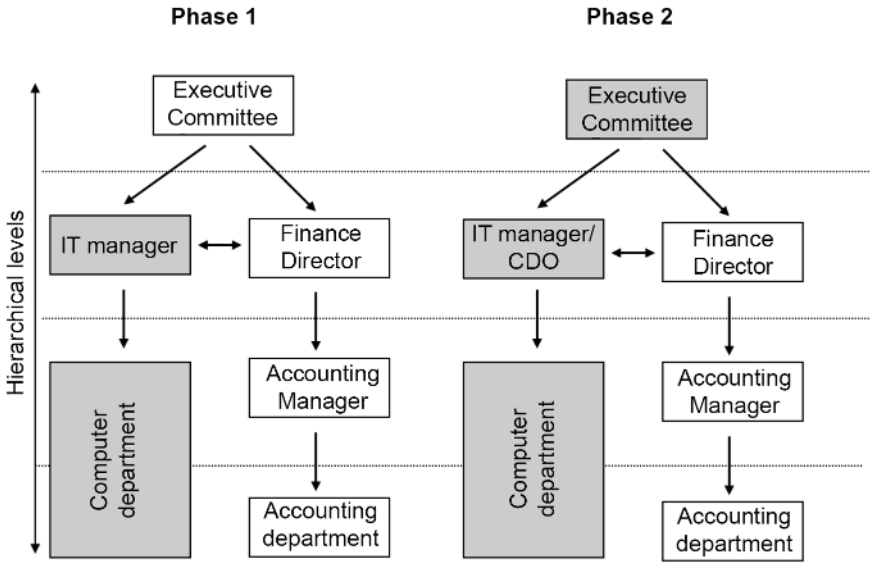

Figure 1.3. *Contemporary evolution of hierarchical levels*

The years 1995–2010 confirmed this shift, and recent years have seemingly intensified it. The emergence of the post of "Systems Manager", "IS Manager" or "Director of IS Governance", and the involvement of the head of the IS function on the company's Executive Committee or Board of Directors, represent significant stages in this change of status of computer managers. Systemic features reinforce this evolution, confirming the strategic position of the computer manager. Regulatory changes that are very restrictive in terms of IS management (Sarbanes-Oxley Act – SOX in the USA, the "*loi de Sécurité financière*" – *LSF* in France, the Basel I–IV Agreements for banks, etc.) and the proliferation of good governance benchmarks for IS (Control Objectives for Information and related Technology – COBIT, Information Technology Infrastructure Library – ITIL, IT Scorecard, ValIT, International Organization for Standardization – ISO 1799, etc.) present many constraints, and it is vital to be aware of and to keep abreast of all of them.

The years 2010–2025 will be remembered for the emergence of a director of computer resources who sits alongside the director of human resources and the director of financial resources. Powered by Cloud tools, this title opens the way to professionalizing the concept of value creation attached to IS and the establishment of boards of directors that include the strategic management aspect of IS, in particular by refocusing on data management and digital sciences (Data Science). The introduction of the Chief Digital Officer (CDO) – in other words, a

decision-making stakeholder attached to the board with a cross-disciplinary version – is an indication of this change. Historic recruitments of computer managers or CDOs are the observation criteria of this new trend.

History also highlights a change in the relationship between ISs and value creation. First of all, technological change was responsible for redrawing organizational boundaries and encouraging stakeholders to reconsider value creation. Next, the IS' impact shifted and began to drive new forms of value creation within the organization. More recently, the user relationship is now attracting particular attention for its inherent value potential. With the spectacular progress seen with artificial intelligence, it is clear that AI techniques will have ever greater influence on decision-making processes at the highest organizational level. This in turn leading to general management being increasingly animated and led by nonhuman actors. We must therefore ask what safeguards should be in place to supervise this kind of practice.

1.3.3. *Organizing functions around IS governance*

According to the French school of thought, IS stakeholders can be categorized into two groups: project owners and project managers (see Part 2). The project owner brings together the functions that deal with the organization's core business activity. The project manager brings together the functions that deal with computing. The major managerial problem with this distinction lies in establishing communication between stakeholders who do not speak the same language and do not have the same points of reference. Moreover, project owners and project managers have hierarchical structures, and it is necessary, indeed vital, to establish an appropriate correspondence between the two areas.

Communication between project owners and project managers has for a long time been characterized by different languages and defensive attitudes, a kind of mutual incomprehension institutionalized by preoccupations, culture and skills that are industry-focused for some and IT-focused for others. For as long as IT management consisted of developing tools to facilitate the automation of repetitive tasks and the production of reports, the quality of communication with business managers caused no real issues. Thus, the IT manager could have a relationship characterized by strong interdependence but in which liaison with end users was limited to supervisory functions, and the decision-makers could have no direct involvement in IS.

As the IS became responsible for increasingly complex functions and the services expected of it continued to evolve, it became necessary to clarify the relationship between project owner and project manager. On the project owner's

side, an effort to align structurization with client need began to manifest itself. This became firmly established with the creation of a new function: project owner support, the role of which consists partly of bridging the attitude gap and overcoming the language barrier. Project owner support is delivered by a stakeholder who helps the project owner define their needs and draw up a specification for the project manager. In parallel, on the project manager's side, efforts to market IS services have taken shape and grown. This focus on the design of IS services – just as the marketing function designs products aimed at the end user – took the form of the creation of project manager assistant (PMA) positions, of user interfaces and of customer domains, whose role lies in taking the final steps towards reaching an understanding between IS service providers and the clients, the IS users.

These new functions and the new stakeholders made it possible to greatly enrich and improve the relationship between project owner and project manager, creating a complex and effective structure of operational interfaces between all business areas and project leaders in project management. In conclusion, the roll-out of these new resources led to an improvement in the relationship and a closing of the gap between IS director and IS service users, while increasing the number of stakeholders involved in the development of IS. Also, it led at the same time to a redistribution of roles and skills among all these stakeholders.

The introduction of new stakeholders led quite rapidly to a global redistribution of roles and skills in IS organization. A significant factor in building the bridge between project owner and project was the establishment of liaison with an IS administrator, extending functional organization to project ownership, with a specialist from the project management team, in charge of the client domain. This represents a major change. The client has in front of them a stakeholder specialized in understanding the client's business function, not a language, a platform or ICT; and this shows on the systems manager's side a profound shift in the skills required and the application of these skills. The organizational structure has been enriched by this, and the relationships between the systems manager and their environment have been professionalized by the cross-search for operational synergies. De facto, relationships between project owner and project manager have become multiple and personalized.

This kind of organization sets out to identify the business functions and to develop a specific interface for each of them. The systems manager appears in this context as the organizer and the coordinator of a customer focus broken down into major business functions. Redistribution of the roles mentioned above goes hand in hand with the redistribution of skills. These skills can be split into three main levels. At the highest level, the systems manager–project manager has the ability to see the bigger picture covering all of the project owner functions, and provides a global

response to the need to align IS performance across the whole of the organization's value chain. At the intermediate level, the systems manager develops an IT architecture and IS that are in line with business function requirements as modeled in their complexity within an occupational or business architecture. Finally, at the third level, the systems manager implements the proposed architecture for IS services, thus integrating the conceptual and physical aspects, in other words, a higher profile in the carrying out of a task, an activity or a process by an end user, a client of the IS service. In this description, we find responses given to demands arising from the model put forward by the Gartner Group in the 1990s. This model basically consists of suggesting an alignment of project owner and project manager at three levels: the global value chain, the company's choice of business organization and operational implementation. Adapting IS management to context has made it possible to develop new functions and new skills inhouse. It has also made it possible to professionalize its services and develop a multi-pronged approach.

The evolutionary stages of the IT governance models (project owner/manager) can be defined as follows:

1) The two worlds are separate with a computer manager carrying out instructions.

2) The two worlds ask each other questions and give each other answers with a service-oriented systems manager.

3) The two worlds mix and interweave, with a systems manager who is a business partner and a service provider.

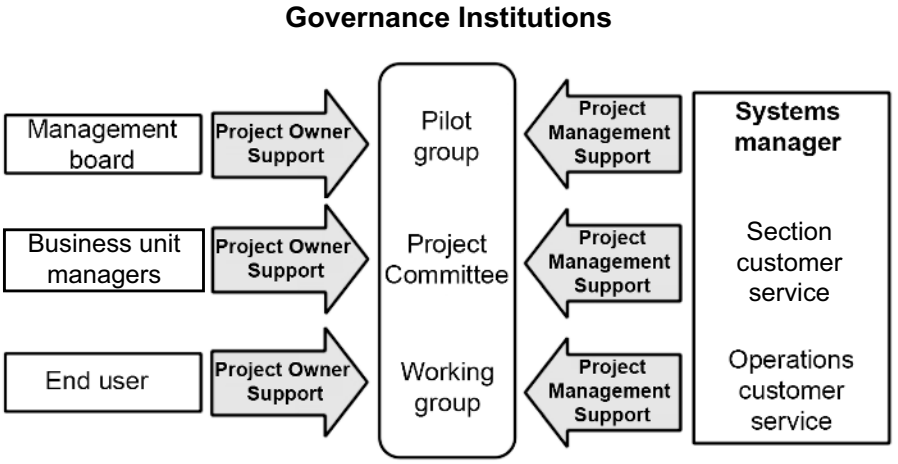

Figure 1.4. *The governance of IS stakeholders*

In summary, IS managers are charged with orchestrating, within the IS governance framework, relationships with key function stakeholders:

– *The board of directors*, which delegates the strategic management of IT to the systems manager, ensures that the systems manager sets up the appropriate governance bodies and contributes to IS management in line with its strategic plan.

– *Operational business directors*, who are clients of the IS management (sales director, marketing director, financial director, etc.). The operational directors own their IS and use it for their own needs. They contribute to managing the ISs in their area of responsibility and also the global ISs.

– *End users*, who can be reached by identifying key users. In this case, consultations take place face to face. Liaison with end users can be routed through project owner support. Project owner support can help users formalize their needs in terms of service level requests (SLRs), as well as tailor the service level agreement (SLA) and take responsibility for SLA. Finally, it can produce the key performance indicators (KPIs) and train users. They can be involved either in the management of one dedicated IS or the management of a number of ISs.

1.3.4. *Extending IS from internal stakeholders to external stakeholders*

From this point on, no business activity can dispense with the utilization of IS resources (workstations, software, architecture, infrastructure, platforms, etc.). For each function, specific processes must be defined and supported between their providers and their own clients. In view of this, and even before considering all of the organizational levels supported by the IS, there is a complex situation to be managed. The systems manager must be able to reach agreements between the executive and the directors, on the one hand, and between the directors of the various functions, on the other. This dual level of complexity requires serious thought in terms of IS stakeholder governance.

The stakeholders in IS governance are numerous, and they have objectives that seldom converge. However, the central, structural nature of IS means that they have to work together and find coherent organizational models. The cooperation to be implemented is tricky because it has to reconcile many levels of action and interaction. An attentive observer looking at an organization's IS will see that the systems manager has to consider first of all the needs of the business in the strict sense, in other words, the needs of the internal clients, i.e. its board and its directors. The directors are tasked with developing the diverse range of skills that make up today's organizations. But the systems manager's job does not end there. A number of other strata of the business environment have to be added in turn to the global management of the system. The same applies in terms of taking responsibility for

dealing with the end client and the network of distributor clients, suppliers and subcontractors, who these days are usually structured into different tiers of suppliers, external partners (banks, insurers, logistic providers, service providers and suppliers, etc.), government departments, shareholders, internal auditors and statutory auditors.

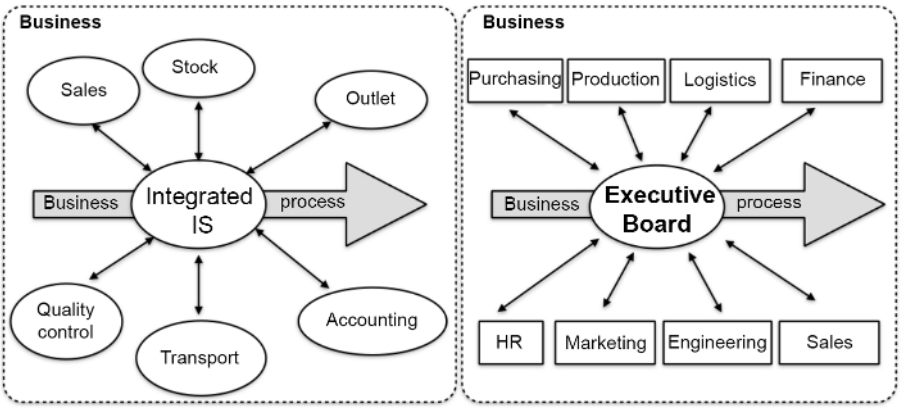

Figure 1.5. *The integrated logic of IS and internal stakeholders*

From a systemic perspective, we can, through Le Moigne's work, see an organization's IS as a subsystem of that organization [LEM 90]. But since the organization itself is a subsystem of a larger system, IS has to be conceived in an expanded, open mode. This means that the boundaries of IS management must be extended to external stakeholders (suppliers, customers, partners) engaged in the same value chain. Moreover, we have to take into account the interactions at play between the various levels. For example, stock management does not stop at local level analysis. IS could provide information on the stock of tier 1 suppliers and, by pursuing the same pattern, of suppliers' suppliers (tier 2), and for the most critical products, the process can move further down the supply channels.

In conclusion, we can see that the issue of IS stakeholders is multi-dimensional. It can be a factor in matters relating to outsourcing, a pooling of resources and shared governance. In every case, the notion of the stakeholder should not be considered only from the human aspect. As regards its analysis objective, IS science is obliged to include a socio-materialistic analysis that takes into account the links interwoven into the materiality of technical objects with the stakeholders who manipulate and sustain them.

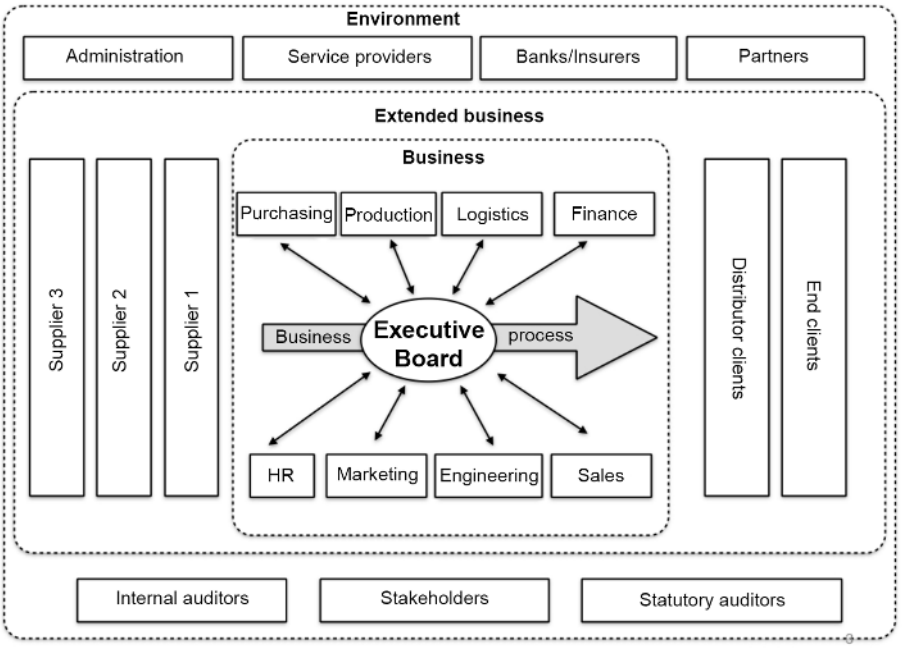

Figure 1.6. *The integrated logic of IS and internal stakeholders*