

FROM INFORMATION CAPTURE TO KNOWLEDGE DISSEMINATION: HOW TO MEET THE STAKEHOLDERS' INFORMATION NEEDS?

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ABSTRACT

Traditional value chain, whose scope of application is essentially industrial, has ceased to be meaningful. They have been replaced by new business models (strongly developed through electronic platforms), structured around powerful "networks". Sharing information, the use of communal structures, the speed of technological developments, the heightened use of resources, and its modular nature, instils strategies in this type of company which are based on a capacity to anticipate, innovate and make shared use of opportunities.

Knowledge management is dominated by the applications of the second industrial revolution conquests and technological revolution, where information, aggregated to communication technologies, assumes a basic role in the sustainable development and in the company's level competitiveness. While marked by connectivity, information, convergence and mobility, knowledge management will be expressed, independently of the perspective analysis, in a strong and deep cultural transformation inside the companies and their relation with stakeholders. This is the genesis of an *Electronic Knowledge Management Culture* (EKMC).

Based on fifty-one companies, most of them integrating the *Euronext Lisbon Indexes*, we have explored the typology of information (voluntary and non-voluntary) effectively released to stakeholders through corporate websites. Size of companies and net returns seems to contribute positively for the quality and quantity of information effectively disseminated.

1. Introduction

Knowledge has been emerged, since last few decades, as a new resource contributing to achieve sustainable competitive advantage. Knowledge management systems are guided to capture, create, store, organize and disseminate organizational knowledge (Nonaka and Takeushi, 1995; Alavi and Leidner, 2001). It seems undeniable that the performance in the capture, creation, codification and allotment of knowledge, depends on the implementation of technological platforms capable to support an integrated management and thus to reach the stakeholders' information needs. Being stored and developed through four essential discrete repositories - people, processes, systems and culture - a functional knowledge management system should be clearly understood inside the organization for the whole of the optimized combination of those repositories.

The traditional systems evolution, guided in a first step by objectives of planning, control of decision (Marchand *et al.*, 2001), have exerted a direct impact to the level of the internal structures (Leidner, 1998). However, they suffered from a superabundance of irrelevant information and thus, stakeholders do not use the information available as an important resource for the decision making process. The increasing importance and complexity that those systems have disclosed in the last few decades had an important impact in the type of information effectively disseminated (financial and non-financial, voluntary and non-voluntary) and in the electronic capabilities available for stakeholders (online sales and services, online searching engines, help and technical assistance, claims and suggestion procedure, Multilanguage navigation, private access, etc.).

Knowledge management systems give us the possibility of information integration through multiple technological platforms (mobile devices, personal computers and other electronic

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platforms), using modern information technologies. Users also became content suppliers. Their main focus is in the tacit knowledge (Nonaka, 1994) and in its conversion into explicit knowledge. Under the perspective of individual knowledge and while limited resource, those systems are used as medias, binding the individuals and promoting the required interaction.

2. Aims and objectives

The evolution in the business models, aligned with developments in the information and communication technologies, claims that organizations should grow up towards a knowledge management culture. Based on several pillars (innovation, organizational culture and learning, information and communication technologies), corporate knowledge management should act as a continuous and dynamic linkage between organizations and stakeholders in order to continuously meet their needs.

Our objective is to evidence the importance of information sharing with stakeholders' through websites, also underlining key characteristics and capabilities effectively available online which support our assertion of corporate knowledge management culture. Based on fifty-one companies, most of them integrating the *Euronext Lisbon Indexes*, and based on non-parametric tests, we have explored the typology of information effectively shared using the Internet. This analysis was carried out on the websites content analysis.

3. Information and knowledge transformation

Some decades ago, Alvin Tofler (1990:96) has already predicted that knowledge will emerge as a new resource (partially paid, partially explored gratuitously) which, stops beyond the traditional factors of production - land, work and capital. It can be used as the definitive substitute. In this context, data, information and knowledge lacks of logic and linkage. From a semantic point o view, it still provokes in the organisational spectrum a cause and effect chain which results of a considerable and strong technological advances in the information and communication technologies and thus in the way of doing business. Those advances have gradually substituted the traditional factors of production. Organizations, in its dynamic processes of search of competitive advantages (and consequently increases in their sustainable development systems), require strong mechanisms to reach a dynamic and continuous transformation.

Data represents isolated facts but when duly embodied and combined within a particular structure, information emerges. Once analysed and used this drift in knowledge. The existing facts, within a mental structure, allow that inferences are made or that consequences are duly evaluated. Wisdom appears if timely used in the choice of a particular option behind multiple alternatives. The complete hierarchy is achieved when a set of values and commitment leads to the wisdom (Tuomi, 2000).

Data is understood as panoply of objective facts and events or as registers structuralized solely on transactions (Davenport and Prusak, 1998:2). They have primarily quantitative natures which give us the illusion of the objectivity and certainty (Gigerenzer, 2005). They do not have, according Tiwana (2000), inherent direction. Its use and consequent transformation depend of the environment, of the agents' perception and capabilities. Through the merger of the diversified resources, duly adjusted to technical, human and financials drivers, they will be able to achieve a structuralized form, and thus stimulate the chain of knowledge creation.

According to Zack (1999), data represent comments or facts and without a specific context, they are therefore devoid of meaning. Information is created when to data we attribute contextual meaning, broadly under the way of a message.

Despite the common sense, information and knowledge are not synonyms and do not exist in an automatic and continuous transformation process between both. Information results from data, through a dynamic process that infuses meaning, relevance and intention. Those indistinct facts, for times undifferentiated, even so in lack of objectivity, show typical descriptive situations but they do not lock up in it, value judgments and conducive to interpretations.

Focused primarily in data, the success of the dynamic merger between data and information, inhabits in the share of the individuals and its proper experiences. Broadly structured, legalized and disintegrated, knowledge comprises logical joint, interpretation and judgment on the part of the individuals. This dichotomy, essential and desirable in a sharing and transformation process, depends on the structured and facilitator environment, the mental capacity of the agents and the available mechanisms for its translation, storage and dissemination through the collective memory.

Information is used, according to Shapiro and Varian (1999:2), in a high sweeping form. It translates everything that can be digitalized and converted into a set of bits. For its amplitude and subjectivities, information concept evidences one of the most universal references: something that can be used, within a dynamic transformation process, to achieve a sustainable competitive advantage. Complementarily, information is, by its nature, a symbolic representation, a set of events, objects or flows that constitute, in its essence, the perceivable reality. It results from the process where data acquire meaning, flowing in the organizations through multiple networks (electronic and social). Information requires either several filters of contextualisation, categorisation, calculation, correction or condensation (Davenport and Prusak, 1998:4). It represents a message, vulnerable to several noises (Tiwana, 2000:40) inherent to any process of communication, as broadly evidenced by traditional communication theories (Dretske, 1981).

Dretske (1981) assumes that information is everything what can, eventually, produce knowledge while Machlup (1983) and Nonaka (1994) perceive it as a flow of messages. Knowledge will be produced from the optimum flow of information, supported in the agent commitment and beliefs. This approach emphasizes the basic detail in which knowledge appears as a linkage to the shared human being.

The transformation process of data into information is not conducted nor developed throughout a linear form. It depends on the filters used in that process. To infuse in data, sense and logic, it requires meaning and structure. Filters typology presented by Davenport and Prusak (1998) and later strengthened by Tiwana (2000), underlines those that, in its essence, can constitute the mechanisms of achieving an intrinsic formalization. Condensation translates the filter of data aggregation and is probably the most concise form. Calculation is a mathematical or statistical treatment, while contextualisation represents the intention of the retraction. Correction enables us to eliminate errors. Categorisation looks and is directed to the identification of the main components.

Hence, knowledge is *“a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it*

often becomes embedded not only in documents or repositories but also in organization routines, processes, practices, and norms” (Davenport and Prusak, 1998:5). In fact, it translates information for the entire sharing process within social networks and sometimes using multiple electronic platforms as computers or mobiles devices. It is the most important resource of the information age and constitutes in itself an intangible asset. It represents the familiarity or understanding of profits through the exploration and experience.

The continuous linkage between information and knowledge are not depleted in a syntactic perspective (volume of information, even so irrelevant in the process of knowledge creation). For Dretske (1981) this semantic perspective assumes greater relevance in the context of knowledge creation.

Multiple typologies of knowledge has been the result of the multiple developments occurred in a diversified sphere of knowing. It will be therefore scientifically understandable that in the scope of social sciences, the knowledge categorisation assumes different typologies that eventually emerge in the context of non social sciences.

Associated to the categorisation in tacit knowledge and explicit knowledge, Choo (2001), following the approach stated in Boisot (1995), relates the existence, and stops beyond the traditional dichotomy tacit - explicit knowledge, of one third nature of knowledge - the cultural knowledge. We consider that the cultural dimension (while basic pillar of the knowledge management) can enable or obstruct the type and the implementation level of organizational practices.

Teece (1998) also presents a diversity of typologies of knowledge: codified/tacit, observed/not observed, positive/negative and autonomous/systematic. The codification level is directly articulated to the economic level of its transference. Similarly, when transposed to technologies and products, knowledge becomes more observed and its property guaranteed in itself. Success or failure associated with the technological innovation translates, respectively, what can be identified as positive or negative knowledge. The eventual need to modify the responsible systems for its production and transference supports the dichotomy of autonomous and systematic knowledge.

Aligned with those assertions, Bontis (2001:41) refers to intellectual capital, as knowledge capital, knowledge based organization, organizational learning, the age of knowledge, intangible assets, intangible assets management. These describers mediate the organizational paradigm where knowledge management results from the merger between peoples, systems, processes and culture. Knowledge management systems are obviously strongly interlinked as enablers in the new business models developments.

Intellectual capital was firstly identified by John Kenneth Galbraith, in 1969, recouped in depth twenty-five years later by Peter Drucker (1993). Effectively, after the landmark placed by Peter Drucker, the proliferation of the term through economical literature has been evidenced and suggested, despite nor always treated with the incidence and depth required. This assignment constitutes what, without any commitment, Roos *et al.* (1997:27) apply as, new words for a new world. Positively, it assumes the intellectual capital as the addition of the organizational knowledge of its members and its consequent practical translation in marks and processes. Negatively, it appears as everything that can create value but that cannot exactly be measured in it. This dichotomy catapults us for the management theory which assumes that value of an organization exceeds its financial dimension. Value also arises from

a structural and human dimension originating the starting up of all and sometimes new developments about intellectual capital domain.

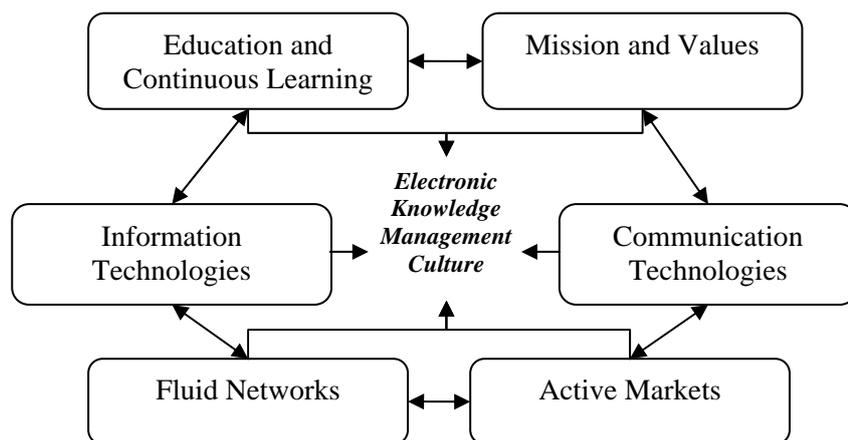
Stewart (1994, 1997) defines intellectual capital as information, copyright and experience, placed to the disposal of the organizations with the intention to create wealth. These new materials of knowledge represent, in the extremis, a transition in the form to think the organizational value. They are therefore recognized in the same platform that the traditional assets, wide studied in the industrial age: land, work and capital.

Jacobsen and Hofman-Bang (2005:571) relates that intellectual capital represents all the critical factors for the future success of an organization and that they cannot be evidenced or reported through the traditional financial statements. Pointed out the passive confusion with the term knowledge, Lynn (2000:49) relates it as the human brain power while Dzinkowski (2000:33), identifies it as the global value that an organization possesses, preventing the complex connotations with the copyright or knowledge assets.

4. Towards an Electronic Knowledge Management Culture

Internet has emerged in the last ten years as the way in excellence to reach the stakeholders information needs. Primarily focused exclusively in the information about products and services, gradually new capabilities were introduced in the corporate websites. Customers can order products and services, potential shareholders can obtain financial and non financial information, electronic contact has contributed to minimize the operational cycle. Concepts of time and space were strongly surpassed, and deep changes in the corporate structures have also occurred. An *Electronic Knowledge Management Culture* (EKMC) seems to emerge inside the organizations, as the result of stakeholders' pressures and needs (Figure 1).

Figure 1 – Electronic Knowledge Management Culture (EKMC)



New activities emerged as the result of disaggregation and re-aggregation processes in the traditional value chains. Broadly, these activities are developed inside electronics contexts, in which networks drive the interlinked phenomena of increasing returns and network effects. Tapscott *et al.* (2000) identify a new system of doing business (the business web), which, has brought new proposals for value, new competition rules and procedures, new resources, capabilities and competences, new strategies and more sophisticated market approaches. These inter networked business systems represent a new source of value for customers and

wealth enablers for shareholders. The core competence of each participant becomes the key factor of success in this business approach. As stated by Tapscott *et al.* (2000:17), a b-web can be defined as: “*a distinct system of suppliers, distributors, commerce service providers, infrastructure providers, and customers that use the Internet for their primary business communications and transactions*”.

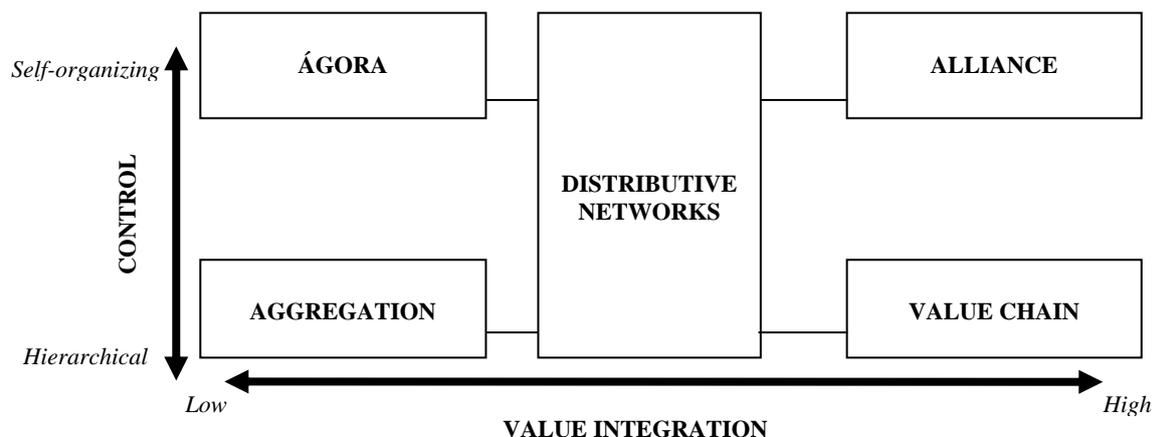
Innovation offers a new proposition that renders the old way of doing business obsolete: the electronic infrastructure now represents the main way of sharing data, information and knowledge. Innovation management can capture broad application ideas and optimise the licensing value of the patented invention (Willigan, 2001:27). Firms become increasingly virtual and volatile on account of the innovation processes. Differences between multiple organisations' competitive agreements (multinational, global, international or trans national) and their consequent value networks (Shapiro and Varian, 1999) remind us that research and development process (as a process that allows the creation of new intellectual property, potentially protected by patent registration) should be kept as an internal activity - the source, par excellence, of true and sustainable competitive advantage.

As already mentioned, in the b-web structures a new proposal for value emerges: the Internet becomes the main structure. Value is created and managed, sometimes, through complex innovation chains. These models, with their intrinsic strengths, apply and require multi participation: competitive advantage in terms of costs, capacities, innovation, competence and future returns are dependent from the core capabilities of the multiple agents who integrate the entire business system.

Performance of those business systems is not exactly linear. Its complexity results from the multiplicity of agents (contributing to global value of the system) that, on the basis of a synergistic interdependence, should provide and guarantee a solid and dynamic competitive advantage. This interlinked way of doing business requires a new breed of pioneers, strongly supported by information and communication technologies, to drive the companies. New cost categories arise such as those for search, contracting and coordinating those business models (e.g. research and development websites expenditures).

From our point of view, the most innovative and revolutionary dimension relates to how participants should do business. We are in a still fluid process, in an uncharted territory, where customers are gaining more power than ever before. *Coopetition* has arisen as a phenomenon in the b-web process. All participants simultaneously compete and cooperate among themselves on the b-web, emerging as a universal platform for creating value and wealth. A b-web is, in truth, highly focused on the end customer. Its members try to satisfy continuously the customers' requirements and needs.

Figure 2 – Electronic Business Models (EBM)



Source: Tapscott *et al.* (2000: 28)

We are deeply embedded in an unsettled and highly volatile field: its functional disaggregation is moving towards a new form of intermediation (Szabó, 1999; Tapscott *et al.*, 2000). The physical space elimination and replacement (where traditional intermediate agents develop their businesses) have gradually led to a new form of intermediation. Multiple participants, requiring new coordination rules and procedures of engagement, also apply for a new structural capital approach (Shapiro and Varian, 1999). Thus, these new business models are built, in the entire value system, on the basis of two structural dimensions: their control (hierarchical or self-organized) and their value integration intensity. Their success depends from its intrinsic innovation strategies, in particular its research and development investment intensity.

In digital economy, whose boundaries are highly flexible, success of the electronic business platforms depends from the participants' capacity and intelligence. Structural combination of physical and intangible assets results in an important competitive advantage (what Tapscott *et al.*, 2000 refers as *marketface*). Some of them represent authentic free and neutral markets where a large and deep assortment of products and information is offered to purchasers through personal negotiation (the Agoras).

In particular, in the alliances, whose nature is not hierarchical, participation is in accordance with established rules and standards, based on a philosophy of creative contributions. As we have repeatedly affirmed, customer assumes a preponderant role value creation. Alliances normally display increasing returns and strong network effects (driven by demand side economies of scale), as they link individuals and organisations in their own self-interest.

The aggregator model is led by companies that act as intermediaries. They focus their activities on the selection and organisation of goods, prices setting and customer help in finding goods and services that on a fulfilment basis, match their needs. Although, capturing specific markets and segments is their basic focus, they do not add value to goods. Nonetheless, they improve and increase value through a linear exchange process.

The market integrator approach has a distinct focus: its responsibility is restructuring and management of the entire value chain. It provides an alternative that more successfully

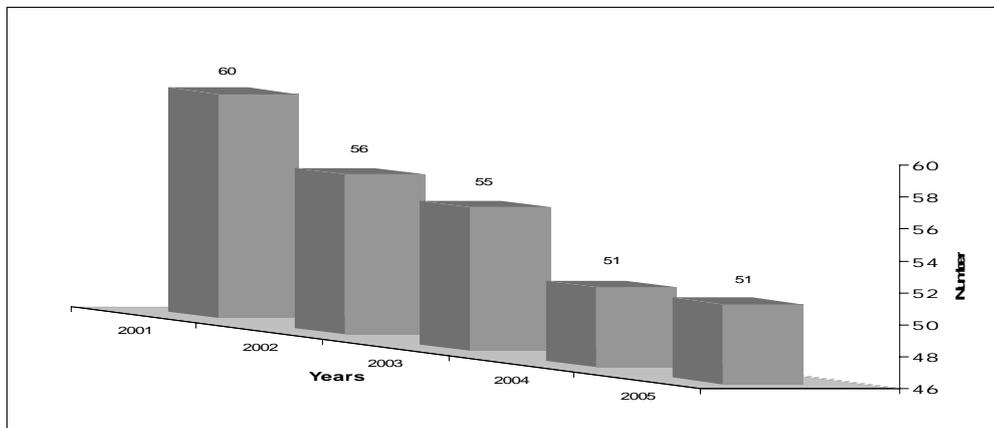
responds to a specific segment, with an integrated and specifically oriented customer approach. Based on high technology and focused on value-added design and relationship management, this model is strongly linked to the innovation process.

In contrast to traditional business models, b-webs require a reduced investment in fixed capital, low fixed costs and offers higher operational edges than traditional approaches. It is therefore to be expected that this type of business lead organizations to high returns and flows. On the other hand, customers have acquired more power in contributing information and knowledge to the system. They normally raise their expectations, acquire flexibility and, thus, gain in terms of cost and quality. Intangible factors (information, control, relationships and knowledge) are enhanced. As mentioned by Kelly (1998:2) *“This new economy has three distinguishing characteristics: It is global. It favours intangible things – ideas, information, and relationships. And it is intensely interlinked. These three attributes produce a new type of marketplace and society, one the is rooted in ubiquitous electronic networks”*. New metrics are required that, on a fair and true basis, can capture and measure competitive advantages that emerge from those new business models. As already underlined, *“The b-web is to emerge as a generic and universal platform of creation of value and wealth”* (Tapscott et al., 2000: 25).

5. Scope

This research was conducted during the first quarter of 2007. We have analyzed 51 websites of the quoted companies, some of them integrated in the *Euronext Lisbon* indexes. Annual financial information was obtained from their management reports with reference to December 31, 2005.

Graph 1 – Quoted Companies 2001 – 2005



Source: CMVM (2007)

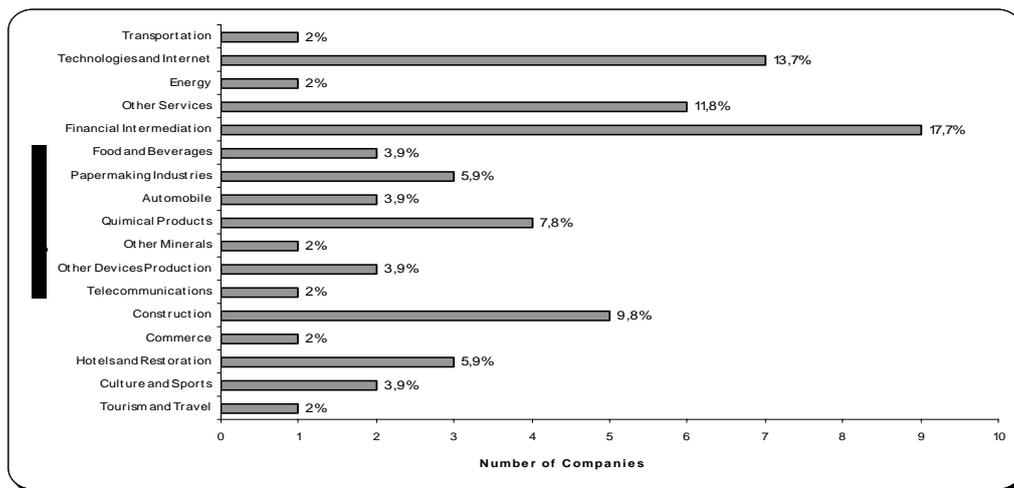
The Stock Exchange of Lisbon was established in January 1st 1769 and since then, several modifications have occurred. We detach its suspension between April, 1974 and February, 1977, due to the national military revolution.

After their fusion in January 2002 with the Oporto Stock Exchange, it was, in February, 6th 2002, renamed as Euronext Lisbon. From September 2002, the members of the Euronext Lisbon have achieved the possibility to negotiate all products available in other European

financial markets, namely Paris (Euronext Paris), Amsterdam (Euronext Amsterdam) and Brussels (Euronext Brussels).

All companies under analysis use the Internet to disseminate information to stakeholders as required by financial markets regulators. It includes financial reports, corporate governance information, press releases, and environment and sustainability reports. Apart of that, we also tried to evidence and capture an *Electronic Knowledge Management Culture (EKMC)* based on several capabilities implemented through their websites and through the effective contribution and linkage between stakeholders and companies.

Graph 2 –Companies’ distribution by activity branch sector



Source: CMVM (2007)

As evidenced in the graph stated above, the most important branches are financial intermediation (aprox. 18%), technologies and internet (aprox. 14%), other services (aprox. 12%), followed by construction (aprox. 10%). Although the size of companies analysed and their contribution to the Portuguese GDP, the results achieved cannot be applied for a separated sector basis analysis.

In our research, our main objective, as mentioned in point 2, is to identify the typology of information effectively released through corporate websites, the main electronic platform in the digital economy (Table 1). In order to evaluate their effectiveness, we have also searched for technical capabilities available throughout that electronic platform (Table 2).

Information released to stakeholders depends on the capabilities effectively available. Broadly, companies tend to release only favourable information except the mandatory information required by the financial markets rules (e.g. annual and quarterly financial reports, press releases, sustainability information, etc.). Annual financial reports are released but internal performance indicators remain still unknown by stakeholders. Filters introduced in the information and knowledge culture tend to restrict the information dissemination and access. Marketing and financial markets related information assumes the main type of information and knowledge truly disseminated. In fact, information is costly to produce and assemble but cheap to reproduce (Shapiro and Varian, 1999:21).

Company’s websites act as a filter regarding information dissemination. Only selected information will be available through that electronic platform. However, stakeholders and

enterprises have today a better proximity and linkage than some decades ago. They can easily access and contribute for a better business performance.

6. The results (first approach)

In the first step, we have looked for the information effectively disseminated and available in each company website, namely financial, environment and sustainability information, company strategy and mission and other useful information. Results are summarized in table 1.

Table 1 – Type of information released to stakeholders

Type of information released	Yes (%)	No (%)
I.1 Corporate mission and strategy	92,9	7,1
I.2 Financial management reports	95,2	4,8
I.3 Non financial performance indicators	10,7	89,3
I.4 Corporate governance reports	67,9	32,1
I.5 Environment and sustainability reports	53,6	46,4
I.6 Recruitment opportunities	50,0	50,0
I.7 Press releases to stakeholders	92,9	7,1
I.8 Products and services information	85,7	14,3
I.9 Knowledge management portal or link	0,00	100,0
I.10 Full contact details	96,4	3,6
I.11 Website update reference	81,0	19,0
I.12 Frequent questions and answers	39,3	60,7
I.13 Information dissemination timetable	67,9	32,1
I.14 Company legal statutes	46,4	53,6

Knowledge is far from being consolidated in the Portuguese companies' environment. Deep changes should occur to consolidate an organisational culture where the allotment of knowledge with stakeholders through the Internet is a reality.

Companies do not disseminate non financial performance indicators (89,3%) and none evidence a portal or link to a knowledge management area. Only 39,3% include in its website a frequent questions and answers information. However, it seems undeniable according our research, that companies who present better returns and total equity are those that disseminate more, better and useful information (Person significant correlation at the 0,05 level). Otherwise, company legal statutes are not available for 53,6% of the companies under analysis. Note that corporate statutes is an important way to perceive some strengths or weaknesses in terms of administration decision making Based on non-parametric Chi-Square tests, frequencies observed are adjusted to expected frequencies (rates between 0,684 and 0,724 for a 0,05 level).

In fact, companies only distribute mandatory information as required by regulators and information about their products and services. No significant capabilities are implemented in order to link on a regular basis companies and outside stakeholders, as evidenced in the following table.

Table 2 – Capabilities available on-line

Online capabilities	Yes (%)	No (%)
II.1 Website private access	42,9	57,1
II.2 Newsletter subscription	21,4	78,6
II.3 Connection with legal entities	10,7	89,3
II.4 Online searching engine	57,1	42,9
II.5 Multilanguage website	85,7	14,3
II.6 Alerts subscription	17,9	82,1
II.7 Suggestions/claims procedure	39,3	60,7
II.8 Help and technical assistance	53,6	46,4

Regarding online capabilities, several weaknesses were identified. Only 42,9% of companies have a website private access. As stated by Lopes *et al.* (2005), Internet is used by stakeholders specially for information searching and for financial services (like payments, transfers, bank accounts queries). Activities such as education, research and development or employment purposes observe a residual impact in the Internet use. It consolidates the rates achieved in our study by financial intermediation companies.

Otherwise, companies have not increased enough their electronic relation with stakeholders through the implementation of an online suggestion and claims procedure (39,3%), newsletter subscription (21,4%) and electronic alerts subscription (17,9%). As a final note, websites are available to stakeholders only in Portuguese and English languages.

Table 3 – Towards a knowledge management language

III. Words Searching Process	Rate
III.1 Intellectual capital	0,42
III.2 Knowledge management	0,94
III.3 Intangible assets	3,06
III.4 Innovation	8,63
III.5 Research and development	2,06
III.6 Organisational culture	1,31
III.7 Organisational learning	0,63

The rate mentioned in table 3 results from the division between number of entries and number of companies with an online searching engine implemented ($\#Validated\ entries / \#Companies$). As evidenced, poor rates were achieved relating knowledge management language. Nevertheless, “Other services” branch sector contribute with approximately 72,6% for those rates. Probably, knowledge management culture externalisation is not yet a priority for those companies and stakeholders do not perceive and capture their mission alignment, based on innovation and bilateral learning.

7. Final remarks and further investigation

This is a dynamic research which requires a continuous update. Websites contents change on a systematic manner and these information repositories tend to reach in particular stakeholders commercial needs. Variables identified in tables 1 to 3 are those that, from our point of view and first approach, better describe information releases state of the art. Websites, as dynamics electronic platforms, should be contextualized in a particular time and space (strongly managed according particular information rules). New capabilities should be introduced and performance rates require sustainable increases.

Finally, some key remarks should be reinforced: 1. there is no evidence of an *Electronic Knowledge Management Culture* (EKMC) in the companies under analysis. Information released to stakeholders is classified as “mandatory information” as required by governmental entities like taxation authorities or financial market regulators; 2. Activity performance indicators are not disseminated to stakeholders through Internet. Some of them are included in the annual reports but are not referred to in their company website. Despite, capabilities available online do not match the stakeholders needs and several functionalities are not easily understandable or do not work properly. However, companies’ returns and size correlate positively with type and quantity of information effectively released.

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