



**EXPLORING IT GOVERNANCE AND STRATEGIC CONTROL OF WEB SITE CONTENT:  
A FIELD STUDY**

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### **Abstract**

Electronic information systems (IS) such as web sites can be used as a strategic tool. Information technology (IT) governance and strategic control may help firms deal with important issues such as information security, reliability and risk management related to web-based disclosure.

This study describes IT governance factors and strategic control mechanisms related to the web site content of two public enterprises: a vertically integrated firm in the retail industry and a decentralized manufacturer. It assesses the relationships between these factors and mechanisms. Results suggest that both firms' IT governance is well developed while the strategic control of web sites is not developed to the same degree. In the first case but not the second, we found that IT governance structures, processes and relational capabilities can be associated with web site content processes; also, IT governance structures could influence web site relational capabilities. This field study is expected to contribute to the governance, strategic and IS management literature. The study also aims to contribute to the web-based corporate reporting literature. Further research needs to be done to assess the relationships between IT governance factors and strategic control mechanisms of web site content in other contexts, in order to develop testable propositions.

**Keywords:** electronic information systems; IT governance; strategic control; web site content; Internet.

### **Résumé**

Les systèmes d'information par voie électronique tels que les sites web peuvent être utilisés comme instruments stratégiques. La gouvernance des technologies de l'information (TI) et le contrôle stratégique peuvent aider les entreprises à faire face à des problématiques importantes telles la sécurité, la fiabilité et la gestion du risque reliées à la communication d'informations sur le Web.

Cette étude décrit des facteurs de gouvernance des TI et des mécanismes de contrôle stratégique reliés au contenu des sites web de deux sociétés cotées en Bourse : une entreprise de ventes au détail intégrée verticalement et une entreprise manufacturière décentralisée. Les relations possibles entre ces facteurs de gouvernance et ces mécanismes sont également analysées. Les résultats suggèrent que la gouvernance des TI est bien développée chez les deux entreprises alors que le contrôle stratégique de leur site web ne l'est pas au même niveau. Dans le premier cas, mais pas dans le second, nous avons constaté que les structures, les processus et les compétences relationnelles caractérisant la gouvernance des TI peuvent être associées aux processus relatifs au contenu des sites web ; de plus, les structures de gouvernance des TI peuvent influencer les compétences relationnelles relatives aux sites web. Cette étude sur le terrain vise à alimenter la littérature portant sur la gouvernance, la stratégie et la gestion des systèmes d'information. Elle vise également à contribuer à la littérature portant sur la communication d'informations sur le Web. Des recherches additionnelles permettront d'analyser dans d'autres contextes les relations entre les facteurs de gouvernance des TI et les mécanismes de contrôle stratégique des sites web, dans le but de développer des propositions pouvant être testées.

**Mots clés :** systèmes d'information par voie électronique ; gouvernance des TI ; contrôle stratégique ; contenu des sites web ; Internet.

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### **INTRODUCTION**

Maintaining good relations with stakeholders, facilitating their access to financial and non-financial information, and considering their information needs can provide organizations with economic advantages (Svendsen, et al., 2003; Trites, 2004; Ashbaugh, et al., 1999; Beattie & Pratt, 2001, 2003). To meet their strategic goals, organizations may therefore formulate and implement a communication strategy to present a good image and to be well perceived by stakeholders.

Information technology (IT) has a significant role in the corporate strategy (Brown et al., 2006). Firms can use a variety of strategic system initiatives based on the Internet (Fernandez & Nieto, 2006) or the Web (Brown et al., 2006). More specifically, web sites can be used as a strategic information system (IS) by allowing a vast group of stakeholders to be reached timely and quickly (CICA / Trites, 1999). Driven by corporate governance (Van Grembergen et al., 2004), IT governance could explain differences in web site design (Brown et al., 2006). In fact, IT governance is one of the top 10 IT issues facing the accounting profession (3<sup>rd</sup> in 2009; 4<sup>th</sup> in 2008) (Trites, 2009; Trites & Lavigne, 2008).

To better and strategically manage their web site content, firms are encouraged by regulators and by accounting standard-setters to incorporate a web-based disclosure policy into their governance mechanisms (TSX, 2003; IFAC, 2002). In fact, to oversee and coordinate web-based disclosure, firms can use guidelines provided by regulators and standard-setters to develop structures and processes surrounding the responsibilities and involvement of senior management (CSA, 2002) and of external auditors (APB, 2001a, 2001b).

A few studies examine what senior managers, the Board of Directors and auditors are doing in the web-based disclosure process. For instance, the results of these studies indicate that managers are concerned about the security, integrity and credibility of information (Ashbaugh et al., 1999) but are not proactive to ensure the integrity of information disclosed on web sites (Smith & Pierce, 2005). The Boards of Directors of small listed firms are actively involved in determining and approving web site content (Gowthorpe & Flynn, 2002) while the Boards of Directors of larger firms, as well as their external and internal auditors, are not very involved in the process (Héroux, 2006). It is not yet clear whether the information put on web sites is reliable (audited). In this respect, external auditors' responsibilities are not clear (Fisher et al., 2004). They have little control over the web site content and the changes that can be made to audited information (Khadaroo, 2005).

Given that corporate governance drives and sets IT governance, and because there is little knowledge about the strategic control of financial and non-financial web site content, this paper explores the influence of IT governance on the strategic control of web site content. The purpose of this study is *i*) to describe IT governance structures, processes and relational capabilities; *ii*) to describe strategic control related to web site content; and *iii*) to discuss the possible relationships between those IT governance factors and strategic control mechanisms. The remainder of this paper is organized as follows. In the next section, a conceptual framework is proposed. The research method is then described, followed by the results and the conclusion of the study.

## **CONCEPTUAL FRAMEWORK**

IT governance could drive electronic information systems (IS) such as web sites. Among other things, ideally, the web-based disclosure strategy should be incorporated into the overall communication strategy, that should itself be in line with the overall corporate strategy. However, to our knowledge, there is no empirical evidence to support this standpoint. Moreover, in practice, this may not be so obvious.

Indeed, on the one hand, some firms may have less (more) developed IT governance and less (more) sophisticated strategic control related to web site content (Fig. 1, quadrant 1 and 2); hence, they might have fully integrated their corporate strategy at all organizational levels. On the other hand, other firms might have more (less) developed IT governance and less (more) sophisticated strategic control (Fig. 1, quadrant 3 and 4); hence, their corporate strategy might not be fully integrated at all organizational levels. For instance, as a result of an organizational choice or because of limited resources, corporate strategy and IT strategy may be characterized by a clear mission focusing on more than one specific group of stakeholders while the web-based communication strategy might be restricted to satisfying shareholders' information needs. Moreover, it could take a certain amount of time to fully integrate the corporate strategy throughout the firm's units or activities. Furthermore, in some circumstances, there might be no association between IT governance and strategic control of web site content (not illustrated in Fig. 1).

**Insert Fig. 1 about here**

In light of this discussion, in order to provide support for the development of the conceptual framework and to guide data collection, the IT governance, strategic management, as well as web-based corporate reporting literature was reviewed. Further, consulting interviews were also conducted with a representative of a regulatory body in charge of the governance regulation, a senior partner in a "big 4" accounting firm, four senior managers and one internal auditor<sup>1</sup> of three units of a large financial group (seven interviews lasting 45 to 60 minutes, totalling around seven hours of recording).<sup>2</sup> This leads us to

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<sup>1</sup> The Chief Financial Officer (CFO), the Senior Executive – Operations / IT and Chief Compliance Officer, the Senior Executive – On-line Products / Services, the Executive Manager – Operational Risks and Regulation Compliance and one Corporate internal auditor were interviewed.

<sup>2</sup> In the context of a prior study (author), a thorough understanding of how web site content is managed was gained through interviews with four web site managers in large organizations, one consultant in numerical relations whose major clients are large private firms and one top manager of a fund management company (six consulting interviews in five organizations / two public; four large; from three business sectors; duration of 90 to 120 minutes each, totalling almost 11 hours of recording).

the following a priori generic model linking IT governance factors and strategic control mechanisms related to web site content (Fig. 2).

**Insert Fig. 2 about here**

## **IT Governance**

As a subset of corporate governance, IT governance is a responsibility of the Board of Directors (ITGI, 2003; Parent & Reich, 2009) and executive management (ITGI, 2003). *IT governance* “is the strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management” (Webb et al., 2006, p. 7). It also involves IT capability management and delivery of business value through IT (Wilson & Pollard, 2009). IT governance “consists of the leadership and organizational structures and processes that ensure that the organization’s IT sustains and extends the organization’s strategy and objectives” (ITGI, 2003, p. 10). In this study, “IT governance factors” include structures, processes and relational capabilities.

Structures consist of formal positions and roles for making IT-related decisions (Bowen et al., 2007; Peterson, 2004), as well as committees and councils (Peterson, 2004). They refer to individuals, such as CIOs, who are formally appointed to manage the IT function and coordination. Processes focus on the implementation of IT management techniques and procedures in compliance with establishing IT strategies and policies (Bowen et al., 2007). IT executives’ and IT Board members’ positions and roles, and the use of an IT balanced scorecard (BSC) and Control Objectives for Information and related Technology (COBIT) framework, can be used for strategic IT decision-making and monitoring (Peterson, 2003).

The formal structures and processes need to be complemented by informal relational capabilities (Peterson, 2004). “This capability is the active participation of, and collaborative relationships among, corporate executives, IT management, and business management (Peterson et al., 2000)” (Peterson, 2004, p. 15). It involves business-IT partnerships in decision-making and problem structuring / solving and shared learning (Peterson, 2004). Examples of business-IT partnership mechanisms include informal contacts and negotiations, joint performance incentives and rewards, and co-location of business and IT managers (Peterson, 2004). Shared-learning is supported by, for example, strategic dialogue between business and IT executives, active conflict resolution, strategic coalition building, and cross-functional business-IT training (Peterson, 2004). IT leadership is also a powerful relational mechanism (De Haes & Van Grembergen, 2009).

### **Strategic control**

Strategic management is performed by the executive team, directed by the Board of Directors. It encompasses *strategic control* and refers to the different steps through which strategies are formulated, implemented and evaluated (Steyn, 2003; Hendry & Kiel, 2004). Strategic control is defined as a formal system that can signal changes in the competitive environment, leading managers to react to these perceived changes by adjusting the content of the strategy to identify new opportunities and threats (Van Veen-Dirks & Wijn, 2002). In a broad sense, strategic control focuses on planning and monitoring (Ittner & Larcker, 1997). As a fundamental strategic management tool (Kearns, 2006), strategic planning may focus on the integration of a firm’s activities and on the long-term anticipation of stakeholders’ needs. The monitoring (control) phase ensures that the firm stays on track and achieves its goals and strategies (Steyn, 2003). In this study, strategic planning and monitoring have been selected as “strategic control mechanisms” because they may help organizations improve the financial and non-financial content of their web sites. Financial content refers to information such as results disclosed in the annual reports and stock quotes. Non-financial content includes general information (e.g. mission, profile) and other

information related to corporate governance, employees, social responsibility, media section, description of products / services, Internet sales conditions / prices, etc.

More specifically, *strategic planning* is viewed as a process of crafting a web site's long-term vision by anticipating stakeholders' information needs and resource allocation, of setting web site objectives that are coherent with a firm's overall communication strategy, and of managing risks inherent to web-based content. *Monitoring* refers to the process of following-up on the web site content at a strategic level (as opposed to an operational level). Monitoring mechanisms could deal with important issues such as security, reliability and integrity of information. They should ensure that the web site content is aligned with the web site's aim and the overall communication strategy.

### **IT governance effectiveness**

In order to discuss the possible relationship between IT governance factors and strategic control mechanisms, and to help in analyzing the results, we present hereafter elements that could be taken into consideration to help IT governance to be effective or to improve its understanding, namely: i) key IT governance practices; ii) strategic approaches to IT; and iii) firms' IT intensity.

#### *Key IT governance practices*

In an exploratory case study of 10 Belgian financial services organizations, De Haes & Van Grembergen (2009) identified seven key IT governance practices that are present and mature (i.e. at a minimum, processes are standardized, documented, communicated and mandatory [ITGI, 2003]) in high performers in terms of business / IT alignment. These practices are: Chief Information Officer (CIO) reporting to Chief Executive Officer (CEO), IT steering committee, IT project steering committee, portfolio management (including ROI and business cases), project governance / management, IT budget control and reporting, and IT leadership by CIO in articulating and communicating a vision for IT's role in

the firm. The first three practices relate to structures, the following three involve processes, and the last one is in the area of relational capabilities.

### *IT strategic approach*

According to Nolan & McFarlan (2005), having the Board of Directors audit committee deal with IT governance risks is fine for organizations that have a defensive approach to IT, i.e. that have either a “support mode” or a “factory mode” strategic approach to IT. In the support mode, firms use technology basically to support employees’ tasks and firms do not strategically depend on IT systems. In the factory mode, organizations need highly reliable IT systems as their operations depend on the Internet and business can be lost in the event of a systems failure; however, they are not proactive seekers of IT innovations for competitive advantage. In contrast, organizations that have an offensive approach to IT, i.e. that have either a “turnaround mode” or a “strategic mode” approach to IT, will need the support of an IT strategy committee of the Board of Directors. In the turnaround mode, firms are in the midst of a strategic transformation that involves an important IT project with the objective of gaining a competitive advantage and cutting costs; this mode is usually transitory and firms subsequently move to a factory or strategic mode. In the strategic mode, firms need reliability of their systems, but “they also aggressively pursue process and service opportunities, cost reductions, and competitive advantages” (Nolan & McFarlan, 2005, p. 101).

### *IT intensity*

Indeed, a Board can establish an IT strategy committee to ensure that the risks associated with IT are properly managed and mitigated, and to strategically align IT with business objectives (ITGI, 2003). Alternatively, the Board itself, with the help of members with IT backgrounds or knowledge, could discharge these duties. A firm’s IT intensity should drive the amount of time and attention the Board of Directors spends on IT governance (Parent & Reich, 2009). In a study of 17 medium-to-large sized organizations in the financial services and primary resources industries, Huff et al. (2006) find that risk is

the number one concern of all Boards. However, this preoccupation is dealt with at the audit committee level for the vast majority of firms. In more IT intensive firms (i.e., for financial services firms), business continuity in the face of an IT disaster is a concern discussed by whole Boards (as opposed to committees of the Boards) (Huff et al., 2006). Moreover, few whole Boards discuss alignment of IT with corporate strategic orientations or IT development, structure and effectiveness (Huff et al., 2006). Furthermore, having an IT strategy committee for the Board seems to be a rare occurrence as none of the firms represented in Huff et al.'s (2006) and Bart & Turel's (2009)<sup>3</sup> studies had such a committee. Overall "most Boards seem to be passive receivers of information about IT as opposed to aggressive, proactive questioners" (Huff et al., 2004, p. 2). These authors suggest that the low level of IT involvement stems from Board members' lack of IT experience or competence. Nevertheless, Boards of high IT intensity firms ought to seriously consider having an IT strategy committee as it can significantly impact the overall effectiveness of IT governance (Ali & Green, 2007).

### **Relationship between IT governance structures and strategic control mechanisms related to web site content**

Effective IT governance is associated with active involvement of the IT steering committee<sup>4</sup> and having a balanced representation of senior business and IT executives on the steering committee (Bowen et al., 2007; Rau, 2004). According to Duffy (2002), the Board of Directors has to confirm that the IT department is delivering the maximum as defined in the organization's strategic plan and to ensure that policies require the plan to be validated and updated on a regular basis. The CEO has to ensure that business and IT strategies are fully harmonized; he has to define CIO's roles and to support him in

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<sup>3</sup> Bart & Turel (2009) surveyed 107 Canadian Board members to determine usage and importance of 27 questions related to IT governance. Risk assessment regarding IT usage, business continuity and privacy issues were found to be important matters.

<sup>4</sup> The IT steering committee should involve at least the CEO / Chief Operating Officer (COO), CIO, CFO and the heads of majors user areas of technology or the heads of the strategic business units (Rau, 2004).

responding to the Board's requirements. The CIO has to interpret the business strategy in terms of IT requirements and to seek ways to increase IT value contribution. Overall, executives' and Board members' roles with respect to IT may influence the degree of use of strategic control mechanisms such as strategic planning and monitoring.

The web-based disclosure process could benefit from effective IT governance. More sophisticated IT governance structures (such as an IT strategy committee or a CIO on the Board) could lead to greater support and commitment to web site content maintenance and improvement; it could also lead to more sophisticated strategic planning and monitoring with respect to web site content.

### **Relationship between IT governance processes and strategic control mechanisms related to web site content**

#### ***IT balanced scorecard***

In accordance with the business balanced scorecard (BSC) framework, the financial evaluation of an organization (financial perspective) should be complemented with measures related to customer satisfaction (user perspective), internal processes (internal perspective) and the ability to innovate (innovation perspective) (Kaplan & Norton, 1992). The BSC has been applied in the IT function and its processes. The use of an IT BSC aligned with a business BSC may support the IT governance process (Van Grembergen et al., 2004). The IT BSC should aim at: i) aligning IT plans and activities with business goals and needs; ii) aligning employees' goals toward IT aims; iii) developing measures to evaluate IT effectiveness; iv) maintaining IT performance; and v) achieving balanced results among stakeholders. Indeed, the use of an IT BSC drives an organization's IT strategies and the IT follow-up.

An organization's business BSC may indicate that its strategy is to reach more shareholders / investors, clients and the public at large (three groups of stakeholders explicitly referred to in the corporate mission) (user perspective) more quickly. This could be reflected in the communication strategy and in the IT BSC by choosing to use web site technology and to develop the organization's web site content (internal perspective). To do so, the firm might decide to train and educate IT staff in emerging technologies (innovation perspective). If a firm aligns its IT goals to its business goals, it might also align its web site aim with these goals. The firm could hire employees with high IT skills and experience with web site content maintenance and improvement. This could influence the strategic planning and monitoring mechanisms related to web site content.

### ***COBIT framework***

A COBIT framework can support IT governance (ITGI, 2006). It can be used by management to assist in balancing risk and control; auditors can also use it to support their opinion or to provide advice to management on internal controls (Bodnar, 2006). With four groups of processes (plan and organize; acquire and implement; deliver and support; monitor and evaluate) to manage IT resources, this framework provides the information that an organization needs to achieve its strategic goals (Damianides, 2005). It helps to deal with security, integrity, reliability and quality of information provided. Among the 34 guidelines suggested by COBIT with respect to these groups of processes, an organization may: i) define a strategic IT plan, communicate senior management's objectives, manage human resources and IT investments, and assess risks to plan and organize IT activities; ii) assess internal control adequacy, ensure compliance with external requirements and evaluate the IT performance (ITGI, 2006).

The principles derived from a COBIT framework may be used to improve strategic planning and monitoring mechanisms related to web site content. Strategic planning ("plan and organize" processes) could lead a firm to define a web site's aim, to communicate it to employees, to anticipate financial and

human resources needed to maintain and improve the web site content and to identify risks inherent to web-based disclosure. Monitoring (“monitoring and evaluate” processes) may assume the assessment of internal controls that ensure the integrity and the reliability of information disclosed on web sites. It may need to develop mechanisms to ensure that this information is in line with regulatory requirements.

### **Relationship between IT relational capabilities and strategic control mechanisms related to web site content**

“Effective IT governance is about the way senior management interacts and communicates with IT leaders to ensure that technology investments enable the achievement of business strategy in an effective and efficient manner” (Rau, 2004, p. 35). Moreover, good corporate communication systems<sup>5</sup> were found to be significantly related to the overall level of effective IT governance (Ali & Green, 2007). In fact, web-based portals can be used as part of an effective corporate communication system to inform members of the organization (Weill & Ross, 2004).

Managerial IT skills can be a source of competitive advantage (Mata et al., 1995). Moreover, CEO attitude to IT, CEO innovativeness, and CEO knowledge of IT can influence innovation adoption (Karakaya & Khalil, 2004) and Internet adoption (Thong & Yap, 1995). CEO participation in IS planning signals top management support and leads to a greater alignment between IS and organizational strategies, and to the use of IS for competitive advantage (Kearns, 2006). Organizations with more CEO commitment to e-commerce have more comprehensive e-commerce sites (Zhuang & Lederer, 2004). IT leadership by CIO in articulating and communicating a vision for IT’s role in the organization is a key IT governance practice in high performers in terms of business-IT alignment (De Haes & Van Grembergen, 2009). In

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<sup>5</sup> Good corporate communication systems enable the organization to inform employees about the existence of IT governance mechanisms as well as IT governance decisions and processes and provide support in educating the organization’s members in IT governance (Weill & Ross, 2004).

effective IT organizations (where IT is performing according to or above expectations), internal user involvement, top management participation (commitment and support) and management IT training is considerable (Brown et al., 2006).

Indeed, “effective IT governance would create the environment whereby management collaborates with the CIO or top IT management to participate in the design of a web site and the related functionality” (Brown et al., 2006, p. 258). These relational capabilities could affect the strategic planning and monitoring of web site content.

## **RESEARCH METHOD**

In this paper, we report on two case studies that are part of a research program integrating four case studies in medium to large organizations.

In each of the firms, the manager in charge of the web site, a top executive in charge of IT or his close collaborator (CIO, IT executive), a member of the Board of Directors involved in IT governance (if applicable), and a Chief internal auditor were interviewed. The selection of organizations was based on a combination of criteria related to the conceptual framework (e.g. IT intensity; presence of IT executives; presence of an internal auditor who could use the COBIT). In order to enable comparisons between cases, two selected firms offer services and rely on IT to deliver their core business while the two others manufacture and sell products, supported by IT. Overall, interviews were conducted with four executives or managers in charge of web sites, seven IT executives and / or their close collaborators, four chief internal auditors, and two Board of Directors members (17 persons were met; 14 interviews lasting 60 to 80 minutes each, totalling almost 14 hours of recording).

In the letter signed by the researchers and provided to each person interviewed, it was stated that information provided will remain anonymous and confidential and will only be used for future publication of academic or educational articles. It was also stated that the information published will not contain information allowing the person interviewed or its organization to be identified. Therefore, in this paper, generic terms (pseudonyms) are used, some characteristics are omitted and, if necessary, data are summarized.

Consulting interviews<sup>6</sup> and the conceptual framework led to the development of an interview guide (see Appendix). Overall, questions mainly focus on who (executive team, Board members, auditors) is doing what (planning, monitoring), why (strategic reasons), when (at what point in time) and how (means). The interview guide was used in semi-structured interviews. Interviews were recorded and transcribed afterwards. The analysis followed qualitative research principles outlined in Miles & Huberman (1994) and Yin (2003). To ensure reliability of coding, transcriptions were double coded by the researchers using the conceptual framework as a guide. Any discrepancies in coding were resolved through discussions. Data were then organized in tables to facilitate the analysis.

The overall objective of the research program is to obtain and describe different profiles respecting IT governance factors and strategic control mechanisms related to web site content. A within-case analysis will provide a description of the structures, processes, relational capabilities and mechanisms for each organization. A between-case analysis will focus on the commonalities and differences between them. In the following section, we present the results from the analysis of Case #1 and Case #2.

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<sup>6</sup> Details are presented in the Conceptual framework section of this paper.

## **ANALYSIS OF CASE #1 – SERV1**

Interviews were conducted with the Chief internal auditor, the CIO and the Corporate IT director, the Vice-president (VP) Communications (in charge of the corporate web site) and a Board member involved in IT governance. The Board member has more than 20 years of involvement with the firm. He is also a senior executive. He was not educated in business; he is thus a “self-made business man”. The VP Communications has 25 years of experience in communications, including three years with the organization; he holds a Bachelor’s degree in business. The Chief internal auditor has a professional designation in accounting and 20 years of experience in auditing, including several years as an internal auditor. The CIO has a Bachelor’s degree in engineering as well as several years of experience in IT. He has been with SERV1 for three years. The Corporate IT director has a Bachelor’s degree in computer science and has worked in IT for 30 years. He has been with the organization for four years.

In the following sections, we first present the organization’s profile and a description of its corporate governance environment. Thereafter, in line with the study’s objectives, we describe IT governance factors and strategic control mechanisms related to web site content. Lastly, we discuss the possible relationships between those factors and mechanisms.

### **Organizational profile**

SERV1 is a vertically integrated public enterprise in the retail industry and has grown through acquisitions. The head office is located in Canada and business units are scattered worldwide. Each business unit serves its local customers and advertisement of products is also local. The firm has been an industry leader from its inception, in business as well as in IT. Its new strategic orientation involves taking advantage of business opportunities offered by the Internet to become more competitive and to reduce costs. Transactional web sites demand the integration of high security standards for credit card

transactions (PCI DSS norms<sup>7</sup>) to be PCI certified. The organization is thus putting a lot of effort into reviewing and upgrading its processes and security standards. According to Nolan & McFarlan's (2005) typology, SERV1 is in the "turnaround mode" and has had to invest heavily in new technologies. Human and financial resources are however limited in view of the considerable task at hand (employees working in IT represent about 4% of the firm's total workforce). Recently, the corporate web site has also undergone changes to clarify the image of SERV1. Aside from the organization's profile, investor relations and career sections, the corporate web site has a media section and a social responsibility section.

SERV1's senior executives are entrepreneurs as well as business unit managers. They have a long-term vision for the firm. Their knowledge of the industry and local markets is a key success factor for the organization. The Board of Directors includes individuals proficient in finance as well as persons with more of a business orientation, as well as a person with IT expertise. Up to now, the organizational structure has been decentralized. SERV1 is now in the process of re-centralizing part of its managerial structure to consolidate its image.

### **Corporate governance environment**

Perceived as being a "trustee" by the Board member, the Board plays a defensive role by monitoring the activities, as well as an offensive role by being involved in strategic decision-making. In that respect, the Board has adopted the following philosophy along the years: "Compromise between cost, speed and quality needs to be done [...] cannot have them all [...]". The CEO is chairman of the Board of Directors. Board of Directors committees (audit committee, human resources and compensation committee,

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<sup>7</sup> The Payment Card Industry Data Security Standard (PCI DSS) is a set of requirements designed to ensure that all companies that process, store or transmit credit card information maintain a secure environment. It is managed by the major payment card brands (Visa, MasterCard, American Express, etc.) ([www.pcicomplianceguide.org](http://www.pcicomplianceguide.org)).

corporate governance committee) are comprised of independent Board members. The corporate governance committee addresses risk management issues, including IT risks.

All senior executives are members of the firm's executive committee. They usually meet twice a month. They attend the annual strategic planning meeting with all top managers. At the last annual meeting, senior executives and top managers shared a common strategic vision: the Internet was identified as a strategic priority for the organization as a whole. "We have to be competitive on the Internet. It becomes a corporate objective" (Chief internal auditor).

The VP Communications, VP Legal affairs and CFO are senior executives. They are all members of the disclosure committee (mandatory for public companies). This committee deals with major issues related to financial information and sets disclosure policies. It could address major issues related to web-based financial disclosure (e.g., if financial information disclosed on the web were different from the information disclosed by traditional means such as paper). If needed, if there is a major decision to make regarding the communication strategy, the disclosure committee makes recommendations to the Board of Directors. The Chief internal auditor is present at every disclosure committee's meeting. According to this person, the disclosure policies include only "one note" on web-based disclosure.

The VP Communications reports to the CEO. He is a member of the executive committee. He manages the corporate reputation / image and leads the communication team which includes one director for public affairs and one for web-based disclosure and press / public relations. He is in charge of the Intranet and is accountable for the corporate web site. He plays a "strategic role" with respect to transactional web sites (macro-level oversight).

The Chief internal auditor reports to the audit committee of the Board of Directors. A few years ago, he was hired to create the internal audit department in order to monitor compliance with regulations and

process optimization. He leads the internal audit team which includes an IT internal auditor. One of his concerns relates to monitoring disclosures made by business units: “Policies may be written by the corporate head office and provided to business units but sometimes there are mishaps in their application”. In that spirit, the Chief internal auditor works closely with the CFO and business units to increase compliance with firm-wide standards and guidelines. The organization’s policies are formulated in order to ensure compliance with external regulation. The internal audit short term and long term planning includes standard IT / computer systems audits to ensure that “controls exist and are functional”. “Since electronic sales are reaching almost 10% of total sales”, the Chief internal auditor anticipates looking more closely at transactional web sites in the next year.

In sum, in light of the above description, SERV1’s corporate governance environment provides the context for effective IT governance and could influence the strategic control of the organization’s web sites.

### **Description of IT governance factors**

As stated previously, IT governance consists of three main factors: structures, processes and relational capabilities. We describe below each of those factors in place at SERV1.

#### *Structures*

There is no IT strategy committee on the Board of Directors. At the Board level, IT risks are managed through the corporate governance committee. One member of this committee has IT expertise.

At the executive level, the IT steering committee includes the CEO and the other senior executives. The committee is in charge of IT decision making, IT strategic planning and IT monitoring. The CEO and

CIO are respectively president and facilitator of this committee that “prepares the CEO to discuss IT with the Board of Directors” (CIO).

The CIO reports to the CEO and is a member of the executive committee. He leads the IT department. The IT department’s mission is to “offer, develop and support IT platforms and tools for the whole group” (CIO) and to “standardize the information flow, the containers and the tools” (Corporate IT director). The CIO’s role is to contribute to the corporate mission through planning (IT department human and financial resources allocation, IT evolution, alignment with corporate strategic orientation) and monitoring (compliance with the C-52-109 Rule, the PCI DSS, etc.). The CIO views himself as an “IT generalist”.

The Corporate IT director reports to the CIO. The Corporate IT director’s role is to understand the systems; implement, document and plan systems changes; update the IT business plan and schedule; and develop IT systems in a broad sense. He is involved with all IT development groups. As previously mentioned, he has an IT educational and professional background.

The Chief security officer (CSO) is involved with the Corporate IT director in every change, and reports to him. He also works closely with the Chief internal auditor. According to the Corporate IT director, the CSO has five main responsibilities: “security, business continuity, information protection (financial and personal), compliance with rules and regulation, and work with internal and external auditors to do so.” The CSO develops and communicates IT policies to ensure compliance with rules and regulations. The CSO has an IT educational background (CISA Certified Information Security Association) and has developed knowledge of guidelines and rules as well as a feel for business and finance that makes him more of an IT-business resource than solely an IT resource.

Six of SERV1’s practices relating to structures figure among the practices that were found to be effective by experts in financial organizations (De Haes & Van Grembergen, 2009), namely IT expertise

on the Board, IT governance function / CIO, CIO on executive committee, CIO reporting to CEO, IT steering committee, and CSO. In line with results found in previous studies (Huff et al., 2006; Bart & Turel, 2009), there is no IT strategy committee of the Board. Moreover, the Board as a whole is more a receiver of information about IT than an “aggressive, proactive questioner” (Huff et al., 2004).

### *Processes*

The Board of Directors is concerned about the strategic IT orientation for many reasons: “Not having the utmost modern ITs would lead to a competitive disadvantage”; “IT should serve marketing and not the contrary”; “IT makes it possible to manage profitability based on margin” (Board member). As discussed at the last strategic annual meeting, senior executives and top managers agreed on the importance of the Internet as a strategic opportunity to reach clients: “transactional web sites are now a distribution channel” (CIO). Developing an integrated multiple channels strategy, as well as bridging corporate and transactional web sites, are key elements stemming from this orientation and are considered as SERV1 strategic priorities.

IT risk management is centered around the Board’s corporate governance committee. IT budget control, project follow-up and reporting are performed at different high levels of the organizational structure. *IT steering committee* members meet once a month to approve budgets, discuss new projects and business cases, follow up on projects, and follow up on IT expenditures over \$500,000. The *Corporate IT director and CIO* meet over the year to update IT business plans and schedules. The *CEO (as chairman of the IT steering committee)* makes the case for IT expenditures (“funding”) to the Board of Directors. Once a year, the *CIO* presents a report on IT risks to the corporate governance committee of the Board of Directors. The *CIO* also reports quarterly on IT department activities to the Board of Directors. The *IT internal auditor* ensures that computer systems control processes are effective and reviews exception reports (operational level). *Business units* monitor when “the system goes wrong” (CIO).

An IT governance framework and IT performance measurement are used by SERV1. Indeed, CSO uses COBIT to prepare artefacts, documents, etc. and is involved in every IT change. The *Chief internal auditor* will use COBIT shortly for the audit of transactional web sites, starting at a macro level. According to the CIO, no formal IT-BSC is used “as a whole”. However, a mix of formal performance measure tools is used, adapted to different audiences. As mentioned by the Corporate IT director, “many metrics are available / data on financial, operations, project management, management change, strategic plan, security, etc.” Quarterly IT department reports are used as “dashboards”, with three axes 1) financial / budget; 2) follow-up on major projects / capital expenditures; 3) follow-up on operational issues. Monthly (even twice a month) follow-ups are performed for financial issues and major projects.

Three SERV1 processes, namely IT performance measurement, IT governance framework COBIT as well as IT budget control, project follow-up and reporting were among De Haes & Van Grembergen’s (2009) effective IT governance processes. This suggests that SERV1’s IT processes are highly developed.

### *Relational capabilities*

The founders of SERV1 were pioneers in IT development. According to the Board member who was interviewed, this “influences the organizational culture with respect to IT”. Moreover, a mix of IT-business people and business-IT people have a better chance to have a shared understanding of IT. In that spirit, the Chief internal auditor / the IT internal auditor and the CSO collaborate in monitoring IT. Having business and IT people in the same building at headquarters (co-location) facilitates formal and informal communications and the development of working relationships. Further, the organization’s intranet is used to share knowledge about IT governance and responsibilities with all employees.

IT leadership was among De Haes & Van Grembergen's (2009) key minimum baseline for high performers in terms of business-IT alignment maturity. In fact, SERV1's co-founders and CIO show a great deal of leadership. Three other relational capabilities present at SERV1 are also among De Haes & Van Grembergen's (2009) effective IT governance relational mechanisms, namely senior business and IT management acting as partners, knowledge management on IT governance and co-location of business and IT management. This highlights the importance given to relational capabilities at SERV1.

Overall, IT structures, IT processes and IT relational capabilities described above suggest that SERV1's IT governance is well developed and mature. In other words, IT is under close surveillance. According to the CIO: "IT is governed closely. [However,] there is a governance problem with the transactional web sites, which are now considered as an important distribution channel [...]".

### **Description of strategic control of web site content**

As mentioned before, strategic planning and monitoring have been selected as "strategic control mechanisms" because they may help organizations improve the financial and non-financial content of their web sites. Those mechanisms can be pooled under "web site content processes".

Before describing strategic control mechanisms, and even though the a priori generic model (Fig. 2) does not include structures and relational capabilities specifically related to web site content, it should be noted that SERV1 makes use of them, to a certain extent. Indeed, a "basic" structure exists for making web site content-related strategic decisions and there are collaborative relationships among corporate executives, IT management, and business management. More specifically, the VP Communications has a formal role. He is accountable for the corporate web site content and plays a strategic role for transactional web site content. The CFO and the VP human resources are respectively responsible for the content reliability of the financial and career sections of the corporate web site. As for business units, they are not

yet “accountable for” their transactional web sites. Moreover, to ensure that web site content is aligned with the organization’s communication strategy, the VP Communications discusses major changes or concerns with co-members of the disclosure committee. Furthermore, the VP Communications is a leader with respect to social responsibility disclosure. Lastly, the Corporate IT director and the IT department team work closely with the Chief internal auditor (“considered as a control expert”) for the current major change to transactional web sites. In addition to these structures and relational capabilities, SERV1 uses strategic planning and monitoring mechanisms to control for web site content at a strategic level.

Strategic planning focuses on the integration of the firm’s multiple channels strategy and on the long-term anticipation of client needs. The fact that the Internet has been identified as a strategic opportunity by senior executives and top managers at the last annual strategic meeting is reflected in the web sites’ strategic orientation. Indeed, according to the VP Communications, developing a bridge between the corporate web site and transactional web sites is a “strategic priority”. Web site users should be able to go to from one site to another, to get the information they want, easily and without problems. In fact, the corporate web site’s aim is “to give an image to the organization” (VP Communications) while the transactional web sites’ aim is “to sell” (CIO). The former discloses general information, social responsibility, financial, media and human resources content while the latter provides marketing content (detailed description of services, Internet sales conditions / prices, etc.). According to the VP Communications, the corporate web site’s financial content and the human resources content tend to be more “static” while the other non-financial content (general information, social responsibility and media sections) is more “dynamic”. Moreover, the Internet is a communication medium that has its own dynamics. According to the VP Communications, it is therefore important to take into account its particular characteristics in order to get a strategic advantage. “For example, the corporate web site content is now used to manage relationships with journalists while 20 years ago you prepared a press release that you gave to journalists who could do whatever they wanted with it [...], nobody else had access to the press release. Nowadays, anyone can access directly my information, my version of the

facts". Furthermore, some of the general and social responsibility web site content (non-financial content) is "original" (not available in any other format) while web site financial content is usually a reproduction of paper. According to this person, "there are external pressures to disclose original content (general, media, social responsibility) on the web site [...] it is not a strategic decision [...] it just makes sense". The above discussion suggests that web site content can be directly driven by internal pressures (the organizational strategic orientation) as well as by external forces (organizational external environment).

The monitoring phase ensures that SERV1 stays on track and achieves its goals and strategies. To do so, the Board of director's corporate governance committee manages IT risks. Maintaining a corporate web site involves "a reputational risk that could become a financial risk" (CIO). The "security risk" related to transactional web site content is the main issue SERV1 has to deal with. The VP Communications is monitoring the corporate web site content. He is specifically concerned with the content that is more "dynamic" and "strategic" (general information, social responsibility and media sections). According to him, if "something goes wrong in the other areas (financial or human resources)", he will be informed "really quickly". In line with his traditional role, the Chief internal auditor performs audits to make sure that "the financial content is reliable". Until recently, he had a limited involvement in monitoring transactional web sites ("checking manual entries of on-line information"). According to him, he will use the COBIT framework shortly to develop an audit plan with the objective of performing an audit of web sites from a macro-level perspective. The IT department monitors transactional web sites at a micro level (security, transactions, program changes). To comply with PCI rules, security tests are performed by technical hackers four times a year and a vulnerability report is produced each time. Intrusion tests are done once a year.

According to the VP Communications, SERV1 does not use a formal corporate web site performance measurement system. As the owner of this web site, he "does not have formal reports to produce, and nobody is asking for them". The IT department uses a tool called "Google analytics" to obtain statistics

about the number of visitors on the site, the content they have looked at, the time spent on some pages, etc. However, those statistics have limited benefits as “no benchmarks are available”. Work may need to be done to obtain a useful analysis of the statistics but limited resources (human and financial) are allocated to the corporate web site.

Overall, strategic planning and monitoring mechanisms described above suggest that SERV1’s strategic control of web site content is not yet fully developed (low level of formal structures; strategic orientation under change; low monitoring on certain aspects of web site content; no web site leadership yet for transactional web sites). On the one hand, results suggest that the strategic control of transactional web sites is currently under change. Actually, “we put in the hands of business people a machine with which they can influence prices and firm profitability. These people can enter in the system, [...] change mark-up rules, thus changing prices and profitability” (Corporate IT director). In order to improve their strategic control and to standardize the organization’s image projected through corporate and transactional web sites, the management of transactional sites is under a centralization process. It is not an easy task to centralize and, at the same time, leave some freedom to business units that have a better knowledge of the local markets.

On the other hand, the corporate web site’s financial content is the most controlled one: even if the VP Communications is ultimately accountable for all corporate web site content, he is highly supported by the CFO with respect to reliability of the financial content; for the most part, the financial section of the corporate web site does not include new creative materials (“original” content). This is not surprising since financial disclosure is highly regulated for public companies, regardless of the medium that is used to disclose the information to stakeholders. Results also suggest that, even though the VP Communications acknowledges that it would be “nice to have” a more developed performance measurement system for the corporate web site, he also recognizes that it is managed with limited human and financial resources. In that sense, according to him, the current low level of development of this web

site's performance measurement system "is not necessarily a sign of bad governance". This suggests that there is actually some alignment between the level of resources allocated to the corporate web site and the level of sophistication of the monitoring tools used. However, since the firm is in a "turnaround mode" and has identified bridging between corporate and transactional web sites as a strategic priority, the level of resources and the sophistication of monitoring tools may both need to be increased.

### **Relationship between IT governance factors and strategic control of web site content**

Table 1 summarizes SERV1's IT governance factors and web site content mechanisms emerging from the interviews.

**Insert Table 1 about here**

Results suggest that SERV1's IT governance is more developed than its strategic control of web site content. This positions the firm in quadrant (3) of Figure 1. Results also suggest that the firm is in a "turnaround mode". This may explain why IT governance and strategic control of web sites are not yet more integrated. Figure 3 introduces SERV1's model.

**Insert Fig. 3 about here**

As shown in Figure 3, first, IT governance structures are not associated with structures related to web site content (no arrow). The formal structures related to web site content seem to derive from the corporate governance environment (described previously)<sup>8</sup>.

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<sup>8</sup> To simplify the figure, the corporate governance environment is not shown in Figure 3.

Indeed, the senior executive in charge of communications (the VP Communications), who is a member of the disclosure committee, is accountable for the corporate web site and has a right of veto on transactional web site content. Second, some IT governance structures could influence strategic planning and monitoring of transactional web site content. For example, the CSO and IT internal auditor's formal roles and responsibilities related to security may influence follow-ups on the security surrounding transactional web site content. Moreover, the Board corporate governance committee's review of IT risks might influence risk management of transactional web site content. Furthermore, the IT steering committee might address strategic planning and monitoring of transactional web site content since maintaining transactional web sites requires major IT investments. Third, relational capabilities related to web site content could be influenced by IT governance structures (the Chief internal auditor's and IT department's roles and responsibilities lead them to work together regarding current changes to transactional web sites) or corporate governance environment (the VP Communications consults with other members of the disclosure committee for major changes).

Figure 3 also highlights the relationships between IT governance processes and web site content processes. SERV1 has recently identified the Internet as a strategic opportunity to gain a competitive advantage. This organizational strategic orientation is reflected in the IT orientation as well as in the web sites' strategic orientation. In other words, IT strategic planning seems to influence transactional web sites' strategic planning because transactional web sites are of crucial importance as IT systems to reach the organizational strategic aim. However, until now, the monitoring side of web site content seems to be less associated with IT governance processes than with strategic planning. More specifically, formal IT performance measurement is in place while web site performance measurement tools are almost "non-existent". Moreover, COBIT is not used yet to monitor transactional web sites. This may be explained by the fact that the organization is in a "turnaround mode". Nonetheless, there are follow-ups on certain types of web site content (financial / corporate information, marketing / electronic transactions).

The IT governance relational capabilities may be associated with web site content processes (Fig. 3). Indeed, the IT leadership shown by the co-founders and by the CIO may explain why the Internet has been identified as an organizational strategic choice. This could affect the web sites' strategic orientation as well as the web sites' risk-related decisions. Moreover, collaboration in monitoring IT and the co-location of business and IT management may influence web site processes.

## **ANALYSIS OF CASE #2 – PROD1**

Interviews were conducted with the Chief internal auditor, the Corporate IT supervisor and the VP Communications (in charge of the corporate web site). The Corporate IT director provided us with some additional information regarding IT governance. The Chief internal auditor has a professional designation in accounting as well as several years of experience in accounting and finance prior to joining the enterprise eight years ago. The Corporate IT supervisor has an IT education and 30 years of IT experience, of which more than 15 years were acquired with the organization. The VP Communications holds degrees in business and communications and has been working in public relations for several years, including five years with the enterprise.

In the following sections, we first present the organization's profile and a description of its corporate governance environment. Then, we describe IT governance factors and strategic control mechanisms related to web site content. Lastly, we discuss the possible relationships between those factors and mechanisms.

### **Organizational profile**

PROD1 is a decentralized manufacturer that has several business sectors with business units scattered throughout North America and Europe. It is a Canadian public firm that is also listed in the U.S. This

means that the enterprise has to conform to the Sarbanes-Oxley (SOX) Act of 2002, which implies assessing its internal control as well as reporting on any deficiencies herein. As Chan et al. (2009) point out, SOX has had a major impact on companies subject to its provisions. Firms have had to remediate their internal control weaknesses and PROD1 is no exception to this obligation. Hence, the preoccupation with internal control and financial matters, including the preparation of financial statements, drives corporate as well as business unit IT systems. Further, proprietary IT applications are developed internally for business unit production purposes. IT personnel represent approximately 1.5% of the firm's total workforce. For now, PROD1 is in "support mode" in terms of Nolan & McFarlan's (2005) typology. However, it is in the process of acquiring a new ERP (Enterprise resource planning) system, an integrated information system that can serve all departments, and thus it will soon be in "turnaround mode".

Most of PROD1's senior executives as well as business unit managers have been with the organization for a long time, some since the inception of the business. The Board of Directors includes one member who has a special interest in IT, but not an IT background. Recently, the corporate web site as well as business sector web sites have undergone changes to reflect the firm's new branding and to clarify its image. Aside from the organization's profile, investor relations and career sections, the corporate web site has a products / services section and a social responsibility section. In addition, the corporate web site provides links to business sector web sites.

### **Corporate governance environment**

The Board of Directors is comprised of four committees, including the audit committee and the corporate governance committee. The audit committee addresses risk management issues, including IT risks. This committee is very concerned about the inefficiency of the information system currently being used to produce financial information and would like a change.

As part of the usual structure in a public firm, PROD1 has a disclosure committee. The firm also put in place a SOX committee to address compliance with SOX regulations. An “ad hoc” branding committee brought together representatives from communications, marketing, legal affairs as well as external consultants to standardize the corporate image throughout the firm. According to the VP Communications, “it was not an easy task” to bring together different corporate images (disclosed, among other things, on corporate and business sector web sites) and to agree on *one* corporate image.

The CFO, CIO, VP Legal affairs and VP Communications are members of the executive committee while the VP Legal affairs and the CFO attend Board meetings. The VP Communications reports to the CEO. He manages external and internal communications with all stakeholders, excluding the investors. Investor relations are under the responsibility of the Investor relations director, who reports to the CFO. The VP Communications considers himself as the “branding police” since he has to make sure that the corporate image is standardized throughout the whole firm and in all communications, including web-based reporting on business sector web sites and the corporate web site for which he is accountable. He also leads the public affairs and social responsibility team. The VP Communications sends a monthly letter to inform marketing / communications representatives about firm-wide communication and public relation activities, including web-site related activities.

The Business risk director reports to the CFO, and supervises the Chief internal auditor. The Corporate IT supervisor reports to him for his work regarding IT controls. The Business risk director deals with risk management and special projects. In fact, it is the Business risk director who periodically presents the internal audit (and IT control) activity reports to the audit committee. Therefore, this person is the channel for the Chief internal auditor and the Corporate IT supervisor in terms of reporting to the audit committee.

More specifically, PROD1’s Chief internal auditor performs audits on internal controls related to financial processes, in order to make sure that internal controls are identified, applied and efficient at year-

end (to comply with SOX regulation). The Chief internal auditor attends the SOX committee meetings. He relies on the Committee of Sponsoring Organizations (COSO) framework as a basis to control financial information and to inform the finance team about risk management and strategic planning. Internal audit planning is closely linked to the finance department's activities. Weekly meeting calls between internal auditors spread out in different locations help to standardize judgment calls on controls and to discuss financial issues. Quarterly meetings between them (monthly meetings in intensive period) take place to discuss pre-testing and internal audit procedures.

It should also be noted that PROD1 uses a web-based portal to facilitate the exchange of information between parties involved in corporate and IT governance (e.g. risk management, internal audit, IT control). Indeed, information about risks, test plans and results, and all related documentation, can be accessed by these parties, as authorized.

### **Description of IT governance factors**

As we did previously for SERV1, we describe below structures, processes and relational capabilities in place at PROD1.

#### *Structures*

The Board of Directors has no IT strategy committee. However, the audit committee addresses IT risks regarding financial controls. Moreover, the chairman of the Board is also the chairman of the IT project steering committee. This committee includes representatives from the finance team, the IT team and the executive committee. It is in charge of the IT project regarding the acquisition of an ERP system.

The CIO has an accounting education and is a member of the executive committee. He brings IT issues to the executive committee. However, it is the CFO who brings the IT issues to the Board of Directors since he attends all meetings. The CIO supervises the Corporate IT director whom is in charge of the IT department. The IT department's mission is to develop and support IT applications for the whole firm (corporate, business sectors and business units). According to the Corporate IT director, IT people are "strategy consultants".

The Corporate IT supervisor reports to the Corporate IT director. He deals with the IT aspects of internal control and works closely with the Chief internal auditor and the Business risk director to ensure that PROD1 complies with SOX regulation. The Corporate IT supervisor is the IT representative at finance meetings. While the Corporate IT director has an "IT profile", the Corporate IT supervisor has developed an "IT-business profile" over the years combining an IT education and experience with some business knowledge acquired by working closely with the Chief internal auditor, being the IT representative at finance meetings and consulting the CIO who has an accounting background. Business sector IT controllers report to the Corporate IT supervisor and are trained by him regarding COBIT procedures. Guided by the Corporate IT supervisor, internal auditors test IT controls in different business unit locations. It should be noted that Business sector IT directors manage their sector's IT development related to production processes.

Four of PROD1's practices relating to structures are among the practices that were found to be effective by De Haes & Van Grembergen (2009), namely IT governance function / CIO, CIO on executive committee, IT project steering committee as well as audit committee in terms of the Board overseeing IT control activities. In line with results found in previous studies (Huff et al., 2006; Bart & Turel, 2009) and for SERV1, the Board has no IT strategy committee. However, the Chairman of the Board has an interest in IT since he also chairs the IT project steering committee while the CFO also brings IT matters to the Board. Therefore, the Board seems to be concerned with IT matters.

### *Processes*

As stated previously, the audit committee wishes for a change in IT systems used to prepare financial information. IT supports finance needs by assessing what would be the best solution (internally developed systems or buying ready-made new applications). There is no planned IT orientation yet but IT tools for finance and accounting purposes are under study.

IT is aligned with PROD1's business aim / strategy. Indeed, according to the Corporate IT director, the IT project currently under study ("the ERP project") is a "business project [...] where IT has a role to play, in line with the business aim / strategy". Moreover, the IT department's strategic planning is based on business needs.

In that spirit, IT risks are addressed through business risk management. IT risk management is centered on the audit committee. The web-based portal includes a risk matrix. IT control testing, follow-up and reporting are performed at different levels of the organizational structure. IT reports and important IT investment decisions are brought *to the Board of Directors by the CFO*. The *Business risk director* presents IT control activity reports (as well as internal audit activity reports) *to the audit committee*. Monthly meetings between the *Corporate IT supervisor and Business sector IT controllers* are held to discuss new controls, control adjustments and testing results. *Business Sector IT controllers* test IT control in sectors while *internal auditors* test IT controls in business unit locations. Periodic reports are available on the web-based portal to authorized representatives from the executive, internal audit or external audit teams. Those reports highlight PROD1's audit results with respect to SOX compliance, including reports on IT controls.

PROD1 uses the COBIT framework to “support finance and to have a good IT governance” (Corporate IT supervisor). IT controls are based on this framework and they are reviewed annually. A new IT application may need new IT controls. If so, “it is now a standard procedure” (Corporate It supervisor) to select those controls based on the COBIT framework. PROD1 does not use a formal IT performance measurement system such as an IT BSC or a similar tool.

Two PROD1 processes, namely the IT governance framework COBIT and IT control testing, follow-up and reporting (self-assessment on the governance and control over IT) were among De Haes & Van Grembergen’s (2009) effective IT governance processes. In fact, IT is closely supervised because of SOX compliance.

#### *Relational capabilities*

The CIO has started the implementation of IT controls. He still acts as a leader in that area since he is consulted by the Corporate IT supervisor. As mentioned before, the CIO has an accounting education; the Corporate IT director has an IT profile and the Corporate IT supervisor has an IT-business profile. This mix of IT-business competence can help them to deal with IT issues. The CFO, CIO and chairman of the IT project steering committee work together on the project to change the information system to an ERP system. The Corporate IT supervisor, Corporate and Business sector IT controllers and internal auditors collaborate to monitor IT control at different levels (corporate, business sectors and business units). The web-based portal is used to share knowledge about corporate and IT governance between internal auditors, the IT team, the executive team and external auditors.

Four relational capabilities among De Haes & Van Grembergen’s (2009) effective IT governance relational mechanisms are present at PROD1, namely IT leadership, senior business and IT management acting as partners, knowledge management on IT governance and cross-training. Overall, as for SERV1,

PROD1's IT structures, IT processes and IT relational capabilities described above suggest that the firm's IT governance is well developed.

### **Description of strategic control of web site content**

As we did in SERV1's analysis, we describe hereafter PROD1's web site content structures and relational capability mechanisms before describing PROD1's web site content processes.

The VP Communications is ultimately accountable for the corporate web site content (as well as the web site look and design) and is the "branding police" for business sector web sites. He is used as an internal expert in communications by human resources, finance or legal affairs representatives who have respectively the responsibility to feed the web site with the human resources, financial and governance content. The VP Communications also sends a monthly letter to marketing / communications managers addressing, among other things, web issues.

In addition to these "basic" (as opposed to "sophisticated") structures and relational capabilities, PROD1 strategically controls for web site content up to a certain extent. Indeed, according to the VP Communications, the corporate web site's aim is informally limited to inform stakeholders. Moreover, the web site has not been identified as a strategic priority. Furthermore, the senior executives and top managers do not yet share a common strategic vision of the web site. In that context, it is not surprising to find that web site risk management is centered only on the corporate reputation / image risk and that follow-up procedures on web site content are not developed at all. In fact, the Investor relations team makes sure that PROD1's financial information (web-based or not) complies with regulations. Otherwise, there is no formal procedure to follow up on web site content (other than the budget control for the expense account related to the web site as a whole). It should also be noted that PROD1 does not use any

formal web site performance measurement tools except some statistics, such as the number of visitors on the site.

Overall, web site content strategic planning and monitoring described above suggest that PROD1's strategic control of web site content is not developed. It is done more informally and intuitively. According to the VP Communications, the corporate web site "has no aim more specific than informing. [...] there was a huge update to do (with respect to branding) and that was done. [...] Now, it is time to decide where to go, the next step [...] but it may not be necessary to have a huge and heavy process [surrounding web site strategic control] [...] Also, resources allocated to the web site are limited".

### **Relationship between IT governance factors and strategic control of web site content**

Table 2 summarizes PROD1's IT governance factors and web site content mechanisms emerging from the interviews.

**Insert Table 2 about here**

Results suggest that PROD1's IT governance factors are well developed while its strategic control of web site content is not even at an early stage of development yet. This positions the organization nowhere in Figure 1, suggesting that there is no association between IT governance and strategic control of web site content. Figure 4 illustrates PROD1's model.

**Insert Fig. 4 about here**

As shown in Figure 4, overall, neither IT governance structures or processes nor relational capabilities are associated with web site content mechanisms (no arrows). In fact, the VP Communications' role with

respect to web sites is closely linked to his two main responsibilities (maintaining the corporate reputation and being the “branding police”), which are part of the corporate governance environment. More specifically, no parties identified in IT governance structures, no formal IT governance processes or informal IT governance relational capabilities seem to be linked to web site processes. As the Corporate IT director said, the IT team “does not verify web sites”. Furthermore, informal web site relational capabilities also seem to derive from the corporate governance environment.

### **BETWEEN CASES ANALYSIS**

Both organizations’ level of IT governance is well developed. However, the driver for IT governance is different for the two firms. In the case of SERV1, the need to have secure transactional web sites that offer the most up-to-date functionalities is behind the elaborate IT structures and well-developed IT processes. For PROD1, manufacturing needs to lead the development of tailor-made programs by the IT team while finance needs, including compliance with SOX, drive the concern for internal control, including IT controls.

In terms of IT structures, IT risks are examined by the Board’s corporate governance committee for SERV1 while they are reviewed by the audit committee in the case of PROD1. This situation reflects the business strategy of each firm: for SERV1, IT is vital for business because of its transactional web sites while for PROD1, the important concern relates to having no internal control weaknesses, including for IT, to ensure adequate financial statement preparation. IT concerns are brought to the Board by the CFO in the case of PROD1 while the CIO reports present IT matters to the Board in SERV1. This reflects the fact that finance drives IT in the case of PROD1 while for SERV1, business strategy is the impetus. Similarly, SERV1 has a permanent IT steering committee while PROD1 has an IT project steering committee for the purpose of the planned ERP acquisition.

In terms of IT processes, IT is seen as a strategic competitive advantage by SERV1 while it has more of a support function for PROD1 for the preparation of financial statements and for business production. Both organizations use COBIT as their governance framework. However, their IT performance measurement is different as SERV1 uses dashboards while PROD1 does not use a formal IT performance measurement system.

In terms of relational capabilities, collaboration in monitoring IT exists at both firms. However, there is more sharing of knowledge on IT governance at PROD1 than at SERV1. At PROD1, Business sector IT controllers are educated on COBIT and IT controls while the internal auditors have been asked to audit the small set of IT controls in place at the various business unit locations (cross-training). Further, the web-based portal is used to communicate all information related to processes and controls.

Finally, it can be noted that since PROD1 has to comply with SOX, the overlap between corporate and IT governance is greater in its case than for SERV1.

With regards to web sites, both enterprises place the corporate web site under the authority of the VP Communications. In both cases, this person deals with individuals in charge of particular functions such as the Human resource director or the CFO in relation to the content of the web site under their authority. Only in the case of PROD1 is a formal account of web site activity provided to others in the organization via the information letter to communications / marketing directors.

In terms of processes / strategic control of web site content, managing the corporate image is important for both firms. However, since SERV1 has transactional web sites, the security of electronic transactions is also a concern. In fact, the presence of transactional web sites mainly explains the links between IT governance and processes / strategic control of web site content. At PROD1, there is no relationship between IT governance and strategic control of web site content. Finally, SERV1's VP

Communications views the corporate web site as a strategic tool that should be developed further while for PROD1's VP Communications, the corporate web site is more of an informational tool.

## **CONCLUSION**

To our knowledge, these case studies represent the first step in examining key components of the IT governance and strategic control environment surrounding the web-based disclosure process. The identification of IT governance and strategic control profiles should be interesting for organizations concerned about how to improve their web site content, and about the role of senior executives, the Board of Directors and auditors in the web-based disclosure process. It should help them to develop a policy to be included in their governance mechanisms, in order to oversee and coordinate web-based disclosure. More specifically, IT governance and strategic control may help firms to deal with important issues such as information security, reliability and risk management related to web-based disclosure.

Integrating IT governance and strategic control into the analysis furthers the understanding of the key strategic planning and monitoring mechanisms with respect to financial and non-financial web site content surrounding the organizations. Accounting professional bodies and regulators should thus be more able to assess the relevance to develop governance guidelines related to web-based disclosure.

Overall, these case studies are expected to contribute to the governance, strategic and IS management literature by focusing on IT governance and strategic control. This study also aims to contribute to the web-based reporting literature. It should lead to develop propositions that could be tested in further empirical research.

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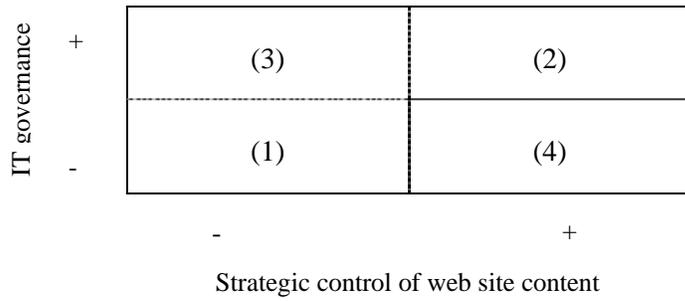


Fig. 1 Level of IT governance and strategic control of web site content

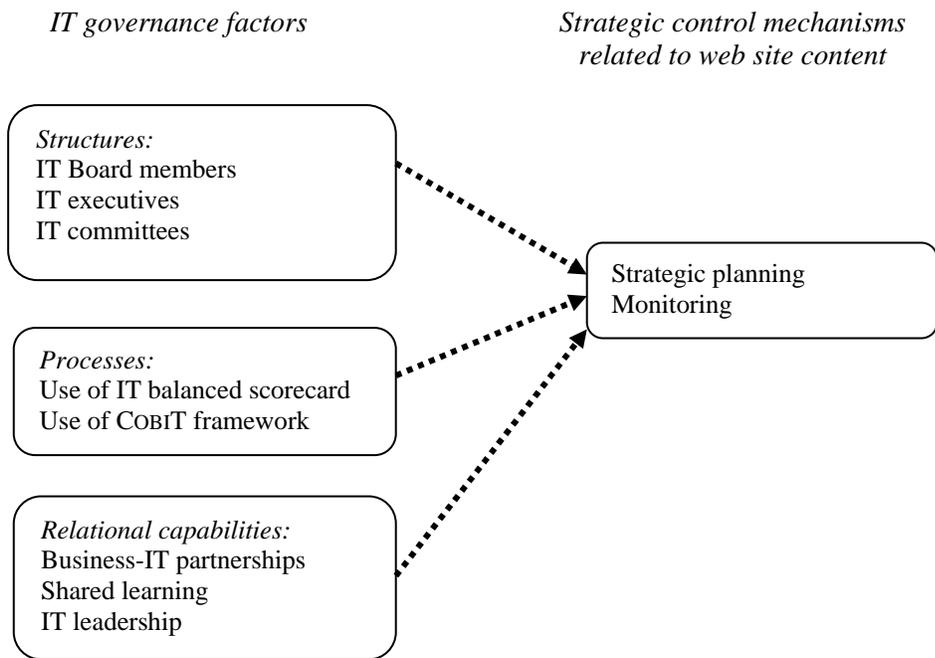


Fig. 2. A priori generic model

*IT governance factors*

*Web site content mechanisms*

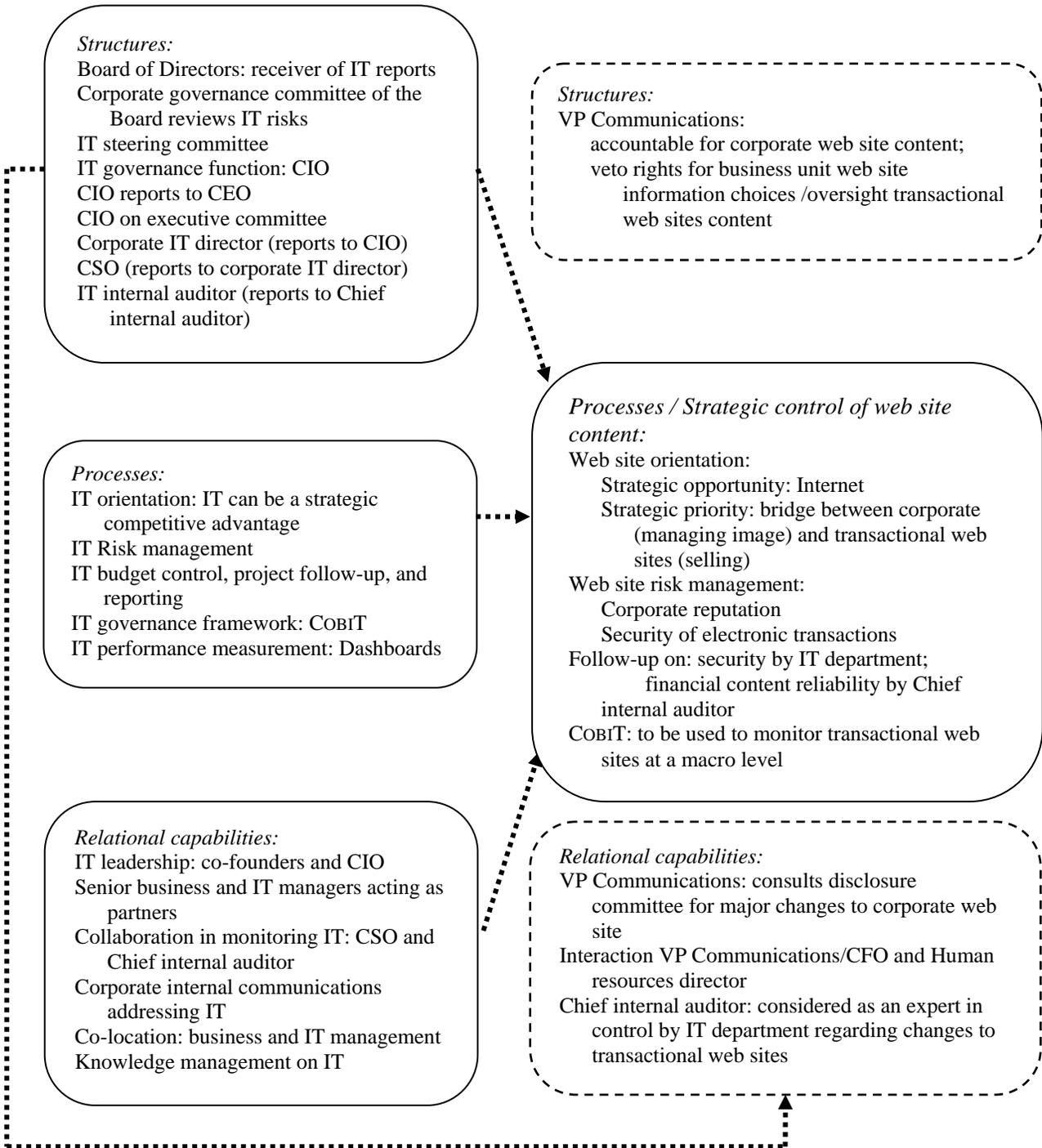


Fig. 3. SERV1 model

*IT governance factors**Structures:*

Audit committee of the Board reviews IT risks related to financial / accounting internal controls; receives IT reports from the Business risk director  
 IT project steering committee  
 IT governance function: CIO  
 CIO on executive committee  
 Corporate IT director (reports to CIO)  
 Business risk director (reports to CFO)  
 Corporate IT supervisor (reports to Corporate IT director)  
 Business sector IT controllers (report to Corporate IT supervisor)

*Processes:*

IT orientation: IT is aligned with business needs and supports the production of financial information  
 IT Risk management addressed through business risk management / web-based portal  
 IT control testing, follow-up, and reporting / web-based portal  
 IT governance framework: COBIT

*Relational capabilities:*

IT control leadership: CIO  
 Senior business and IT managers as partners: CFO, CIO and chairman of the IT project steering committee  
 Collaboration in monitoring IT control: Corporate IT supervisor, Corporate and Business sector IT controllers, internal auditors; Corporate IT supervisor consults CIO  
 Knowledge management on IT controls: web-based portal  
 Cross-training: training IT people about internal control and internal auditors about IT control

*Web site content mechanisms**Structures:*

VP Communications:  
 accountable for corporate web site and “police” for business sector web sites

*Processes / Strategic control of web site content:*

Web site orientation:  
 Provide information on the firm  
 Not a strategic priority  
 Web site risk management:  
 Corporate reputation / image  
 Follow-up on financial content compliance with regulations by Investor relations team

*Relational capabilities:*

VP Communications: consults CEO for content  
 Interaction between VP Communications / Director of investor relations; Human resources director; Legal counsel; Marketing (product description)  
 Information letter to communications/marketing directors that include information on web activity

Fig.4. PROD1 model

Table 1 – IT governance factors and web site content mechanisms - SERV1

<i>IT governance factors</i>		<i>Web site content mechanisms</i>	
<i>Structures</i>	<i>Details</i>	<i>Structures</i>	<i>Details</i>
<b>Board of Directors</b>	No IT strategy committee Corporate governance committee addresses IT risks		
<b>IT steering committee</b>	<i>Composition:</i> CEO and other senior executives CEO is president of the committee and CIO is the facilitator <i>Role:</i> IT decision-making, IT strategic planning and IT monitoring Prepares CEO to meet the Board of Directors		
<b>IT department</b>	<i>Mission:</i> Offering, developing and supporting IT tools for the whole group Standardizing the information flow, the containers and the tools	<b>IT department</b>	Is responsible for the “container” (security, reliability, robustness) / not for the content
<b>CIO (IT governance function)</b>  “IT generalist”	Reports to the CEO Is a member of the executive committee <i>Role:</i> Contributes to realize the corporate mission through planning (IT department human and financial resources allocation; IT evolution; alignment with corporate strategic orientation) and monitoring (compliance with 52-109, PCI, etc.) Heads the IT department	<b>VP Communications</b>	Is accountable for the corporate web site content  Plays a strategic role for transactional web sites content
<b>Corporate IT director</b>  “IT profile”	Reports to the CIO <i>Role:</i> Understands the systems; implements / documents / plans systems change; develops Directs Chief security officer (CSO) Updates IT business plan and schedule		
<b>CSO</b>  “IT-business profile”	Reports to Corporate IT director <i>Role:</i> Security, business continuity, information protection (financial and personal), compliance with rules Planning (system evolution, risk) and monitoring Involved in every change Issues IT security rules		
<b>IT internal controller</b>	Reports to the Chief internal auditor <i>Role:</i> Tests computer systems controls		
<b>Business units</b>	No IT business unit representatives at corporate level	<b>Business units</b>	Are not accountable yet for transactional web sites content

Table 1 – IT governance factors and web site content mechanisms – SERV1 (continued)

<i>IT Governance factors</i>		<i>Web site content mechanisms</i>	
<i>Processes</i>	<i>Details</i>	<i>Processes / strategic control</i>	<i>Details</i>
<b>IT orientation</b>	<p><b>Board of Directors</b> is concerned about strategic IT orientation</p> <p>Strategic annual meeting between senior management and top management</p>	<b>Web site orientation</b>	<p><b>Senior executives, Board of Directors and top management</b> share a common strategic vision: Internet is an opportunity to reach clients</p> <p><b>Strategic priority</b> Bridge between corporate and transactional web sites</p> <p><b>Corporate web site aim</b> Projecting the organization's image Reach different audiences with strategic content</p> <p><b>Transactional web sites aim</b> Selling</p>
<b>IT risk management</b>	Centered around corporate governance committee	<b>Web site risk management</b>	<p><b>Corporate web site</b> Reputation / image risk that could become a financial risk managed by VP Communications</p> <p><b>Transactional web sites</b> Security risk managed by IT department</p>
<b>IT budget control, project follow-up, and reporting</b>	<p><b>IT steering committee members</b> meet once a month to approve budgets, discuss new projects and business cases, follow up on projects, follow up on IT expenditures over \$500,000</p> <p><b>Corporate IT director and CIO</b> meet over the year to update IT business plans and schedules</p> <p><b>CEO (as president of the IT steering committee)</b> makes the case for IT expenditures (“funding”) to the Board of Directors</p> <p><b>CIO</b> presents an annual report on IT risks, to the corporate governance committee of the Board of Directors</p> <p><b>CIO</b> presents quarterly a report on IT department activities to the Board of Directors</p> <p><b>IT internal auditor</b> tests computer systems, checks exception reports (operational level)</p> <p><b>Business units</b> monitor when the system goes wrong</p>	<b>Follow-up</b>	<p><b>Corporate web site</b> Chief internal auditor makes sure that web site financial content is reliable, fair and true</p> <p><b>Transactional web sites</b> Web site content audited at a micro level (for security, operations, program changes) by IT department</p> <p>Security tests by technical hackers four times a year (mandatory according to PCI rules) (vulnerability report)</p> <p>Intrusion test done once a year</p> <p>Keep trace of activities surrounding the firewall</p>

Table 1 – IT governance factors and web site content mechanisms - SERV1 (continued)

<i>IT Governance factors</i>		<i>Web site content mechanisms</i>	
<i>Processes</i>	<i>Details</i>	<i>Processes / strategic control</i>	<i>Details</i>
<b>IT governance framework</b>	<p>CSO uses COBIT to prepare artefacts, documents, etc. and is involved in every IT change</p> <p><b>Chief internal auditor</b> plans to use COBIT to audit web site transactions from a macro-level perspective at first</p>	<b>IT governance framework applied to web site environment</b>	<p><b>Transactional web sites</b> Until recently, limited involvement of chief internal auditor in transactional web sites</p> <p>COBIT will be used for web site audits at a macro level</p>
<b>IT performance measurement</b>	<p>No formal “IT-BSC” as a whole but mix of formal performance measure tools, adapted to different audiences</p> <p>Quarterly IT department report used as “dashboard”, with three axes 1) financial / budget; 2) follow-up on major projects / capital expenditures; 3) follow-up on operational issues</p> <p>Monthly (even twice a month) follow-up on financial issues and major projects</p>	<b>Web site performance measurement</b>	<p><b>Corporate web site</b> Some statistics, not refined</p> <p>Do not use IT BSC No benchmarks No reports to produce</p>
<b>Relational capabilities</b>	<b>Details</b>	<b>Relational capabilities</b>	<b>Details</b>
<b>IT leadership</b>	Co-founders have an IT vision, are IT pioneers Influence the organizational culture		
<b>Senior business and IT managers as partners</b>	Important to have a mix of IT-business people and business-IT people at top executive level / collective IT competence / shared understanding of IT		
<b>Collaboration in monitoring IT</b>	<b>CSO and Chief internal auditor</b> work closely	<b>Collaborating in monitoring web site content</b>	<p><b>VP communications / communications department used as internal expert in communication by human resources department</b> (which is responsible for HR web site content) and <b>CFO</b> (who is responsible for financial content reliability)</p> <p><b>VP communications</b> consults the <b>disclosure committee</b> for major changes to corporate web site content</p> <p><b>Chief internal auditor used as internal expert in control by IT department</b> regarding changes to transactional web sites</p>
<b>Corporate internal communications addressing IT</b>	CSO issues rules / policies on security		
<b>Co-location of business and IT management</b>	<b>Business and IT management</b> are located at corporate headquarters (same building).		
<b>Knowledge management on IT governance</b>	<b>Intranet</b> used to share knowledge about IT governance and responsibilities		

Table 2 – IT governance factors and web site content mechanisms - PROD1

<i>IT governance factors</i>		<i>Web site content mechanisms</i>	
<i>Structures</i>	<i>Details</i>	<i>Structures</i>	<i>Details</i>
<b>Board of Directors</b>	No IT strategy committee Audit committee addresses IT risks		
<b>IT project steering committee</b>	<i>Composition:</i> Representatives from finance team, IT team, executive committee Chairman of the Board is chairman of the IT project committee (and member of the executive committee)  <i>Role:</i> IT project decision-making (rf. “change to ERP system”)		
<b>IT department</b>	<i>Mission:</i> Developing and support IT applications for the whole group <i>Role:</i> “Strategy consultants”		
<b>CFO</b>	Is a member of the executive committee <i>Role:</i> Brings IT issues to the Board of Directors		
<b>CIO (IT governance function)</b>	Is a member of the executive committee <i>Role:</i> Brings IT issue to the executive committee	<b>VP Communications</b>	Is accountable for the corporate web site content (and look and design) Is the “police” for the Business sector sites
<b>Corporate IT director (IT profile)</b>	Reports to the CIO <i>Role:</i> Heads the IT department		
<b>Corporate IT supervisor (IT-business profile)</b>	Reports to Corporate IT director <i>Role:</i> IT aspect of internal control / works closely with business risk director for SOX compliance IT representative at finance meetings		
<b>IT controllers</b>	Corporate IT controllers report to the Corporate IT supervisor and train the Business sector IT controllers with respect to the COBIT framework		
<b>Business sector IT directors</b>	<i>Role:</i> Manage their sector IT developments (production process)		
<b>Internal auditors</b>	Test IT controls in business unit locations		

Table 2 – IT governance factors and web site content mechanisms - PROD1 (continued)

<i>IT Governance factors</i>		<i>Web site content mechanisms</i>	
<i>Processes</i>	<i>Details</i>	<i>Processes / strategic control</i>	<i>Details</i>
<b>IT orientation</b>	<p>IT is aligned with business aim / business strategy and supports finance / accounting needs</p> <p>No planned orientation related to IT systems yet but IT tools for accounting purposes under study</p>	<b>Web site orientation</b>	<p><b>Senior executives and top managers</b> do not share a common strategic vision / no strategic web site orientation</p> <p><b>Strategic priorities</b> None have been identified yet</p> <p><b>Corporate web site aim</b> Informing</p>
<b>IT risk management</b>	<p>Centered on the audit committee</p> <p>IT risks addressed through business risk management</p> <p>Web-based portal includes a risk matrix (including IT risks)</p>	<b>Web site risk management</b>	<b>Corporate web site</b> Reputation / image risk
<b>IT control testing, follow-up, and reporting</b>	<p>Important IT investment decisions are brought <b>to the Board of Directors by the CFO</b></p> <p><b>Business risk director</b> presents IT control activity reports <b>to the audit committee</b></p> <p>Monthly meetings between <b>Corporate IT supervisor and Business sector IT controllers</b> to discuss new controls, control adjustments, test results</p> <p><b>Business sector IT controllers</b> test IT controls in sectors while <b>internal auditors</b> test IT controls at business unit locations</p> <p>Periodic reports on SOX compliance (including IT controls) available on the web-based portal to authorized representatives of the executive, IT, internal or external audit teams</p>	<b>Follow-up</b>	<p>Investor relations team to assure financial content's compliance with regulations (not only for the web site)</p> <p>No other formal procedures</p>

Table 2 – IT governance factors and web site content mechanisms - PROD1 (continued)

<i>IT Governance factors</i>		<i>Web site content mechanisms</i>	
<i>Processes</i>	<i>Details</i>	<i>Processes / strategic control</i>	<i>Details</i>
<b>IT governance framework</b>	<p><b>IT team</b> uses COBIT to support finance and to have good IT governance</p> <p>Annual review of IT controls based on COBIT</p> <p>COBIT used to select New IT controls resulting from a new IT application</p>		
<b>IT performance measurement</b>		<b>Web site performance measurement</b>	<p>Statistics: numbers of visitors</p> <p>No official reports to anyone</p>
<i>Relational capabilities</i>	<i>Details</i>	<i>Relational capabilities</i>	<i>Details</i>
<b>IT control leadership</b>	<b>CIO</b> has started the IT controls		
<b>Senior business and IT managers as partners</b>	<p><b>CIO</b> has a business profile while the <b>Corporate IT director</b> has an IT profile and the <b>Corporate IT supervisor</b> has an IT-business profile</p> <p><b>CFO, CIO and chairman of the IT project steering committee</b> work together on the project to change the information system to an ERP system</p>		
<b>Collaboration in monitoring IT control</b>	<p><b>Corporate IT supervisor, Corporate and Business sector IT controllers, internal auditors</b> collaborate to monitor IT control at different levels (corporate, business sectors and business unit locations)</p> <p><b>Corporate IT supervisor</b> consults with the <b>CIO</b></p>	<b>Collaborating in monitoring web site content</b>	<p><b>VP communications used as internal expert in communication by human resources department</b> (which is responsible for HR web site content), <b>Investor relations department</b> (which is responsible for financial content reliability) and <b>Legal affairs department</b> (which is responsible for governance content)</p> <p><b>VP Communications</b> consults the <b>CEO</b></p>
<b>Knowledge management on IT governance</b>	Web-based portal includes information about IT risks, test plans and results, documentation on IT controls		
<b>Corporate internal communications addressing IT</b>		<b>Corporate internal communications addressing web issue</b>	Monthly letter sent by <b>VP Communications to marketing / communications managers</b> addressing web issues (among other things)
<b>Cross-training</b>	Corporate IT supervisor trains IT people about internal control (to become Business sector IT controllers) and internal auditors about IT control		

## APPENDIX – Interview guide

### *IT governance factors*

Is there a top executive or a Board member in charge of IT and, if so, what is the professional background of those IT executives and IT Board members?

What are their current roles? Have their roles evolved over time?

Are they involved in IT strategic planning and monitoring and, if so, to what extent?

What is the relationship between the IT executive and the IT Board member?

Are IT BSC or COBIT framework used by organizations and, if so, who is using them and how are they used to plan and monitor IT activities?

Does an IT BSC refer to web site content development / improvement / management?

Is a COBIT framework used to control the web site implementation / redesign, or to monitor the web site content? If so, has it been used by internal auditors?

### *Strategic control mechanisms related to web site content*

Are web site objectives formulated and, if so, what are those objectives?

Are strategic decisions about web site content incorporated into the organization's overall communication strategy?

Are strategic actions coordinated with this strategy?

Have the risks inherent in web-based disclosure been identified (e.g. lawsuit if information is wrong, providing strategic information to competitors)?

Are actions anticipated to manage those risks?

Are stakeholder information needs, as well as financial, human and material resources, anticipated on a long-term basis?

Are the executive team or the Board members concerned about issues such as security, reliability and integrity of information?

More specifically, who is concerned? Why are they concerned (e.g. compliance with regulations, avoiding lawsuits, creating value, etc.)?

What mechanisms are they using to follow up on those concerns?

How and when are they used?