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# Exploring the Contemporary State of Information Technology Governance Transparency in Belgian Firms

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## Abstract

Building on an IT governance disclosure framework proposed by prior research, this paper provides an exploratory insight in the contemporary state of IT governance transparency in Belgian firms. Specifically, this research has three objectives. First, the rate and content of IT governance disclosure in annual reports is analyzed. Second, the role of IT usage intensity in IT governance disclosure is investigated. Finally, the relationship between ownership structure and IT governance disclosure is discussed. Our findings show that Belgian firms exhibit low IT governance disclosure rates in general, indicating room for improvement. We also find some preliminary evidence that IT governance disclosure is positively related to IT usage intensity level, and that listed firms tend to be more concerned with disclosing on their IT governance compared to firms that are not listed, given a comparable level of IT usage intensity. These are fruitful areas for future research. Specific examples of how real firms report on aspects of IT governance are provided that serve as hands-on examples of potential reporting strategies for practitioners.

## Short Abstract

This paper provides an exploratory insight in the contemporary state of IT governance transparency in Belgian firms. Our findings show that Belgian firms exhibit low IT governance disclosure rates in general. We also find preliminary evidence that IT governance disclosure is positively related to IT usage intensity level; and that listed firms tend to be more concerned with disclosing on their IT governance compared to non-listed firms, given a comparable level of IT usage intensity.

Keywords: IT governance, transparency, disclosure, sector analysis, IT usage intensity, annual report

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# 1. Introduction

The importance and potential benefits of IT governance are known for over a decade now. Weill & Ross (2004) state that *“effective IT governance is the single most important predictor of the value an organization generates from IT”*. Many studies have identified mechanisms for IT governance (e.g. Huang, Zmud, & Price (2010); Weill & Ross (2004); De Haes & Van Grembergen (2009); Trites (2004); Ali & Green (2012) etc.). Due to a direct link between corporate governance and IT governance (Weill & Ross, 2004), many corporate governance mechanisms are translated into the IT governance domain. An important issue in corporate governance literature is transparency (Augustine, 2012; Millar, Eldomiaty, Choi, & Hilton, 2005; Morris, Pham, & Gray, 2011). However, the issue of IT governance transparency has received little attention in academic research (Joshi, Bollen, & Hassink, 2013). Recently, Joshi et al. (2013) proposed a framework to assess the level of IT governance disclosure, together with a call for additional empirical research to contribute to the under-researched topic of IT governance disclosure. In response we aim to make an exploratory empirical contribution to the field of IT governance disclosure. The main objectives of this study are to: (1) analyze the rate and content of IT governance disclosure in annual reports of Belgian companies, (2) investigate the role of IT usage intensity in IT governance disclosure, and (3) investigate the relationship between ownership structure and IT governance disclosure. Prior empirical research has investigated IT governance disclosure of European and US banks (Joshi et al., 2013). The present paper extends prior research by diving deeper into the European context, focusing on a specific European country (i.e. Belgium), and as such holding the corporate governance code constant over the entire analysis. Indeed, within the European context, there could be potential variations in IT governance disclosure due to variations in the corporate governance codes of different countries. While controlling for the corporate governance code, the investigation of the effects of the IT usage intensity and the ownership structure of the company on its IT governance disclosure is an important contribution to extant literature.

Following the problem statement and research objectives discussed in the previous paragraph, the following research questions are put forward:

**RQ1: What topics of IT governance are reported by Belgian companies in their annual reports?**

**RQ2: To what extent does IT usage intensity influence the level of IT governance disclosure of Belgian companies that are listed on Euronext Brussels?**

**RQ3: To what extent does ownership structure influence the level of IT governance disclosure of Belgian companies that have a high IT usage intensity?**

From the second research question, the following proposition is derived:

**P1: Firms operating in industries that are characterized by a higher IT usage intensity level disclose more on their IT governance compared to firms operating in industries that are characterized by a lower IT usage intensity level.**

Analogously, the following proposition can be derived from the third research question:

**P2: Firms that are publicly traded on the stock market disclose more on their IT governance compared to firms that are not listed.**

It should be noted that these propositions serve a more directive purpose, rather than conclusive, as the small sample size used in this research does not allow for formal statistical

significance testing. Nevertheless, we aim to provide an in-depth qualitative discussion of the issues at hand, while providing real examples from the analyzed annual reports. In the following paragraph the justification of both propositions will be discussed.

Sohal & Fitzpatrick (2002) state that high tier industries are characterized by the fact that IT is the most important factor to influence the core business of a company. They state that banking, communications, and insurance are examples of such high tier industries. On the other hand, in low tier industries IT is generally used at an operational level only, to provide automated support of basic tasks. They state that transportation, construction, manufacturing, and natural resources are typically industries that belong to this category of IT usage. Prior research also suggests that there is a positive relationship between the critical dependency on IT and the need for IT governance, which is then often manifested in a higher IT governance maturity level in such companies (De Haes & Van Grembergen, 2009). We derive the proposition that a higher IT dependency leads to more IT governance disclosure. This argument justifies the first proposition. The second proposition is justified by prior research that indicates that the disclosure of non-financial information improves the value of a firm's stock, due to a reduction of information asymmetry (Healy & Palepu, 2001). Hence, firms that are publicly listed can be expected to disclose more on their IT governance, as part of non-financial disclosure in general, compared to firms that are not publicly listed, as they have more incentive to do so.

The remainder of this paper is structured as follows. The second section provides a theoretical background to this research by presenting important concepts (corporate governance, IT governance, and IT governance disclosure), followed by a discussion of the IT governance transparency framework by Joshi et al. (2013), which will be used for our exploratory empirical research by serving as the measurement instrument for the IT governance disclosure construct. The third section presents the research scope and the research approach. The fourth section presents the results and conclusions of the empirical research. The fifth section presents the research implications (for theory and practice). Finally, the sixth section presents the limitations of this research, accompanied by translations into opportunities for future research.

## 2. Theoretical background

### 2.1. *Corporate governance*

OECD (2004) defines corporate governance as *“Corporate governance involves a set of relationships between a company’s management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined.”* Hence, potential investors are interested in the corporate governance of corporations they want to invest in. Following this line of reasoning, disclosure about corporate governance is essential from the point of view of the organization, especially if they are seeking investors. Indeed, prior research indicates that potential investors tend to evaluate the corporate governance mechanisms implemented in firms as part of their investment decision-making (Holder-Webb, Cohen, Nath, & Wood, 2008). It appears that even the mere announcement of the future implementation of corporate governance mechanisms has a positive effect on the stock price of a firm (Picou &

Rubach, 2006). Beyond financial disclosure, the disclosure of non-financial information (which includes IT governance disclosure) can improve a firm's valuation on the stock market, due to a reduction of information asymmetry (Healy & Palepu, 2001).

Following a series of scandals with great financial impact, corporate governance is now enforced through legislation in many countries. In Belgium, the corporate governance code ("Code 2009") is based on the 'comply or explain'-principle, meaning that corporations have the possibility to deviate from the corporate governance code providing there is a good explanation for this. The Belgian corporate governance code also provides supplementary guidelines on corporate governance disclosure. Specifically, the code states that the corporate governance mechanisms that are implemented in the corporation need to be reported in the annual report of the corporation. This needs to be mentioned in a specific section of the annual report, the "corporate governance statement", in which e.g. information about the composition and operation of the board of directors needs to be reported. It should be noted that the Belgian corporate governance code does not contain provisions or guidelines regarding IT governance in specific, as opposed to e.g. South-African's King III code on corporate Governance which explicitly refers the need to disclose IT governance information in the yearly report (Butler & Butler, 2010; Goosen & Rudman, 2013). However, the Belgian code mentions e.g. the reporting need regarding internal control and risk management systems, in which IT plays a very important role. The main implication for this research in the Belgian context is that it deals entirely with (public) voluntarily disclosure in the annual reports. It should also be noted that when we talk about "the board" we are referring to a unitary board structure (i.e. a single board comprising executive directors and non-executive directors).

## 2.2. IT governance

IT governance is an integral part of corporate governance (De Haes & Van Grembergen, 2009), considering IT governance exists in the realm of overall corporate governance (Weill & Ross, 2004). Weill & Ross (2004) define IT governance as *"the decision rights and accountability framework to encourage desirable behaviour in using IT"*. De Haes & Van Grembergen (2015) define the concept as *"an integral part of corporate governance and addresses the definition and implementation of processes, structures and relational mechanisms in the organization that enable both business and IT people to execute their responsibilities in support of business/IT alignment and the creation of business value from IT-enabled business investments"*. Over time, IT governance gained momentum due to more companies becoming critically dependent on IT for their business operations (De Haes & Van Grembergen, 2009).

The definition by De Haes & Van Grembergen (2015) clearly indicates that IT governance is an integral part of corporate governance, making it the responsibility of the board. Due to this direct link between both concepts, many of the issues that are discussed regarding corporate governance also apply to IT governance (Heart, Maoz, & Pliskin, 2010; Mähring, 2006; Raghupathi, 2007). Drawing on the ideas of corporate governance, IT governance can be implemented using structures, processes, and relational mechanisms (De Haes & Van Grembergen, 2009; Peterson, 2004). In the IT governance body of knowledge, many different mechanisms are reported, such as strategy committees, steering committees, portfolio management, etc. (Ali & Green, 2012; De Haes & Van Grembergen, 2009; Huang et

al., 2010; Weill & Ross, 2004). An important issue in corporate governance literature is transparency (Augustine, 2012; Millar et al., 2005; Morris et al., 2011). However, the issue of IT governance transparency has received little attention to this date in academic research (Joshi et al., 2013). Next to academic literature, the international good-practice framework COBIT 5 also refers to the importance of ensuring stakeholder transparency in the context of IT governance. In its process reference model, COBIT 5 describes this process as required to *“ensure that enterprise IT performance and conformance measurement and reporting are transparent, with stakeholders approving the goals and metrics and the necessary remedial actions.”*

### 2.3. IT governance disclosure

Since disclosure about corporate governance is essential for organizations that are seeking for investors, and IT governance is seen as an integral part of overall corporate governance, IT governance disclosure should also be considered by organizations. The importance of transparency about IT governance is mentioned in literature (Raghupathi, 2007), but is to this date vastly under-researched compared to disclosure about overall corporate governance. IT governance transparency can be defined as *“the extent to which firms provide adequate and relevant IT governance information in a timely and effective manner to their stakeholders, such as investors, policy makers, and regulatory bodies, so that they can assess management’s behaviour in using IT”* (Joshi et al., 2013). In earlier work, Weill (2004) mentions transparency in relation to IT governance mechanisms. The author states that transparency is a critical success factor of IT governance and that is about *“making each IT governance mechanism transparent to all managers. The more IT decisions are made covertly and off-governance, the less confidence people will have in the structure and the less willing they will be to play by the rules, which are designed to increase enterprise-wide performance.”* As this research deals with public voluntarily disclosure about IT governance (i.e. with the goal of informing external stakeholders), the definition by Joshi et al. (2013) is more appropriate in the context of this paper.

Few studies can be reported that investigate the effects of certain aspects of IT governance-related disclosure. Considering information security, Gordon, Loeb, & Sohail (2010) found a positive correlation between the voluntarily disclosure about information security and the market value of a company. Campbell, Gordon, Loeb, & Zhou (2003) found that a security breach, leading to unauthorized access to confidential data, has a negative impact on the value of a firm’s stock. Other studies investigated the effects of disclosure about IT investments. Investors tend to reward disclosure about IT investments when they expect that these investments will have a positive effect on current and future business value (Dehning, Richardson, & Zmud, 2003; Im, Dow, & Grover, 2001). Chatterjee, Pacini, & Sambamurthy (2002) found that investors tend to most intensely reward investments in IT infrastructure, as these investments tend to have a broad scope and a potentially large future value. Another aspect of IT governance-related disclosure that is treated in academic literature is related to the CIO function. Chatterjee, Richardson, & Zmud (2001) found that investors tend to reward the announcement of a new CIO position in organizations that are operating in an industry that is subject to IT-enabled transformation. The CIO appointment enables confidence in the capability of the firm to effectively manage its IT assets.

The previous examples suggest that the disclosure about certain IT governance-related aspects like information security, IT investments, and the existence of a CIO can have positive effects for organizations. This hence adds to the previously mentioned argument by Raghupathi (2007) on the importance of transparency about IT governance. To this effect, Joshi et al. (2013) presented an IT governance disclosure framework based on the IT governance areas as defined by the IT governance institute (ITGI, 2003). Specifically, their IT governance disclosure framework is built around the following domains: IT strategic alignment, IT value delivery, IT risk management, and IT performance measurement. 'IT strategic alignment' deals with the fact that IT investments need to support the strategic goals and objectives of an organization in order to enable the creation of current and future business value. 'IT value delivery' is concerned with the optimization of IT-enabled value creation, where value is broader than strictly monetary (e.g. competitive advantage, higher employee productivity, etc.). 'IT risk management' is concerned with the protection of IT-assets and recovery from IT-related disasters. Finally, 'IT performance measurement' is related to the IT budget and IT investments. It is specifically concerned with the expenditure on IT resources and its association to business value. For this research, the IT governance disclosure framework presented by Joshi et al. (2013) will serve as operationalization of the IT governance disclosure construct. The disclosure framework, together with a description of each item it contains, is presented in Appendix A.

The conceptual model for this research is presented in Figure 1. The dashed boxes represent the propositions at the conceptual level, while the boxes below represent the operationalization of the concepts used in this research. The concept of IT governance transparency will be operationalized using the IT governance disclosure rate derived from the IT governance transparency framework by Joshi et al. (2013). The concept of the firm's strategic role of IT is operationalized using the IT usage intensity as put forward by Sohal & Fitzpatrick (2002). Finally, the concept of firm ownership structure is operationalized using a Boolean categorization: a firm is publicly listed on the Euronext Brussels stock exchange or not.

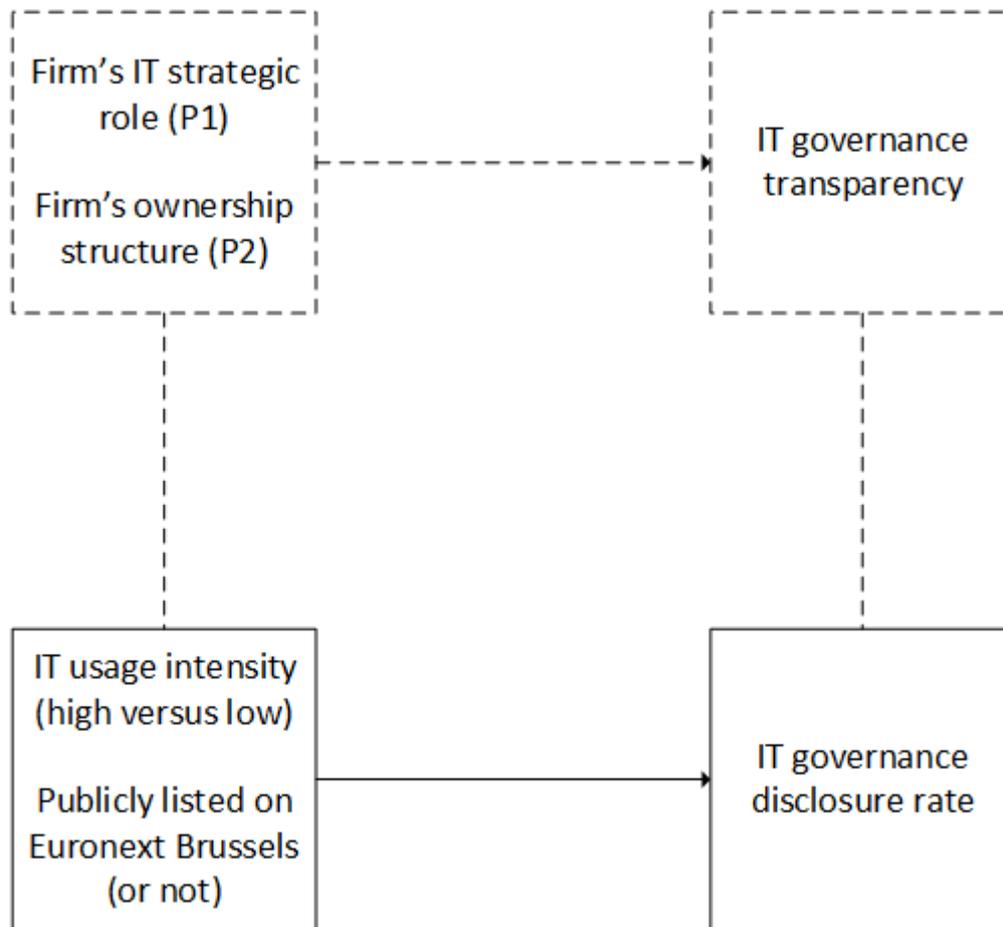


FIGURE 1: CONCEPTUAL MODEL

### 3. Research methodology

#### 3.1. Research scope

It is important to indicate that this study focuses on public corporate disclosure of IT governance (i.e. with the goal of informing external stakeholders). To improve the internal validity of this research project, the research was scoped down in order to control for potential contingency factors. Specifically, this research project was scoped down to Belgian companies to control for the applicable corporate governance code. Prior empirical research has investigated the IT governance disclosure of European Banks (Joshi et al., 2013). Within the European context, there might be variations in IT governance disclosure behavior due to different corporate governance codes. For this reason, we specifically chose to select a single country within the European context, to control for this potential variation. For the second research question, only companies listed on the Euronext Brussels (stock exchange) were included in the empirical investigation. For the third research question, only companies active in sectors that are characterized by a high IT usage intensity level were used. The specific focus on Belgian companies leads to a smaller sample size. Therefore, this research takes a more in-depth approach to discussing the issues, together with hands-on examples taken from real annual reports, as opposed to a pure conclusive/confirmatory approach.

The specific controlled factors are summarized for each research question in Table 1.

Research question	Controlled contingencies
<b>RQ1</b>	<ul style="list-style-type: none"> <li>- Country: Belgium</li> <li>- Data source: annual reports of 2013 (EN)</li> </ul>
<b>RQ2</b>	<ul style="list-style-type: none"> <li>- Country: Belgium</li> <li>- Data source: annual reports of 2013 (EN)</li> <li>- Publicly listed companies on Euronext Brussels</li> </ul>
<b>RQ3</b>	<ul style="list-style-type: none"> <li>- Country: Belgium</li> <li>- Data source: annual reports of 2013 (EN)</li> <li>- Industries: characterized by a high IT usage intensity level</li> </ul>

**TABLE 1: CONTROLLED CONTINGENCY FACTORS BY RESEARCH QUESTIONS**

As mentioned in the introduction, the grouping of companies according to the level of IT usage intensity is based on the categories that were presented by Sohal & Fitzpatrick (2002). According to their representation, high tier industries are characterized by the fact that IT is the most important factor to influence the core business of a company. Examples of such industries are banking, communications, and insurance. On the other hand, in low tier industries IT is generally used at an operational level only, to provide automated support of basic tasks. Examples of such industries are transportation, construction, manufacturing, and natural resources.

### *3.2. Research approach*

The research started with a literature review to identify opportunities for future research and copper fasten the study, and to define the main concepts used in the research project. For the empirical research stage, the following approach was used. First, the research deals with a convenience sample of firms conform the scope. Specifically, groups of four firms are selected. This smaller sample size is due to our specific focus on the Euronext Brussels to improve the internal validity of the research. The first group consists of Belgian firms that are listed on Euronext Brussels and are active in sectors that are characterized by a high IT usage intensity (i.e. belonging to the high tier industries as defined by Sohal & Fitzpatrick (2002)). The second group consists of Belgian firms listed on Euronext Brussels and are active in sectors that are characterized by a low IT usage intensity level (i.e. belonging to the low tier industries as defined by Sohal & Fitzpatrick (2002)). The third group consists of Belgian companies that are not publicly listed and are active in sectors that are characterized by a high IT usage intensity. The selection of these groups is in line with the specified research questions and propositions that were presented in the introduction. It should be noted that the goal of this paper is not to provide a high level of generalizability of the results. Rather, we focus on the internal validity of the research, while providing an in-depth view on the issues that are investigated.

The final sample is presented over the three groups in Table 2. The sector in which the firms operate is indicated in parentheses.

High tier industries, listed	Low tier industries, listed	High tier industries, not listed
ING (Banks)	CFE (Construction & Materials)	Argenta (Banks)
KBC (Banks)	Deceuninck (Construction & Materials)	Belfius Bank (Banks)

	Materials)	
Delta Lloyd (Insurance)	Saint-Gobain (Construction & Materials)	Bank Degroof (Banks)
Mobistar (Mobile Telecommunications)	Nyrstar (Industrial Metals & Mining)	Keytrade Bank (Banks)

**TABLE 2: DESCRIPTION OF THE SAMPLE (N=12)**

For each firm in the sample the English annual report of 2013 was obtained and analyzed, as these were the most recent available at the time. The annual report is a public disclosure document that is available for all firms. Additionally, Joshi et al. (2013) found that the annual report seems to be the preferred medium for sharing information regarding IT governance. The analysis of the annual reports of 2013 for all firms implies a cross-sectional analysis. The qualitative data analysis procedure that was used is conceptual content analysis. This enables the analysis of the existence and frequencies of concepts of interest (Schreier, 2012), and is hence very suitable for our purpose. Applied to this research, IT governance disclosure items will be identified in the annual reports, using the IT governance disclosure framework as a coding frame. Each annual report is manually analyzed, applying dichotomous coding for each disclosure item in the framework (i.e. a score of '1' if the item is present in the annual report and a score of '0' otherwise). Joshi et al. (2013) provide a definition for each disclosure item that was included in the disclosure framework (see Appendix A), hence improving the face validity of the items and as such supporting the coding process. For each category of the IT governance disclosure framework, an "IT governance disclosure rate"<sup>2</sup> can be calculated. As this results in a ratio, the interpretation in the context of this qualitative research is less relevant (as we are unable to test for statistical significant differences either way). Therefore, we propose to split the IT governance disclosure rate in five ordinal categories, as presented in Table 3. This allows us to provide a plain and simple way to guide our in-depth qualitative discussion.

IT governance disclosure rate	Ordinal category
0% to 20%	Very low
21% to 40%	Low
41% to 60%	Medium
61% to 80%	High
81% to 100%	Very high

**TABLE 3: IT GOVERNANCE DISCLOSURE CATEGORIES**

Finally, as a means of concluding the research, explanations for the observed results are sought in academic literature.

## 4. Results

### 4.1. Topics reported by Belgian companies in their annual reports

Table 4 **Fout! Verwijzingsbron niet gevonden.** reports the average disclosure rate of Belgian companies (N=12) for each category of the IT governance disclosure framework, using the

<sup>2</sup> *IT governance disclosure rate* =  $\frac{1}{n} \sum_{i=1}^n x_i$  (with *n* items)

ordinal categories in Table 3. The major observation from this table is that the disclosure rates never exceed “low”, pointing to the fact that there is room for improvement in the IT governance disclosure of firms in our sample. Each category of the IT governance disclosure framework will be discussed separately over the following subsections, which enables some deeper insights. For instance, ‘A CIO or an equivalent position in the firm’, belonging to the ‘IT strategic alignment’ category, is reported in the annual report of four firms out of twelve. Please note that these are reporting rates, and hence are by no means an indication that e.g. only one firm out of three has a CIO or equivalent position at the firm.

	<b>Belgian companies (N=12)</b>
<b>IT strategic alignment</b>	Very low
<b>IT value delivery</b>	Low
<b>IT risk management</b>	Low
<b>IT performance measurement</b>	Low
<b>Average</b>	<b>Low</b>

TABLE 4: REPORTING RATE PER DISCLOSURE CATEGORY

4.1.1. IT strategic alignment disclosure

<b>IT strategic alignment</b>	
IT expert on the board	0/12
IT expert with experience on the board	0/12
A CIO or an equivalent position in the firm	4/12
IT committee	1/12
IT risk is part of audit committee or risk committee	3/12
IT is part of audit committee	1/12
IT steering committee	0/12
IT planning committee	0/12
Technology committee	0/12
IT committee at an executive level	1/12
CIO or equivalent is on the board	1/12
<b>Disclosure rate (average)</b>	<b>Very low</b>

TABLE 5: STRATEGIC ALIGNMENT DISCLOSURE RATES (N=12)

The firms in our sample seem to disclose the least about ‘IT strategic alignment’. At the item-level, five out of eleven items are not even reported in a single annual report. This is a surprising result, since strategic alignment is the responsibility of the board (De Haes & Van Grembergen, 2015) and the majority of the items in the IT strategic alignment category are specifically situated at the board level. For instance, ‘IT expert on the board’ and ‘IT expert with experience on the board’ are reported in none of the analyzed annual reports. The composition of the board of directors is written in the annual reports (as this is part of the guidance in the Belgian corporate governance code), however either expertise and/or experiences of directors are not specifically mentioned (8 cases out of 12), or there are no board members with IT-related expertise and/or experiences (4 cases out of 12). Academic literature confirms that a high degree of board involvement in IT governance has a positive effect on organizational performance (Bart & Turel, 2010; Nolan & McFarlan, 2005; Turel &

Bart, 2014). The importance of IT experience at the board is also specifically mentioned. This is important considering that the board should monitor IT management to ensure that corporate objectives are supported (Nolan & McFarlan, 2005; Trites, 2004). Academic literature provides a possible explanation as to why such a low IT strategic alignment disclosure rate is observed. Nolan & McFarlan (2005) state that boards are often not aware of the importance of IT when it comes to supporting corporate objectives and the need for alignment between the overall corporate strategy and the IT strategy. Additionally, the board is often incapable to ask IT management “the right questions” due to a lack of expertise, leading to the inability to effectively monitor the management of IT (Bart & Turel, 2010). Strategic alignment is also often perceived as a very complex challenge, to the point where decision makers are unsure about how to approach the alignment challenge (Preston & Karahanna, 2009). It should also be noted that putting the CIO (or equivalent) on the board, or putting an IT committee in place at the level of the board, can help in solving these issues (De Haes & Van Grembergen, 2009). This seems to be an opportunity for the organizations in the sample, as only 1 in 12 firms reported on these items. Mobistar (high tier listed company) mentions the existence of a board-level strategic committee, which is responsible for the organization’s IT systems. The existence of a CIO position (or equivalent) at the firm is reported in 4 annual reports out of 12. However, as just indicated, only one of those annual reports specifically mentions the CIO (or equivalent) being part of the board. Belfius Bank (high tier not listed company), specifically mentions that the COO is responsible for IT and participates in board meetings. The item ‘IT steering committee’ is never reported, despite the fact that the importance of steering committees as an IT governance mechanism is clearly indicated in the literature (De Haes & Van Grembergen, 2009; Huang et al., 2010; Karimi, Bhattacharjee, Gupta, & Somers, 2000; Peterson, 2004).

Aside from putting new IT-related mechanisms in place, putting IT-related matters on the agenda of existing board-level committees (i.e. audit committee or risk committee) is also not frequently reported upon, despite being recommended in various academic studies (De Haes & Van Grembergen, 2009; Hadden, DeZoort, & Hermanson, 2003; Nolan & McFarlan, 2005). ‘IT risk is part of audit committee or risk committee’ is reported in 3 out of 12 annual reports, while ‘IT is part of audit committee’ is only reported in a single annual report. ING (high tier listed company) reports on ‘IT risk is part of audit committee or risk committee’: *“In addition, the audit committee discussed the IT incidents (DDoS attacks) at ING Bank”*. CFE (low tier listed company) reports on ‘IT is part of audit committee’: *“it [the audit committee] monitored the development and implementation of the ERP project”*.

Overall, our findings regarding IT strategic alignment disclosure are in line with prior research, which points out that firms are lacking in putting board-level IT governance mechanisms in place, as well as putting IT-related matters on the agenda at board-level (Andriole, 2009; Huff, Maher, & Munro, 2006). For instance, Belfius Bank (high tier not listed company) reports on the following advisory committees established by the board of directors in their annual report: appointments and compensation committee, audit committee, strategy committee, and risk & capital committee. Their relevant duties and remit are also indicated. However, IT-related duties are not mentioned.

#### 4.1.2. IT value delivery disclosure

IT value delivery	
IT governance framework/standard: ITIL/COBIT/ISO etc.	0/12
IT as an issue in the board meeting	2/12

Suggestion/decision/advise by the board on IT	0/12
Special report/section on IT/IT projects in annual report	3/12
IT mentioned as a strategic business issue	4/12
IT projected as strength	6/12
IT projected as opportunity	5/12
Project updates or comments	4/12
IT is explicitly mentioned for achieving specific business objectives	6/12
Comments/updates on IT performance	1/12
IT training	3/12
Green IT	2/12
Direction and status about IT outsourcing and in-sourcing	2/12
<b>Disclosure rate (average)</b>	<b>Low</b>

TABLE 6: IT VALUE DELIVERY DISCLOSURE RATES (N=12)

'IT value delivery' is more frequently reported upon compared to 'IT strategic alignment', although the average disclosure rate remains low. Academic literature provides evidence that points to incentives for firms to report on this category. Dehning et al. (2003) and Im et al. (2001) state that investors are interested in the business value that can be generated through investments in IT. Table 6 enables interesting observations at the item-level. Half of the organizations in the sample report on the use of IT to achieve specific business objectives. Indeed, it is important to disclose for the achievement of which business goals IT investments are justified in order to gain insight in the value creation that is associated with these investments. For instance, CFE (low tier listed company) provides details on their "VICS" project, a software that ultimately should lead to more contracts. Mobistar (high tier listed company) mentions: *"Additionally, the company will integrate its online system with its retailing system to improve the customer experience."* In a vaguer way, ING (high tier listed company) reports on 'IT mentioned as a strategic business issue': *"Information technology plays a crucial role in ensuring ING remains a competitive and an innovative financial services player. It underpins ING's banking and insurance business propositions"*.

Another interesting observation is that none of the annual reports mentions if the board makes suggestions or decisions regarding IT. Similarly to the reasoning concerning IT strategic alignment, this could be explained by the fact that boards are often unaware of the importance of IT or simply lack the necessary experience (Nolan & McFarlan, 2005). The same argument can be used for the item 'IT is an issue at board meetings', which is only reported in 2 out of 12 annual reports. For instance, Delta Lloyd (high tier listed company) reports that *"The Supervisory Board also devoted specific attention to cyber-crime risk. It paid a visit to the Delta Lloyd data center and was informed about the approach to such types of risk."*

None of the annual reports mentions the usage of an IT governance framework or standard. This is surprising, since according to ITGI (2011) the usage of IT governance frameworks and standards to aid the IT governance implementation increased over the years. According to their survey results, ITIL/ISO 20000 is most frequently used (by 28% of the respondents in 2010, compared to only 13% in 2006). The same upward trend can be observed with COBIT, which is used by 12.9% of the firms in 2012 compared to 9% in 2006. Hence organizations are more frequently using industry frameworks and standards to implement IT governance. However, no evidence was found on the disclosure regarding the usage of these frameworks and standards in this research. This might hence indicate a missed opportunity for firms in

the sample, if it is the case that they are using an IT governance framework/standard, but don't disclose about it. Two annual reports mention 'Green IT'. Academic literature reports that Green IT initiatives are associated with higher reductions in IT equipment energy consumption and higher profit impact of IT, hence providing hard incentives next to corporate social responsibility (Mithas, Khuntia, & Roy, 2010). Argenta (high tier not listed company) reports: *"Developing initiatives with suppliers to reduce the impact of ICT on energy and the environment [...]"*.

Reporting on IT project updates and/or comments is encouraged by academic literature, especially for intensive IT projects (e.g. ERP projects) (Mauldin & Richtermeier, 2004). We observe disclosure about the status of IT-related projects in 4 out of 12 annual reports. For instance, Argenta (high tier not listed company) reports that *"The updating of the customer and transaction applications in the branches, which started in 2011, was extended with an online people management application, the beginning of workflow management, and optimization of branch and back office operating processes."* Belfius Bank (high tier not listed company) mentions that *"In the area of keeping information secure, a great deal of work was carried out in 2012 and 2013 on developing a major Identity & Access Management (IAM) project. The business roll-out was started at the end of 2013, and will be continued in 2014 and 2015."*

Academic literature considers IT training to be critical in the realm of IT governance. IT personnel is generally highly trained and needs continuing training to keep up with rapid advances in their field (De Haes & Van Grembergen, 2009; Trites, 2004). We observe reporting regarding 'IT training' in 3 out of 12 annual reports. A few firms mention employee training (or training costs) in their annual reports. However, only few specifically mention the types of training that are available. For instance, CFE (low tier listed company) specifically mentions the types of training available to their employees, which includes IT training. Delta Lloyd (high tier listed company) reports that *"Delta Lloyd Group invested in technical measures and advanced its e-learning awareness programme to raise awareness of information security and effectively manage the risks."*

Finally, only two of the annual reports contain information regarding IT sourcing. ITGI (2011) reports that 70% of the respondents fully outsource certain IT activities, and 20% of the respondents confirm the partial outsourcing of certain IT activities. However, our findings indicate that firms seem to be less concerned about reporting on their sourcing activities. A possible explanation for the low reporting rate could be that organizations are often rather careful or even suspicious when it comes to the outsourcing of their IT activities (Derksen, 2013). If the organizations also suspect such suspicion among (potential) investors, it makes sense from their point of view to not report on this item. For instance, Argenta (high tier not listed company) remains unspecific when reporting on their outsourcing activities: *"Outsourcing takes place in operational services like computer centres [...]"*.

4.1.3. IT risk management disclosure

IT risk management	
IT is referred under the operational risk	7/12
Special IT risk management program	3/12
Use of IT for regulation and compliance	2/12
IT/electronic data processing (EDP) audit	3/12
Information and security policy/plan (IT security)	8/12
The role of IT in accounting and the reporting standards (IAS)	3/12

Operations continuity plan	3/12
<b>Disclosure rate (average)</b>	<b>Low</b>

TABLE 7: IT RISK MANAGEMENT DISCLOSURE RATES (N=12)

'IT risk management' is also more frequently reported upon compared to 'IT strategic alignment', but still shows a low disclosure rate. We first look for reasons why firms would disclose information regarding this category. The Belgian corporate governance code states that organizations should report about risk management: *"The corporate governance report also contains information about the corporate governance policy: e.g. [...] a description of the most important aspects of the internal control and risk management systems [...]"*. Given the fact that organizations are becoming more critically dependent on IT (De Haes & Van Grembergen, 2015), they become more susceptible for IT-related risks (ITGI, 2003). Hence IT-related risks become an important risk category and it makes sense for firms to report on their IT-related risk management (especially if they are critically dependent on IT). Another explanation can be found in the implementation of IT governance. ITGI (2011) reports that the improvement of risk management practices is the single most often perceived result of an IT governance implementation. This could also lead to the fact that organizations more frequently report about IT risk management.

At the item-level, 8 of 12 report on 'information and security policy/plan (IT security)'. This should come as no surprise since most companies store a lot of data, including confidential data (e.g. financial data, customer data etc.), which makes information security essential. Additionally, the introduction of new technological trends (e.g. mobile data, cloud computing etc.) often makes a revision of IT security necessary. Belfius Bank (high tier not listed company) reports on 'information and security policy/plan (IT security)': *"In the area of keeping information secure, a great deal of work was carried out in 2012 and 2013 on developing a major Identity & Access Management (IAM) project"*. ING (high tier listed company) reports *"Following the establishment of a Cybercrime Task Force in 2012, ING Bank has set up a Cybercrime Resilience Program in 2013 to structurally address the cybercrime threats. Within the programme, ING Bank has defined a wide range of measures, on top of existing IT security measures, to strengthen ING's resilience against e-banking fraud, DDoS and targeted attacks (also called Advanced Persistent Threats). To monitor and to respond to cybercrime effectively across ING Bank, a permanent central Cybercrime Emergency Response Team has been established."* As previously discussed, investors are also concerned with IT security. Gordon et al. (2010) found a positive correlation between the voluntarily disclosure concerning information security and the market value of a company. Additionally, Campbell et al. (2003) found that a security breach, leading to unauthorized access to confidential data, has a negative impact on the value of a company's stock. Given the potential impact on (potential) investment decisions, it makes sense for organizations to try and increase the confidence in their IT risk management and security.

IT is often referred to under operational risk (in 7 out of 12 annual reports). This is considered to be a good practice (Jordan & Silcock, 2005). To tackle IT-related risks, 3 out of 12 annual reports mention the existence of an 'IT risk management program'. Delta Lloyd (high tier listed company) mentions *"[...] to maintain this situation, Delta Lloyd Group has an effective IT risk management and control system in place."* KBC (high tier listed company) reports on 'special IT risk management program' by stating that information security and information technology processes are part of the third building block for managing operational risk. Most annual reports mention the existence of general risk management

and risk management programs, without specifically mentioning IT-related risk management.

‘Operations continuity plan’ is only reported in three of the annual reports. With the increasing dependency on IT (De Haes & Van Grembergen, 2015) comes the threat of the unavailability of IT. According to ITGI (2011), 13.7% of the respondents had experienced difficulties with the recovery from “IT disasters” and hence has had difficulties with ensuring operations continuity in the year the survey was conducted. Operations continuity is hence a very important concern for contemporary organizations. Academic literature also indicates that the board should be involved in the design of continuity plans (Trites, 2004). ING (high tier listed company) reports *“Despite our business continuity plans and procedures, certain of our computer systems and networks may have insufficient recovery capabilities in the event of a malfunction or loss of data.”* Delta Lloyd (high tier listed company) mentions *“Contingency ICT and business arrangements aim to restore services to markets and customers in the event of a business interruption. Contingency and continuity plans have been prepared for all critical business operations and applications.”* Other annual reports tend to mention business continuity in general, without mentioning specific areas or specific plans.

4.1.4. IT performance measurement disclosure

<b>IT performance measurement</b>	
Explicit information on IT expenditure	8/12
IT budget	0/12
IT hardware cost	3/12
IT software cost	7/12
IT manpower cost is mentioned	0/12
IT expenses are mentioned under administrative cost	3/12
IT related assets are mentioned under intangible assets	10/12
Direct cost on IT is mentioned in currency or percentage	0/12
<b>Disclosure rate (average)</b>	<b>Low</b>

TABLE 8: IT PERFORMANCE MEASUREMENT DISCLOSURE RATES (N=12)

The ‘IT performance measurement’ category also shows a low average disclosure rate. There are three dominant items in this category: ‘IT related assets are mentioned under intangible assets’ (reported in 10 of 12 annual reports), ‘explicit information on IT expenditure (reported in 8 of 12 annual reports), and ‘IT software cost’ (reported in 7 of 12 annual reports). An explanation for this can be found in legislation. Listed companies need to report their consolidated annual reports following the International Accounting Standards (IAS). IAS 38 puts software under intangible assets. Unsurprisingly, most annual reports mention the fact that software is placed under intangible assets. The majority of annual reports also contain explicit information on IT expenditure (i.e. concrete numbers). This provides an explanation as to why the combination of these three items is frequently reported upon. IAS hence also might be the reason why ‘IT software cost’ is more frequently reported as a separate category in the financial section of the annual report than ‘IT hardware cost’. Argenta (high tier not listed company) reports on ‘IT related assets are mentioned under intangible assets’ by providing a breakdown of the intangible assets in the section where the valuation principles are discussed. The annual report states: *“For the capitalization of hardware and software expenditure, mainly consisting of maintenance costs and licenses,*

*the minimum amount is fixed at EUR 10,000. Amounts lower than EUR 10,000 are charged immediately*". CFE (low tier listed company) reports that *"the main chunk of intangible assets are software licences"*. ING (high tier listed company) reports on 'explicit information on IT expenditure' by showing detailed financials for software as part of intangible assets. KBC (high tier listed company) reports on 'IT hardware cost' by mentioning financials for IT equipment as part of the 'property and equipment' category. As IAS is only mandatory for listed companies, it will be interesting to check if differences can be observed regarding these items while discussing the third research question (listed versus non-listed companies). Another potential explanation for the high reporting rate on IT expenditure is that IT management reports that IT expenditure is a critical attention point for them (ITGI, 2011). According to the survey results, 45.3% of the respondents were planning initiatives to reduce IT expenditure. Also, 38.7% of the respondents indicated that the increasing IT expenditure was perceived as a problem. Considering this, it is strange that none of the annual reports contains information about the IT budget, as this is clearly a related issue. The estimation of IT-related costs is notoriously difficult (Oz, 2005). As firms have difficulties in estimating the IT budget, they might also be reluctant to reporting these figures in their annual reports. Another plausible reason for the absence of IT budget in the annual reports might be that firms are attempting to reduce proprietary costs.

'IT manpower cost' is also never mentioned, but this can be explained by the fact that none of the annual reports contains a specific breakdown for the staff expenses at the level of the employee type or department. If staff expenses are reported, only a single figure tends to be reported for all staff combined.

#### 4.2. High tier versus low tier group analysis

In order to provide an answer to the second research question (and the first proposition that was derived from this research question), an analysis was performed between companies that are active in sectors that are characterized by a high IT usage intensity (high tier) and companies that are active in sectors that are characterized by a low IT usage intensity (low tier). The listing on Euronext Brussels was held constant (i.e. the stock of the companies is publicly traded). The results of this analysis are presented in Table 9.

	High tier listed companies (N=4)	Low tier listed companies (N=4)
IT strategic alignment	Very low	Very low
IT value delivery	Low	Very low
IT risk management	Medium	Low
IT performance measurement	Medium	Low
<b>Average</b>	<b>Low</b>	<b>Very low</b>

**TABLE 9: REPORTING RATE PER DISCLOSURE CATEGORY PER IT USAGE INTENSITY**

IT governance transparency is related to the way IT governance is implemented (Joshi et al., 2013). The way IT governance is implemented depends, among other factors, on the sector in which the firm is operating (De Haes & Van Grembergen, 2009; Nolan & McFarlan, 2005). For instance, De Haes & Van Grembergen (2015) give the example that a bank likely needs a higher IT governance maturity compared to a bricks and mortar factory. This is argued to be true because a bank is more critically dependent on IT for its business operations. Following

Sohal & Fitzpatrick (2002), this is also reflected in the IT usage intensity level. Hence, we anticipate observable differences in disclosure rates between these two sets of companies.

A direct observation from Table 9 is that our empirical research points at some evidence for the justification of proposition 1. The high tier listed companies in our sample seem to have a higher average reporting rate compared to the low tier listed companies. Overall, high tier listed companies seem to be more concerned with IT governance disclosure than low tier listed companies (specifically for the categories of 'IT value delivery', 'IT risk management' and 'IT performance measurement'). A first possible explanation is in the fact that the high tier sectors deal with services and the low tier sectors mainly deal with goods. The high tier sectors deal mainly with digital information, leading to the fact that the information intensity is greater in these sectors (Zhu, Kraemer, & Dedrick, 2004). The organizations in the low tier sectors are mainly manufacturing companies. These companies mainly use IT in a more supporting role (Zhu et al., 2004), while IT plays a more strategic role in the high tier sectors (De Haes & Van Grembergen, 2015). This leads to the fact that firms operating in the high tier sectors are in need of a higher overall IT governance maturity (De Haes & Van Grembergen, 2009), leading to a difference in IT governance transparency (Joshi et al., 2013).

The item-level disclosure rates of high tier listed companies versus low tier listed companies are presented in Appendix B. This enables some deeper discussion. Prior research indicates that disclosure about IT governance-related aspects leads to different effects (or effects of different magnitude) in different sectors. Gordon et al. (2010) investigated the effects of disclosure about information security on the market value of a company. The results indicate that the effect has the highest positive magnitude in sectors that are more dependent on e-commerce and are therefore processing confidential customer data on a regular basis. We observe that all of the high tier listed companies report on an 'information and security policy/plan (IT security)', while only 1 of the 4 low tier listed companies reports this. Related with this is the observation that two of the high tier listed companies indicate that IT risk is part of their audit committee or risk committee, as opposed to none of the low tier listed companies. The same is true for 'IT is referred under operational risk', which is reported in 3 out of 4 of the high tier listed companies' annual reports, while only in 1 out of 4 of the low tier listed companies' annual reports. According to De Haes & Van Grembergen (2015), an increasing dependency on IT comes together with an increased IT-related risk. Since the high tier companies are more dependent on IT, this could be a possible explanation for the fact that they seem to be more concerned with IT-related risks. Chatterjee et al. (2001) found that the disclosure about a new CIO function had a positive effect of the highest magnitude in sectors where IT plays a transformational role. Organizations that are active in these sectors are more critically dependent on IT. Investors therefore expect coherent IT leadership from these firms, as manifested in the appointment of a dedicated CIO function. We observe that 2 out of 4 high tier listed firms report on the existence of a CIO or equivalent in their organization, while none of the low tier listed firms reports on this item. Finally, Dehning et al. (2003) investigated the effect of the disclosure about IT investments. They found that when IT investments are reported by companies that are active in a sector where IT plays a transformational role, a positive effect on the market value of the organization can be expected. We observe that 2 out of 4 high tier listed companies have a special section in their annual report dedicated to IT, while none of the low tier listed

companies have this. Additionally, two of the high tier listed companies provide IT-related project updates or comments, three of them mention IT as a strategic business issue, and all of them clearly project IT as a strength in their annual report. However, none of the low tier listed companies does any of this. Relating to our observations, we would advise high tier companies to include such a special section related to IT in their annual report. Doing this, the firm will be forced to think about their projects and the (potential) value or contribution to the mission/goals, thus increasing the disclosure on the 'IT value delivery' category.

**4.3. Listed versus not listed group analysis**

In order to provide an answer to the third research question (and the second proposition that was derived from this research question), an analysis was performed between companies that are listed on Euronext Brussels and companies that are not publicly traded, holding the IT usage intensity level constant (high tier). The results of this analysis are presented in Table 10.

	<b>High tier listed companies (N=4)</b>	<b>High tier non-listed companies (N=4)</b>
<b>IT strategic alignment</b>	Very low	Very low
<b>IT value delivery</b>	Low	Low
<b>IT risk management</b>	Medium	Low
<b>IT performance measurement</b>	Medium	Low
<b>Average</b>	<b>Low</b>	<b>Low</b>

**TABLE 10: REPORTING RATE PER DISCLOSURE CATEGORY PER PUBLIC LISTING CATEGORY**

Potential investors tend to evaluate the corporate governance of firms as part of their investment decision-making (Holder-Webb et al., 2008). The disclosure of non-financial information can improve a firm’s valuation on the stock market, due to a reduction of information asymmetry (Healy & Palepu, 2001). Hence, firms that are publicly listed can be expected to disclose more on their IT governance, as part of non-financial disclosure in general, compared to firms that are not publicly listed, as they have more incentive to do so. Following this logic, we anticipate observable differences in the IT governance disclosure rates between listed and non-listed companies.

A direct observation from Table 10 is that our empirical research points at some evidence for the justification of proposition 2. High tier listed companies have the same average reporting rate compared to high tier non-listed companies. However, for the categories 'IT risk management' and 'IT performance measurement', more reporting was observed for the high tier listed companies in our sample when compared to the high tier non-listed companies. For the categories 'IT strategic alignment' and 'IT value delivery', roughly the same reporting was observed between both groups.

The item-level disclosure rates of high tier listed companies versus high tier non-listed companies are presented in Appendix C. This enables some deeper discussion. Interesting differences can be observed between high tier listed companies and high tier non-listed companies in the area of 'IT performance measurement'. All of the high tier listed companies disclosed explicit information on IT expenditure, IT software cost, and mentioned IT related

assets under intangible assets. For the high tier non-listed companies, only 2 out of 4 disclosed explicit information on IT expenditure, only 1 out of 4 reported IT software cost, and 3 out of 4 mentioned IT related assets under intangible assets. As mentioned earlier, listed companies are to comply with IAS, which forces them to put software costs under intangible assets. This can serve as an explanation for these observed differences. Another interesting observation is the lower reporting rate for the non-listed companies regarding some items of 'IT value delivery'. Indeed, the non-listed companies seem to be less concerned with reporting IT as a strategic business issue, mentioning IT as a strength, and mentioning IT explicitly for the achievement of specific business objectives. The findings of Dehning et al. (2003) apply here specifically. When IT investments are reported by companies that are active in a sector where IT plays a transformational role, a positive effect on the market value of the organization can be expected. Indeed, listed companies should be especially concerned about this, as they are publicly traded on the stock exchange.

#### *4.4. Conclusions*

This paper provided an exploratory insight in the contemporary state of IT governance transparency in Belgian companies. We started from the premise that the issue of IT governance transparency has received little attention in academic research. This paper put forward three objectives: (1) to analyze the rate and content of IT governance disclosure in annual reports of Belgian companies, (2) to investigate the role of IT usage intensity on IT governance disclosure, and (3) to investigate the relationship between a firm's ownership structure and IT governance disclosure.

Answering the first research question, we observed that firms exhibit low IT governance disclosure rates in general. 'IT strategic alignment' is the least disclosed category among the organizations in the sample. Overall, these results indicate that there is room for improvement in overall IT governance transparency in annual reports. Academic literature clearly suggests potential benefits of disclosure on non-financial aspects in general and IT-governance related aspects in specific, providing firms with a clear incentive to consider increasing their IT governance disclosure. While comparing our results to the extant academic literature, our study provides several new insights on IT governance transparency. It is essential to note that our study provides a unique setting to examine the level of IT governance disclosure, as we examine three propositions in the context of Belgian firms. An earlier study by Joshi et al. (2013) contrasts IT governance disclosure at institutional level. That is, how the level of IT governance disclosure differs between US and European firms. Their study shows that the overall level of disclosure for European firms is higher than for US firms. Using our study, we add to this literature by narrowing our focus to a specific country within the European setting. Thus, we keep the environment of corporate governance code and principles constant to facilitate a deeper understanding of IT governance transparency. For our sample of Belgian firms, the results suggest that the level of IT governance disclosure is on average low on all the categories of the IT governance disclosure framework. Although our result cannot be directly compared to the study of Joshi et al. (2013), we observe that the lowest disclosed category for their European firms sample is 'IT strategic alignment', which is consistent with our observation for 12 Belgian firms. Next, we also note the specific attention for IT risk management items (i.e. all the items in this category are reported at least once). This observation can also be related to the prior literature to exemplify that IT risk management is the most disclosed IT governance category (Joshi et al., 2013).

The results of the second research question, and the related first proposition, indicated that firms operating in industries that are characterized by a higher IT usage intensity level seem to be more concerned with disclosing on their IT governance compared to firms operating in industries that are characterized by a lower IT usage intensity level. This is especially so for the categories of 'IT value delivery', 'IT risk management' and 'IT performance measurement'. Overall, this result can be expected, as firms operating in high tier industries are more critically dependent on IT and are using their IT at a strategic level to enable competitive advantage.

Answering the third research question, and the related second proposition, we observed that firms that are publicly traded on the stock market seem to be more concerned with disclosing on their IT governance compared to firms that are not listed, given a comparable level of IT usage intensity. While for the categories 'IT strategic alignment' and 'IT value delivery', roughly the same reporting was observed between both groups, for the categories 'IT risk management' and 'IT performance measurement' more reporting was observed for the high tier listed companies in our sample. Overall, this result can be expected, given that literature suggests that (potential) investors tend to be interested in the governance of firms in their investment decision-making. This gives firms that are publicly traded on the stock market hence a clear incentive to try and optimize their disclosure in general, and their IT governance disclosure<sup>3</sup> in specific.

## 5. Implications

From an academic point of view, this research adds to the relatively unexplored domain of IT governance transparency. Specifically, this research adds to the empirical backbone of IT governance transparency as a research subject in general, and the IT governance disclosure framework in specific. This research extends prior empirical research regarding IT governance disclosure of European and US banks by diving deeper in the European context, holding the corporate governance code constant to the Belgian corporate governance code. While controlling for the corporate governance code, the investigation of the effects of the IT usage intensity and the ownership structure of the company on its IT governance disclosure is an important contribution. Using the Joshi et al. (2013) IT governance disclosure framework, we were able to collect some preliminary empirical evidence in support of two propositions that were grounded in prior literature. The indicated propositions serve a more directive purpose, rather than conclusive, as the small sample size used in this research does not allow for formal statistical significance testing. Nevertheless, we provided an in-depth qualitative discussion of the issues at hand, while providing real examples from the analyzed annual reports.

From a practitioners' stance, organizations are provided with hands-on examples on how they can disclose on their IT governance by showing how real organizations report on the disclosure items. Organizations can also use the IT governance disclosure framework in general to assess what could possibly be reported about their IT governance. IT governance-related aspects that are implemented in the organization but are not disclosed, can be seen as a missed opportunity for the organization. Finally, a potential contribution to practice is that corporate governance codes could incorporate some guidance, based on the present and further research, on how boards can or should report on IT governance. The same is

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<sup>3</sup> This should be especially true for listed companies that are critically dependent on IT for their daily activities (i.e. high tier of IT usage intensity).

true for practice-oriented frameworks for the governance and management of IT, like ISACA's COBIT 5 framework. Despite acknowledging the importance of stakeholder transparency about IT governance, COBIT 5 remains silent in its current form on specific transparency guidance.

## 6. Limitations and opportunities for future research

This research only deals with disclosed information. There could very well be discrepancies between what is reported and what is implemented regarding IT governance. For instance, an organization may have a dedicated CIO function, but it is possible that this is not explicitly mentioned in their annual report. It would therefore be very interesting to link this study with IT governance maturity to detect discrepancies between the IT governance implementation in organizations and their disclosure.

This study deals with a relatively small sample size. This was motivated by a strong focus on the internal validity of the research and an in-depth discussion of the issues, but it stands without question that a larger study would be interesting. If the sample size is large enough, statistically significant differences in the proportions could be tested for using z-tests, which in turn would increase the reliability. This could also enable a stronger (quantitative) validation of the IT governance disclosure framework by testing it as a set of "factorial" dimensions and specifying the categories as independent (orthogonal) or dependent (oblique).

This study presented a cross-sectional sample. Without doubt, a comparison between different points in time would be very interesting. Specifically for this study, we think about a comparison between before and after the introduction of the Belgian corporate governance code. In the US context, a comparison between before and after the introduction of Sarbanes-Oxley, etc.

Another opportunity for future research is data triangulation. This study only used annual reports as a data source. This was motivated by the fact that annual reports seem to be the preferred medium for IT governance-related disclosure. Nevertheless, data triangulation using additional data sources (e.g. press releases, company website, etc.) would enable a richer understanding of a firm's IT governance disclosure.

Another interesting research path would be to organize in-depth interviews with board members to better understand why boards are (or not) reporting on their IT governance. This would provide an even more in-depth understanding.

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## Appendix A: IT governance disclosure framework by Joshi et al. (2013)

<b>IT strategic alignment items</b>	<b>Description</b>
IT expert on the board	One or more board of directors who is/are independent or non-independent with sufficient knowledge regarding IT and information assets.
IT expert with experience on the board	One or more board of directors who is/are with sufficient knowledge as well as work experience with regard to IT and information assets.
A CIO or an equivalent position in the firm	Firm has a special CIO or an equivalent position with respect to IT and information assets at an executive level.
IT committee	A committee looking after IT and information assets at the board level.
IT risk is part of audit committee or risk committee	IT and information assets related risk are on the agenda of the Audit or Risk committee.
IT is part of audit committee	IT and information assets auditing is part of the audit committee at the board level.
IT steering committee	Firm has an IT steering committee which monitors IT management, IT spending, and related cost allocations.
IT planning committee	Firm has an IT planning committee which looks after strategic planning and investment decisions on IT and information assets.
Technology committee	A special committee which looks after IT and related technology architecture, projects, and governance issue at an executive level.
IT committee at an executive level	In some countries there is a two-tier structure of corporate governance, in this situation an IT committee may be formed at an executive level. This committee reports to the supervisory board.
CIO or equivalent is on the board	A CIO or an equivalent position is represented at the board level committee.
<b>IT value delivery items</b>	
IT governance framework/standard: ITIL/COBIT/ISO etc.	These are best practices and frameworks for IT governance. The firm has adopted or mentioned to adopt any IT governance framework.
IT as an issue in the board meeting	IT and information assets issues are explicitly discussed at the various board level meeting.
Suggestion/decision/advise by the board on IT	IT and related technology decisions, suggestions at the board level.
Special report/section on IT/IT projects in annual report	A special report or a section dedicated to provide information about IT and

	information assets.
IT mentioned as a strategic business issue	IT is mentioned as a strategic business issue to accomplish the business mission and goals.
IT projected as strength	IT and information assets are mentioned as the organizational strength to achieve the business objectives, goals etc.
IT projected as opportunity	IT and information assets are referred as the key assets to achieve the future opportunities.
Project updates or comments	Updates or comment about on-going and/or finished (successfully or unsuccessfully) IT and related projects.
IT is explicitly mentioned for achieving specific business objectives	IT has been deployed to achieve one or more specific business objective.
Comments/updates on IT performance	There is/are comments about good or bad performance of IT.
IT training	Information on IT and related training program for human resource.
Green IT	Efficient and environment friendly use of is termed as Green IT. A firm has reported on such initiative.
Direction and status about IT outsourcing and in-sourcing	Information regarding in-sourcing or out-sourcing of IT.
<b>IT risk management items</b>	
IT is referred under the operational risk	IT is considered as a potential risk to successful business functioning and being treated as an operational risk.
Special IT risk management program	Firm has a special program to mitigate IT and related technology risks.
Use of IT for regulation and compliance	IT is used to address the regulations and compliance requirements by the legal institutions.
IT/electronic data processing (EDP) audit	Firm has explicitly reported with regard to IT audit.
Information and security policy/plan (IT security)	Firm has a clear information and security policy for its stakeholders (e.g. customers, employee).
The role of IT in accounting and the reporting standards (IAS)	IT support for the accounting and to address certain framework (e.g. Basel II).
Operations continuity plan	IT and related technology continuity plans are mentioned in case of disaster.
<b>IT performance measurement items</b>	
Explicit information on IT expenditure	Financial and Non-financial statements containing information on the overall IT expenditure.
IT budget	Financial section of the document has

	disclosed the budget on IT and information assets.
IT hardware cost	Specific IT hardware cost is mentioned under the IT expenditure.
IT software cost	Specific IT software cost is mentioned under the IT expenditure.
Explicit IT manpower cost is mentioned	Specific IT man power cost is mentioned under the IT expenditure.
IT expenses are mentioned under administrative cost	IT and information assets related expenses are mentioned under the administrative cost.
IT related assets are mentioned under intangible assets	IT and related asset are referred as intangible assets and financial are provided as intangible assets.
Direct cost on IT is mentioned in currency or percentage	The information on IT spending is given in the percentage of the total revenue or in other accounting ratio.

## Appendix B: Reporting rate per disclosure item per industry type

<b>IT strategic alignment items</b>	<b>High tier listed companies</b>	<b>Low tier listed companies</b>
IT expert on the board	0/4	0/4
IT expert with experience on the board	0/4	0/4
A CIO or an equivalent position in the firm	2/4	0/4
IT committee	1/4	0/4
IT risk is part of audit committee or risk committee	2/4	0/4
IT is part of audit committee	0/4	1/4
IT steering committee	0/4	0/4
IT planning committee	0/4	0/4
Technology committee	0/4	0/4
IT committee at an executive level	1/4	0/4
CIO or equivalent is on the board	0/4	0/4
<b>Reporting rate (average)</b>	<b>Very low</b>	<b>Very low</b>
<b>IT value delivery items</b>	<b>High tier listed companies</b>	<b>Low tier listed companies</b>
IT governance framework/standard: ITIL/COBIT/ISO etc.	0/4	0/4
IT as an issue in the board meeting	1/4	1/4
Suggestion/decision/advise by the board on IT	0/4	0/4
Special report/section on IT/IT projects in annual report	2/4	0/4
IT mentioned as a strategic business issue	3/4	0/4
IT projected as strength	4/4	0/4
IT projected as opportunity	2/4	2/4
Project updates or comments	2/4	0/4
IT is explicitly mentioned for achieving specific business objectives	3/4	2/4
Comments/updates on IT performance	1/4	0/4
IT training	1/4	1/4
Green IT	0/4	0/4
Direction and status about IT outsourcing and in-sourcing	1/4	0/4
<b>Reporting rate (average)</b>	<b>Low</b>	<b>Very low</b>
<b>IT risk management items</b>	<b>High tier listed companies</b>	<b>Low tier listed companies</b>
IT is referred under the operational risk	3/4	1/4
Special IT risk management program	2/4	1/4
Use of IT for regulation and compliance	1/4	0/4
IT/electronic data processing (EDP) audit	0/4	1/4
Information and security policy/plan (IT security)	1/4	1/4
The role of IT in accounting and the reporting standards (IAS)	0/4	2/4

Operations continuity plan	2/4	0/4
<b>Reporting rate (average)</b>	<b>Medium</b>	<b>Low</b>
<b>IT performance measurement items</b>	<b>High tier listed companies</b>	<b>Low tier listed companies</b>
Explicit information on IT expenditure	4/4	2/4
IT budget	0/4	0/4
IT hardware cost	1/4	0/4
IT software cost	4/4	2/4
Explicit IT manpower cost is mentioned	0/4	0/4
IT expenses are mentioned under administrative cost	1/4	0/4
IT related assets are mentioned under intangible assets	4/4	3/4
Direct cost on IT is mentioned in currency or percentage	0/4	0/4
<b>Reporting rate (average)</b>	<b>Medium</b>	<b>Low</b>

## Appendix C: Reporting rate per disclosure item per ownership category

<b>IT strategic alignment items</b>	<b>High tier listed companies</b>	<b>High tier non-listed companies</b>
IT expert on the board	0/4	0/4
IT expert with experience on the board	0/4	0/4
A CIO or an equivalent position in the firm	2/4	2/4
IT committee	1/4	0/4
IT risk is part of audit committee or risk committee	2/4	1/4
IT is part of audit committee	0/4	0/4
IT steering committee	0/4	0/4
IT planning committee	0/4	0/4
Technology committee	0/4	0/4
IT committee at an executive level	1/4	0/4
CIO or equivalent is on the board	0/4	1/4
<b>Reporting rate (average)</b>	<b>Very low</b>	<b>Very low</b>
<b>IT value delivery items</b>	<b>High tier listed companies</b>	<b>High tier non-listed companies</b>
IT governance framework/standard: ITIL/COBIT/ISO etc.	0/4	0/4
IT as an issue in the board meeting	1/4	0/4
Suggestion/decision/advise by the board on IT	0/4	0/4
Special report/section on IT/IT projects in annual report	2/4	1/4
IT mentioned as a strategic business issue	3/4	1/4
IT projected as strength	4/4	2/4
IT projected as opportunity	2/4	1/4
Project updates or comments	2/4	2/4
IT is explicitly mentioned for achieving specific business objectives	3/4	1/4
Comments/updates on IT performance	1/4	0/4
IT training	1/4	1/4
Green IT	0/4	2/4
Direction and status about IT outsourcing and in-sourcing	1/4	1/4
<b>Reporting rate (average)</b>	<b>Low</b>	<b>Low</b>
<b>IT risk management items</b>	<b>High tier listed companies</b>	<b>High tier non-listed companies</b>
IT is referred under the operational risk	3/4	3/4
Special IT risk management program	2/4	0/4
Use of IT for regulation and compliance	1/4	1/4
IT/electronic data processing (EDP) audit	0/4	2/4
Information and security policy/plan (IT security)	4/4	3/4
The role of IT in accounting and the reporting standards (IAS)	0/4	1/4

Operations continuity plan	2/4	1/4
<b>Reporting rate (average)</b>	<b>Medium</b>	<b>Low</b>
<b>IT performance measurement items</b>	<b>High tier listed companies</b>	<b>High tier non-listed companies</b>
Explicit information on IT expenditure	4/4	2/4
IT budget	0/4	0/4
IT hardware cost	1/4	2/4
IT software cost	4/4	1/4
Explicit IT manpower cost is mentioned	0/4	0/4
IT expenses are mentioned under administrative cost	1/4	2/4
IT related assets are mentioned under intangible assets	4/4	3/4
Direct cost on IT is mentioned in currency or percentage	0/4	0/4
<b>Reporting rate (average)</b>	<b>Medium</b>	<b>Low</b>