

**THE INFORMATION ASYMMETRY ASPECT OF AGENCY THEORY IN
BUSINESS COMPLIANCE CONTEXTS: A SYSTEMATIC REVIEW**

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Abstract. *The information asymmetry aspect of agency theory constitutes a relevant risk and hinders principal-agent relationships. Business compliance implementations, therefore, must address the information asymmetry aspect. This article summarizes the existing literature concerning information asymmetry, agency theory and compliance through a systematic literature review in the Web of Science and Scopus databases. A broad set of applicable domains was identified, with varied approaches to tackle information asymmetry and mixed results. Firms with successful compliance implementations, and those who implement compliance beyond obligatory regulation achieve higher levels of performance. The systematic review also indicate promising research opportunities addressing the convergence of knowledge engineering artefacts, possibilities and knowledge management tools towards business compliance and the information asymmetry of the principal-agent problem.*

Keywords: *information asymmetry; agency theory; principal-agent problem; compliance; knowledge engineering*

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1 INTRODUCTION

This article is part of broader research concerning agency theory in corporate compliance contexts. Our research hypothesis is that knowledge engineering methods and tools can help mitigate the principal-agent problem and address the information asymmetry gap between the principal and agent. The research's final goal is to propose a knowledge model to be used in information intensive business compliance contexts. We analyze business compliance from the principal-agent perspective, in which the principal-agent relationship is characterized by information asymmetry, uncertainty and opacity (TALEB, 2012 apud OMAR et al, 2016). A thorough study of the information asymmetry aspect of agency theory and compliance is, therefore, required; and it is the object of this study.

Business compliance can be seen as a set of rules and codes implemented to ensure the fulfillment of business objectives in a transparent and correct manner; mitigating risk and ensuring that the organization complies with respective, both internal and external, regulation (KUHNEL et al, 2017; MAREKFIA et al, 2012; PUPKE, 2008). Within the enterprise, the relationship between principals (mainly stakeholders and hierarchical decision makers) and agents (executives and staff) constitutes one of business compliance's core and main concerns (KUHNEL et al, 2017; PUPKE, 2008). Thus, agency theory constitutes an adequate and useful tool to interpret and analyze business compliance.

The information asymmetry aspect of agency theory jeopardizes the principal-agent relationship, which present an inherently principal-agent problem (HOENEN; KOTSOVA, 2015; EISENHARDT, 1989). Agency theory is analog to information processing approaches of contingency theory, as the two perspectives constitute information theories (SILVA, 2016; EISENHARDT, 1989). Within this context, considering that both principal and agent are rational and seek to maximize their utility functions, often having nonaligned and different interests, and that they possess different pieces of, and access to, information, the principal-agent problem can be understood as an information asymmetry and uncertainty problem (SILVA, 2016; HOENEN; KOTSOVA, 2015; SAITO; SILVEIRA, 2008; EISENHARDT, 1989).

Compliance is crucial to ensure that the principal interests are protected, carried on and cared for by the agents. Understanding the relationship between compliance and the information asymmetry aspect of agency theory through the lens of existing scientific literature is therefore paramount to better address business compliance initiatives and planned or ongoing implementations, contributing to the satisfactory fulfillment of compliance requirements.

2 METHODOLOGY

Systematic literature review is a method that allows the summarization of large quantities of contents of a given subject (COOK; MURLOW; HAYNES, 1997) and was the method employed in this article. According to Cordeiro et. al (2007), systematic reviews provide credibility and robustness to collected data because they employ rigorous and explicit steps to identify, select, collect and analyze data, and to describe the relevant contributions of these data to a given research.

To Sampaio and Mancini (2007) apud Omar, Cunha and Sell (2016), systematic reviews must: a) be reproducible; b) present a crystal clear research question; c) employ defined search strategies; d) possess inclusion and exclusion criteria; e) carefully analyze found literature; and f) follow an original article structure.

The review process was conducted according to Rother (2007) apud Botelho, Cunha e Macedo (2011) proposed seven steps: a) formulation of the research question; b) tracking of the articles; c) critical evaluation of the articles; d) data collection; e) data analysis and presentation; f) data interpretation; and g) review update and enhancement.

The research question that guided the systematic review was: “what research has been conducted concerning the information asymmetry aspect of agency theory in business compliance contexts?”. Other assumptions are that information asymmetry can hinder compliance in a wide range of domains and that knowledge tools can help mitigate its effect on compliance.

Initial search with the keywords “agency theory”; “information asymmetry”; “corporate compliance”; and/or “business compliance” has returned few results, indicating few existing literature regarding the research subjects. Additional searches adding the keywords “principal-agent problem” instead of “agency theory” and broader scope using the keyword “compliance” by itself were performed.

Once the keywords were determined, searches were performed using Web of Science and Scopus databases, employing logical operators to alternate and/or concatenate keywords. The criteria employed to include or not a publication were the abstract and article analysis and subsequent adherence to the research question. The timespan searched is between 2008 and 2017. Eleven articles matched these criteria and were selected; as listed in table 1.

Table 1 – selected articles for the systematic review ordered by # of citations

Article	Journal	Author (s)	Year	# Citations
1. Why do firms go dark? Causes and economic consequences of voluntary SEC deregistrations	Journal of Accounting and Economics	Leuz, Christian; Triantis, Alexander; Wang, Tracy Yue	2008	86
2. To what extent are EU steel companies susceptible to competitive loss due to climate policy?	Energy Policy	Okereke, C., McDaniels, D.	2012	19
3. Aggregated, voluntary, and mandatory risk disclosure incentives: Evidence from UK FTSE all-share companies	International Review of Financial Analysis	Elshandidy, Tamer; Fraser, Ian; Hussainey, Khaled	2013	17
4. The impact of internet health information on patient compliance: A research model and an empirical study	Journal of Medical Internet Research	Laugesen, J., Hassanein, K., Yuan, Y.	2015	12
5. Sustainability in multi-tier supply chains: Understanding the double agency role of the first-tier supplier	Journal of Operations Management	Wilhelm, M.M., Blome, C., Bhakoo, V., Paulraj, A.	2016	10
6. Corporate Legitimacy and Investment-Cash Flow Sensitivity	Journal of Business Ethics	Attig, N., Cleary, S.W., El Ghouli, S., Guedhami, O.	2014	6
7. The impact of external monitoring and public reporting on business performance in a global manufacturing industry	Business and Society	Katz, J.P., Higgins, E., Dickson, M., Eckman, M.	2009	6
8. Exploring agency, knowledge and power in an Australian bulk cereal supply chain: A case study	Supply Chain Management	Byrne, R., Power, D.	2014	5
9. Extending the boundaries of IQ: Can collaboration with information management improve corporate governance	International Journal of Information Quality	Maguire, H.	2008	2
10. Information security policy compliance: An empirical study on escalation of commitment	19th Americas Conference on Information Systems, AMCIS 2013 - Hyper connected World: Anything, Anywhere, Anytime	Kajtazi, M., Bulgurcu, B.	2013	-

11. Agency Theory, Disclosure - Transparency: The Nemesis of Enterprise and Corporate Governance Systems	4th European Conference on Management, Leadership and Governance (ECMLG)	Lazarides, Themistokles; Argyropoulou, Maria; Drimpetas, Evaggelos;	2008	-
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Source: compiled by the author.

The next section discusses the results of the articles' analysis.

3 ANALYSIS OF SELECTED ARTICLES

All the selected articles consider at least two elements of the research subjects of this research: the relationship between compliance (in a broader sense, not limited to business compliance) and information asymmetry and/or agency theory or the principal-agent problem.

One of the first conclusions is that the subject and its' relationship with the elements of the database search performed is little explored by the respective scientific communities. Several wide results were achieved when employing a single search keyword in either case (compliance or agency theory), but the fact is that few studies have addressed both as a combined approach to address the information asymmetry issue. Furthermore, few studies address information asymmetry as a relevant aspect towards the success or failure of compliance implementations.

Nonetheless, the results showed a broad range of domains affected by information asymmetry between principals and agents, strengthening our initial supposition.

Among the domains covered by the articles are US public trading firms that stop SEC reporting (LEUZ et al, 2008); EU steel industry and incentives to sustain competitiveness while complying with environmental compliance (OKEREKE; MCDANIELS, 2012); public non-financial trading companies of the FTSE in the UK, and their risk disclosure policies (ELSHANDIDY et al, 2013); medical domains and the public information on the internet regarding health and diseases (LAUGESSEN et al, 2015); supply chains and sustainability compliance throughout the supply chain and the role of first tier suppliers as double agents of sustainability compliance (WILHELM et al, 2016); Investment cash flow sensitivity and the impact of corporate social responsibility and legitimacy on investment cash flow (ATTIG et al, 2014); apparel industry as a global manufacturing industry and the impact of public reporting and external monitoring (KATS et al, 2009); bulk commodities (cereal) Australian industry supply chains and the role of knowledge to form collaborative supply chains (BYRNE; POWER; 2014); corporate governance and collaboration together with information management to enhance

compliance (MAGUIRE, 2008); information security policy and behavioral study of employees' compliance with escalation rules (KAJTAZI; BULGURCU, 2013); and a theoretical study of the relationship between agency theory, corporate governance and information systems (LAZARIDES et al, 2008).

Table 2, listed below, summarizes the selected articles' main topics and research domains and their respective results and impact on information asymmetry.

Table 2 – Main Topics and

Article #	Main Topics / research domain	Main results / Impact of information asymmetry
1	US public trading firms that cease SEC reporting (hence going dark); main causes are the SOX act (compliance); poor future prospects; and distress. Published soon after the adoption of the Sarbanes-Oxley Act.	Compliance increased costs cause the firms to go dark; going dark jeopardizes the firms' returns; Insiders have vested interests in going dark, decreasing outside scrutiny and increasing the information asymmetry, happens more often when governance and investor (principal) protection are weak; Going dark and going private are two different things.
2	Steel and Iron industries within the European Union; Specifically, ArcelorMittal; Corus; and ThyssenKrupp. Special rules devised to increase the sector's competitiveness regarding carbon footprint. Highlights the information asymmetry aspect of the relationship between the government (principal) and agents (steel firms)	The steel companies largely exaggerate their competitive vulnerabilities in order to receive greater incentives and free allocations/allowances. This largely happens due to the principal-agent problem (information asymmetry aspect specifically) of the companies' narratives regarding their vulnerabilities and the EU ETS inability to objectively probe and assess their competitive vulnerabilities.
3	Analyzes the impact of corporate risk levels on aggregates, voluntary and mandatory risk disclosures of FTSE non-financial listed companies; The article contrasts firms with greater compliance with mandatory regulations with those of lower compliance requirements.	The article draws a positive correlation between higher board independence and lower insider/outsider interference with overall firm returns and higher dividend yields; Higher levels of risks are related to higher levels of voluntary risk disclosures (reducing information asymmetry and increasing compliance);
4	A survey study of 225 medical patients that use health information on the internet and its impact on the patients' compliance with the prescribed treatment regimens; The article analyzes the impact of the information asymmetry (of using information on the internet) in the relationship of patient (agent) and doctor (principal).	Internet public health information has little to no impact on patient compliance with treatments; The principal (physician) has the upper hand due to the patient's perceptions of higher quality information; This article offers an uncommon perspective where information asymmetry acts to the benefit of the principal instead of the agent.
5	Dispersed multi-tier supply chains with great and growing complexity. The article states that first-tier suppliers are crucial for sustainability compliance throughout the supply chain. First-tier suppliers act as agents and double agents	Major findings include the leading firm's own internal alignments of the sustainability function determine the supply chain compliance; reducing the information asymmetry along the supply chain positively contributes to the supply chain sustainability compliance;

	(forwarding requirements to their own supply chains) to fulfill the leading firm's (principal) sustainability compliance requirements. Three case studies of different institutional contexts were carried.	The authors propose a framework for future research regarding multi-tier supply chains; and also highlight the double agency role of first tier suppliers as an instrument to fulfill compliance requirements.
6	Assesses the impact of corporate social responsibility (CSR) on investment sensitivity to cash flows (ISCF). Information asymmetry and agency costs of CSR affect investment-cash flow sensitivity.	CSR performance decreases ISCF; ISCF increases when CSR concerns increase; CSR activities beyond compliance requirements is desired and may improve access to financial capital.
7	Focuses on external monitoring and public reporting and its correlation with firms performance in terms of valuation in the apparel industry domain.	External monitoring is valuable to business (agent) and society (principal) because it reduces the information asymmetry mitigating the principal-agent problem;
8	Inter-firm relationships and the role of information sharing practices in bulk commodity supply chains in Australia, characterized by power asymmetries in the system. Contrasts compliance x collaboration of different firms in the supply chain	Better understanding of the relationship between firms translates in better procurement and better chances of creating situations of collaboration instead of plain compliance;
9	Agency theory moral hazards, adverse selection and consequently information asymmetry between CEOs and boards, coupled with widespread and overwhelming information volumes within the enterprise increase the pressure on the firm to meet legislative, accountability, and business requirements and compliance.	Effective records management and record management functionality to assess information quality can improve corporate governance mechanisms and meet the requirements of accountability, transparency and compliance and in reducing information asymmetry.
10	The authors work within the boundaries of agency theory and the theory of planned behavior to examine Escalation situations and employees' behavior towards compliance with the requirements of their information security policies.	The authors delineate three mediating factors to explain employees' attitude: work impediment; information asymmetry; and safety of resources; Main finding is that information asymmetry and safety of resources both have significant impact on attitude, but work impediment does not; information security policy, also, as significant impact on all mediating factors.
11	Discusses information requirements for compliance with SOX act and OECD's corporate governance principles. Information flow as a critical factor for the success of corporate governance and depends on the firm's information system's design.	Corporate Governance depends on the implementation of modern enterprise systems to secure disclosure and transparency; The control and dissemination of information are crucial to comply with OECD principles and SOX.

Source: Sourced from the selected articles (table 1).

Table 2 analysis evidences that despite having different focus and approaches, all articles highlight the information asymmetry problem and the challenges posed by it when implementing compliance requirements.

Two articles cover the subject in the supply chain domains (WILHELM et al, 2016) and (KATZ et al, 2009). Supply chains constitute a relevant compliance domain due to the many distinct independent actors involved, and risks posed, whether from the point of view of supply interruption and business disruption or the dependencies on supply companies to comply with a wide range of requirements, from sustainability and environmental to materials used and even labor policy and financial transparency. The issue is especially relevant in multi-tier supply chains (WILHELM et al, 2016). Understanding the agency role of suppliers and addressing the principal-agent problem both constitute determinant factors to successfully achieve compliance throughout the supply chain.

Other articles focus on public listed companies and information disclosure, whether it is mandatory or voluntary disclosure, and even the absence of it - firms going dark – as covered by Leuz et al (2008) in the US financial market; or risk disclosure incentives from public traded FTSE companies in the UK (OKEREKE; MCDANIELS, 2012). In both cases, the authors address the principal-agent problem from the perspective of the stock market and society in general (principal) and the companies per se (agent) and highlight the constraints and limitations imposed by information asymmetry.

Several other articles discuss the information asymmetry problem through the realities of several distinct domains. And although most articles propose some advice or recommendations on how to address and mitigate the issue of information asymmetry, none have resorted to knowledge management tools or knowledge engineering artefacts to do so. Moreover, a lack of a structured approach, possibly due to the uncertain and implicit nature of principal-agent relationships, to address the information asymmetry issue was also observed.

4 FINAL CONSIDERATIONS

One of the results of the systematic review is the fact that there are few articles in the existing literature that correlate agency theory, information asymmetry and compliance, indicating a promising field of original and relevant research. This observation is especially apparent regarding business compliance, specifically.

While analyzing the selected articles of the systematic review, the lack of knowledge engineering or knowledge management approaches to tackle the information asymmetry aspect of the principal-agent problem became evident. We believe that due to the nature of the information

asymmetry problem, information systems and knowledge methods, artefacts and tools would yield positive outcomes tackling the issue, and constitute a promising research field.

The implicit nature of the asymmetry of information within the principal-agent relationship and its inherent complexity poses a challenge to the elicitation, structuring and sharing of information and knowledge throughout the enterprise and towards external stakeholders, and we believe that knowledge engineering has a relevant role to play in this context.

It is important to emphasize that the articles that somehow showed cases in which the information asymmetry problem was addressed and mitigated regardless of method were able to achieve higher performance and overall better competitiveness, indicating that the enterprise benefits from compliance, which represent a substantial additional incentive for implementing it. Nonetheless, objective measurements of these benefits and quantitative assessment of the results of compliance, even beyond imposed regulations, are also promising fields of research.

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