

Accounting Information System and Transparency: A Theoretical Framework

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Abstract This article contributes to the growing literature on transparency by developing a theoretical framework to analyse the relation between the AIS integration level and the transparency level in the Italian public sector. Based on the literature review regarding transparency and IIS, a research model is proposed. The AIS integration level is measured through three dimensions: part integration, full system integration and full information integration. The transparency level is assessed by the following dimensions: formal transparency, quality transparency and full transparency. The framework shows how different AIS integration levels match with various transparency characteristics. Higher levels of AIS integration enable an increase in the characteristics of transparency and guarantee its effectiveness and interactivity. In contrast, lower levels of AIS integration determine a sufficient and minimum degree of transparency that is evaluated only through the existence or the nonexistence of the information on the public organisation website.

Keywords Transparency • Accounting information systems • Public administration • Integrated information systems

1 Introduction

This study provides an analysis of the relation between the accounting information system (AIS) integration level and the transparency level in Italian public organisations.

Over the last two decades, transparency has become a relevant issue as a result of recent legislation [1]. Many governments have introduced norms of transparency as a key component of their efficiency and reform programmes to improve performance and accountability in the public sector (e.g. transparency agenda in the UK 2010, open government in the USA 2009, Dlgs. 33/2013 in Italy).

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According to the transparency laws, public organisations must publish the key data set on their websites in specified, open data standards to disclose information to many parties and make public data more accessible, interesting and dynamic via websites, mobile device apps and other platforms.

In this context, AIS integration appears to play a pivotal role by providing assurance and support on how to improve and manage transparency.

Transparency in regulation's growing significance has stimulated a call for additional research.

Many studies have focused on the advantages and disadvantages of transparency and on the descriptions of specific transparency initiatives [1–5]; however, they do not consider the dynamics of this phenomenon [6]. These dynamics are very complex because the transparency results from the interactions between many and different actors and the rapid changes in technologies. Therefore, there are large differences in the characteristics of transparency initiatives and in the degree to which transparency is applied.

The construction of transparency involves a variety of actors. Public organisations make decisions on and apply a transparency programme; however, in this process, they are influenced by different stakeholders that are crucial for the success or the failure of the process [7]. Moreover, these relations between public organisations and stakeholders are developed in different cultural settings and in complex national and international policy contexts. In addition, the decisions and the implementation of the transparency are influenced by new and constantly evolving new technologies.

The dynamics and changes regarding transparency can be examined in terms of these features. To begin, the institutional relations between public organisations and stakeholders may be developed in terms of what are considered to be correct actions and which external actors could access the information. Second, information exchanges may be analysed in terms of speed, ease of use and accessibility.

All of these aspects need to be explained further.

To date, a growing number of studies have been conducted on the construction of transparency in interactions between the public sector and stakeholders (transparency as an institutional relation) [6, 8] and on the interaction between transparency and new technologies (transparency as information exchange). However, these studies use a reductionist approach because they focus only on short-term changes and ignore the fact that transparency is a phenomenon that is built and rebuilt over time through a social and political process as well as information exchanges. Public disclosure is related to information system and, more specifically, AIS because the information that public organisations must publish, at least in Italy, concerns mainly financial data. Despite this aspect, the literature is nearly silent on the relations between transparency and AIS.

Therefore, considering these research gaps, we need further studies to analyse transparency.

This article fits in the research area concerning transparency as an information exchange.

The key goals of this paper are as follows:

- To contribute and expand the literature on transparency that explores the relation between AIS integration and transparency. Specifically, this work analyses whether and how the integration level of AIS influences the level of transparency in terms of regulatory compliance and access to information in public organisations.
- To develop a theoretical model to analyse whether and how different levels of AIS integration contribute to improve transparency's effectiveness.

The remainder of this paper is structured as follows: the next section analyses the literature and formulates the research question, and the third section presents and analyses the theoretical model. Finally, conclusions and future implications of the research follow.

2 Literature Review

2.1 *Concepts of Transparency in the Public Sector*

Although transparency in public sector organisations has been the object of several studies, particularly since the 1990s [1], there is not yet a mutually agreed-upon definition for transparency [6]. Transparency is defined and analysed in a variety of forms, which reflects the fact that researchers often have different perceptions of transparency and examine it from different perspectives.

The literature on transparency in the public sector can be articulated in two main research areas.

In the first area, transparency is considered a tool to curb corruption and is confused with “good government” and accountability [9]. Some of these studies analyse government corruption and accountability from the principal-agent theory perspective and consider transparency to be the principal means to reduce information asymmetries between citizens (principals) and the government (agent). The principal-agent theory presupposes that information asymmetries are the main obstacle that prevents principals from monitoring agents. Therefore, if agents create and operate in transparent organisations, principals are more enabled to evaluate the extent to which their interests are being served by government and to encourage accountability and deter abuses by officials. In contrast, “if agent creates an opaque organisation, principals are largely obstructed from exercising accountability” [9].

Transparency is often used as synonymous to accountability; however, Bovens [11] considers this definition a reductionist approach because he believes that transparency “is not enough to qualify as a genuine form of accountability”. Accountability is a complex concept composed of five different dimensions: transparency, liability, controllability, responsibility and responsiveness. According to this broader conceptualisation, transparency appears to represent only one element of accountability that is instrumental for the success of the accountability process [10, 11].

Furthermore, this first research area shows that transparency and accountability require changes in the public administration culture [12]. When political leaders and public managers promote more transparency, this request often produces a negative reaction from others. Citizens, for example, view these initiatives solely as vehicles for politicians to seek re-election. However, public employees consider these initiatives to be signs of mistrust and think that they waste time and effort in reporting what they do rather than doing more. To change the work culture and resolve this conflict, certain suggestions appear to be relevant [12]. First, to develop and rebuild the trust in citizens, electors, the media and employees, governments must work to safeguard organisations' integrity and reputation. Second, to develop trust means to reduce suspicion. Public managers must be able to communicate that the requirements for accountability do not indicate that managers have lost trust but that they attempt to minimise the corruption risks. Furthermore, managers must spread this message to others: "Even if a report is not read, writing it can be of value" [12]. Providing updates may modify work approaches and make people more competent to improve the products and services provided.

The second research area defines transparency as the public disclosure of information. Transparency refers to the ability to disclose information to relevant parties, thus reducing uncertainty by developing trust. This definition of transparency considers three elements: the act of disclosure, the information disclosed and the agents that either disclose the information or are its recipients [1]. All of these elements are management practices that reduce corruption and contribute to the stabilisation of the government organisation. In accordance with this definition, transparency can be analysed from three different perspectives [1]. From a market perspective, transparency is considered a tool to reduce the risk of exposure and vulnerability. From a political perspective, transparency represents the characteristic of a well-functioning government that follows democratic and empowering principles. From an international perspective, transparency makes a "platform for international trust and for better assessment and implementation of international treaties; a lack of disclosure implies a weakening, if not sabotage, of the international regime" [1].

In fact, the literature discusses two other distinct approaches to information disclosure related to transparency: a "functional rationale" approach and a "cultural rationale" approach.

The first focuses on the utilitarian benefits of transparency and attributes to transparency the functional role of developing trust in both government and democracy, of improving confidence in a country's economy and of leading to major economic prosperity and political stability. This approach can be applied at both the national and international levels. A national level of transparency is related to policy compliance; however, the international levels are associated with the formation of international treaties.

The second approach focuses on transparency as a norm of appropriateness. The country's transparency level permits the measurement of its embeddedness in the world polity. The requirement of transparency is not only based on mandatory regulations, but appears to be based on a cultural model of proper governance. In

accordance with this approach, transparency is considered a new transnational norm that can be matched to the principles of social progress and social justice. Government organisations explain what they do and who they are by providing data and information to their broadly defined stakeholders. These organisations can develop transparency in several social spheres that are composed of human rights, local politics, defence, democracy, welfare and family relations. In this context, transparency permits governments to achieve two goals: organisational efficiency (often called “development”) and empowered social involvement (often called “democracy”).

The analysis of the transparency literature shows that many studies have focused on the advantages and disadvantages of the phenomenon, the impacts that it produces on the democracy and the accountability factors that influence transparency.

Therefore, the existing literature is very silent on the dynamics that guide and determine the transparency level in the public sector. These dynamics are several and complex and regard the interactions between people and the continuous development of information and communication technologies (ICT).

Focusing on the dynamics between transparency and ICT, a growing number of studies [13, 14] are primarily focused on analysing the potential contribution of electronic government (E-government) to enhance interactivity and transparency as well as the openness of the public sector to promote new forms of accountability. E-government has been defined as the “use of ICTs, and particularly the internet as a tool to achieve better government” [15]. “It is considered as a mechanism to transform public sector organisations through the use of ICTs” [16]. The literature [14, 16] shows that the main benefit of these technologies is the enhancement of citizen participation. The creation of blogs, collaborative websites (e.g. Wikipedia), social networking sites (e.g. Facebook), microblogging services (e.g. Twitter) and multimedia sharing services (e.g. Flickr, YouTube) permits all users to participate directly in the process of communication through the contribution of contents, comments regarding social and political problems and tagging.

The analysis of E-government studies and Italian transparency regulations (Dlgs. 33/2013, CIVIT deliberation 105/2010, Commissione Anticorruzione deliberation 50/2013) has enabled the identification of the following transparency characteristics: publication of information, accessibility, information quality, usability and interactivity [4, 17–26].

In this paper, the compliance level with the transparency process is measured through these variables, which are described in Sect. 4.

2.2 Accounting Information System and Transparency

AIS is considered a relevant component of the general information system that has the role of collecting, processing and communicating accounting information [27]. Studies reveal that the first use of information systems (ISs) was in relation to accounting [28].

Although a growing number of studies highlight the relevance that accounting information has in the transparency process [29–33], the literature is actually nearly silent on the relation between AIS and transparency.

In recent years, scholars have conducted theoretical and conceptual studies that generically consider the link between AIS and transparency.

Dillard and Yuthas [34] reveal the importance to construct new AIS to respond to the needs of an increasingly pluralistic society. The authors consider “critical dialogics” and “agonistic pluralism” to be two relevant theories for AIS design and implementation. Critical dialogics refers to the power of accounting information to facilitate democratic mechanisms. Agonistic pluralism is a branch of democratic theory, in which AIS must provide a starting point to enable and support pluralistic discussion and decision-making. Based on these considerations, the authors require an expansion of the traditional AIS with regard to system development and use. AIS must incorporate tools and techniques that promote the dialogue among multiple stakeholders, enhance transparency and generate consensus on values, interests and beliefs.

Darabos [29] conducted a theoretical study in which the main article and books that have approached the study of “accounting information” from a decisional perspective are reviewed. At the end of the analysis, the paper shows the relevance of AIS to achieving the consistency, usefulness, transparency and unambiguousness of information.

Empirical studies focus primarily on the capital market [31] or inter-organisational relationships. This research shows that the adoption of new information technology, such as a real-time business reporting technology (RBRT), increases transparency and enables the attainment of capital at a lower cost than rivals; in addition, it can lead to the creation of organisational capabilities and the realisation of relational capital.

The literature review reveals none of the existing theories, and the framework considers if and how the integration level of AIS influences the transparency process in the public sector.

The motivation of this research project is derived from this research gap. Therefore, the purpose of this study is to develop a better understanding of the relation between the integration levels of AIS and transparency levels. There appears to be the potential for government organisations to make better use of integrated AIS when performing a transparency activity. This research project will attempt to uncover how integrated AIS can offer support to transparency and how it can be exploited.

The next section presents the research model developed to analyse the relation.

3 Developing a Research Model to Analyse the Relation Between AIS Integration and Transparency

The model, which the authors developed on the basis of the literature to explore the relation between the AIS integration and transparency in government organisations, focuses on the following areas:

- Integrated information systems (IISs)
- Transparency in public organisations

Public transparency has been analysed in the previous sections of this paper. Therefore, in this section, we focus on the aspects regarding the IIS (how previous studies have examined and evaluated the IIS) and on the model construction.

IS integration consists of an integrated technology by which data and applications, through different communication networks, can be shared and accessed for organisational use [35]. The main scope of IIS is to provide significant information support in the organisation to react to continuous challenges in the market.

IS integration is also considered a process that develops step by step and in different firm levels. According to this definition, IS integration is considered not only a tool to facilitate the use of data and applications “but also provide the flexibility to meet future business demands in information and applications” [35].

Research on IIS has evolved in recent years, and it has principally analysed the impacts of enterprise resource planning (ERP) systems on IS quality. Other studies have attempted to analyse the impact of ERP systems on managerial reporting and control [36–38].

IIS can be described by components and characteristics [28].

IIS components represent all the elements that enable the support of management accounting. Examples of components are ERP systems, data warehouses as well as executive portals.

IIS characteristics instead are analysed by utilising two different approaches.

A first approach considers the general characteristics of integration: flexibility, system scope, complexity, functionality, user-friendliness and the level of effort needed to implement the system. A second approach analyses the characteristics of integration that consider different dimensions.

Booth et al. [39] identify three dimensions of integration: data integration, hardware/software integration and information integration. The first refers to the feature of IIS in which data are stored and maintained in one place only. Hardware/software integration regards the technical aspects of integration, whereas information integration refers to the business aspects and the interchange of information between different departments.

In examining the role of IS integration on business process improvement, Bhatt and Troutt [35] re-elaborate the model of Booth et al. [39] and examine two interrelated dimensions of IS integration: data integration and communication network integration. Communication network integration can be further separated into different parts: communication network connectivity and communication

network flexibility. Therefore, IS integration is valued through three elements: data integration, communication network connectivity and communication network flexibility.

Data integration refers to data standards and logical coding schemes. The firms need to develop common data resource management policies to share data in the organisation and between suppliers and customers. An organisation can gradually improve integrated systems by using standards in data definition, logical coding and data structure.

By using integrated communication networks, information can be easily transmitted.

The communication level between two or more integrated information systems (ISs) depends on two factors: communication network connectivity and communication network flexibility. Communication network connectivity regards the level in which various systems, in and between different firms, are connected to sharing information. To geographically connect ISs, a firm can use, for example, local area communication networks (LAN) and wide area networks (WAN). Communication network flexibility refers to the level to which an organisation utilises common standards and protocols to promote compatibility between various ISs. The compatibility between systems enables companies to meet the existing information needs and helps to address future demands (alliances with several other companies).

Considering the literature review, the framework used to assess if and how the AIS integration influences the transparency level in public organisations is shown in Fig. 1.

The framework articulates AIS integration and transparency on three levels and defines hypothetical relations that could be developed between the different levels.

A starting point to analyse the three AIS integration levels is to define the following dimensions of AIS integration [35, 39]:

- Data integration
- Network connectivity
- Network flexibility

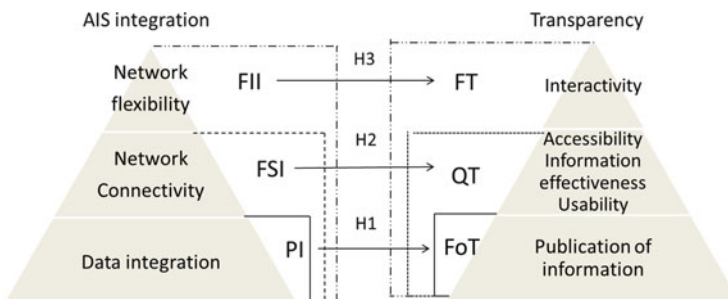


Fig. 1 Research model

“Data integration” is the first integration dimension; it refers to two features of IIS. The first concerns the existence of one common database for all applications, by which data are stored and maintained in one place only. The second features relate to the use of standards in data definition, logical coding and data structure, which permit sharing data both inside and outside the organisation. This aspect requires the development of data resource management policies.

“Network connectivity” is the second integration dimension. Network connectivity consists of hardware and software integration and considers only the technical dimensions of information management. On this level, the integration refers to the degree to which various systems, in and between different firms, connect to share information.

“Network flexibility” represents the third integration dimension. Although “network connectivity” considers only the technical aspects of integration, this level also considers the quality of information. In the model, we introduce the “network flexibility” as synonymous to information integration to describe the scope of interchange and the use of data and information generated by enterprise applications and functional areas. Network flexibility refers to the degree to which organisations utilise standards and protocols to promote compatibility between various IISs.

To define the AIS integration levels, a three-point ordinal scale was developed by considering the feasible combinations of these dimensions.

The AIS integration levels are the following, defined from lowest to highest:

- Part Integration (PI): a high level for “data integration” but a low level for the other two dimensions
- Full System Integration (FSI): a high level for “data integration” and “network connectivity” but a low level for “network flexibility”
- Full Information Integration (FII): a high level for all the dimensions

To define the transparency levels, we begin with three dimensions. According to the literature analysed, the authors consider transparency not only as the publication of information on the website but also other information characteristics that can guarantee effectiveness and interactivity. Therefore, we considered the following dimensions:

- Publication of information
- Accessibility, information effectiveness and usability
- Interactivity

The first dimension refers to the existence or the nonexistence of the information that the public administration must publish on the website, according to the regulation. “[. . .] for publication means the publication in the public administration web sites of documents, information and data relating to the organisation and activities of public authorities [. . .]” (Dlgs. 33/2013, art. 2).

Accessibility regards the facility to achieve specific information that the law requires local governments to publish. To increase the access to the information disclosed on the websites, we adopt Decree No. 33/2013, which states the following: “For the full accessibility of the information published on the home page of the

institutional websites has placed a special section called ‘Transparent administration’, in which are contained data, information and documents published under the current legislation” (Dlgs 33/2013, art. 9). Information effectiveness refers to all of the characteristics that each data item that is published must have. Usability regards the possibility to directly download data from a website in a format that permits its reuse and aggregation.

Interactivity regards the existence of tools on the website that ensure a direct and mutual interaction between users and the public administration. In addition to the integration levels, a three-point ordinal scale was developed by considering the feasible combinations of these dimensions.

The three transparency levels are the following:

- Formal Transparency (FoT): a high level for “public information” but a low level for the other two
- Quality Transparency (QT): a high level for “public information” and “accessibility, information effectiveness and usability” but a low level for “interactivity”
- Full Transparency (FT): a high level for “public information”, “accessibility, information effectiveness and usability” and “interactivity”

The theoretical framework supposes the existence of specific relations between the AIS integration levels and the transparency levels. According to previous studies, we hypothesise the following:

- A part integration (PI) matches with a formal transparency (FT).
- A full system integration (FSI) matches with a quality transparency (QT).
- A full information integration (FII) matches with a full transparency (FT).

The model emphasises these relations, which highlights that higher levels of AIS integration enhance the performance characteristics of transparency, whereas a lower AIS integration level determines the minimum requirements of transparency. Greater success in the transparency initiatives is achieved when we have a high level of “data integration”, “network connectivity” and “network flexibility”.

4 Conclusions and Future Research

This paper set out to enhance our understanding of the relation between AIS integration and transparency. Based on the literature review, a theoretical framework has been presented to analyse if and how the integration level of AIS influences the process of compliance to the transparency regulation in the public organisations. The AIS integration level is assessed through three dimensions: data integration, network connectivity and network flexibility. To define the AIS integration levels, a three-point ordinal scale was developed by considering the feasible combinations of these dimensions. The AIS integration levels are the following, defined from lowest to highest: part integration (PI), a high level for “data integration” but a low level for the other two dimensions; full system integration (FSI), a

high level for “data integration” and “network connectivity” but a low level for “network flexibility”; and full information integration (FII), a high level for all the dimensions.

The transparency level is measured through the following dimensions: publication of information; accessibility, effectiveness and usability; and interactivity. In addition, for the integration levels, a three-point ordinal scale was developed by considering the feasible combinations of these dimensions. The three transparency levels are the following: formal transparency (FoT), a high level for “public information” but a low level for the other two; quality transparency (QT), a high level for “public information” and “accessibility, information effectiveness and usability”, but a low level for “interactivity”; and full transparency (FT), a high level for “public information”, “accessibility, information effectiveness and usability” and “interactivity”.

The framework shows how different AIS integration levels match with various transparency characteristics. Higher levels of AIS integration enable an increase in the characteristics of transparency and guarantee its effectiveness and interactivity.

In contrast, lower levels of AIS integration determine a sufficient and minimum degree of transparency, evaluated only through the existence or the nonexistence of the information on the public organisation’s website.

Transparency is an active and ongoing research field. The goal of this article was to provide a theoretical framework based on the literature review, with which to analyse how AIS integration levels contribute to transparency effectiveness. In future research steps, we will consider case studies to test the research project and the validity of the framework. Those cases that will be selected will differ in terms of policy domains, level of government and external actors and be highly relevant in terms of the significant changes in government transparency over the past two decades.

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