

Auditing Practices, Routines and Technologies: A Sociomaterial Approach

General context

The purpose of this study is to analyze how the use of technologies affects practices and routines in public sector audit organizations. The literature on auditing discusses the use of Artificial Intelligence (AI) (Munoko, Brown-Liburd & Vasarhelyi, 2020; Issa, Sun & Vasarhelyi, 2016; Omoteso, 2012; Vasarhelyi, 1993), but does not consider the organizational impacts of these technologies. Conversely, organizational studies on the adoption and use of AI (Lindebaum, Vessa & Hond, 2020, Pittino & Steigenberger, 2020; Gegenhuber et al., 2019; Orlikowski & Scott, 2008; Orlikowski, 2007) do not cover the specificities of auditing activities and routines.

The literature on how AI-based technologies modify human work does not follow the rapid expansion of AI usage (Kallinikos, Aaltonen & Marton, 2010; Barley, 2015). Some issues require more investigation, as the role of AI in the organizational processes (Gegenhuber et al., 2019), and how technology affects practices and routines (Pittino & Steigenberger, 2020; Murray, Rhymer & Sirmon, 2020; Krogh, 2018; D'Adderio, 2010; Orlikowski & Scott, 2008; Orlikowski, 2007), and about the impact of the algorithms on human decision (Lindebaum et al., 2020; Shrestha, Ben-Menahem & Krogh, 2019).

Technologies can affect the emergence, permanence, and replacement of routines (Pentland & Feldman, 2005; D'Adderio, 2010). Therefore, technology is not a fixed artifact. In organizational dynamics, technology may act as prescriptive objects, influencing and imposing actions, or as descriptive and malleable things, depending on the user's willingness to embrace them in their routines (D'Adderio, 2010). Such amalgamation depends on whether protocols, rules, and guidelines support the connection between human and non-human action (Murray et al., 2020).

The literature exploring the influence of digital artifacts (such as technology) on routines is recent (D'Adderio, 2008a, b; Murray et al., 2020). D'Adderio (2010) suggests that bringing technology to the center of routines analysis would highlight how technologies produce, reproduce, influence the pace, direction, and evolution of routines. Empirically, it would reflect the functions that technology plays in daily organizational practices (D'Adderio, 2010).

Barley (2015) suggests that, despite the widespread use of technology, there is little research on how people can improve how they function or use them. The literature on information systems and technology has grown to explain how technology-based practices and processes are affected by the adoption of new technologies (Gegenhuber et al., 2019), and to theorize how technology-based human decision-making improves and impacts new ways of working (Lindebaum, Vessa & Hond, 2020; Shrestha, Ben-Menahem & Krogh, 2019).

Therefore, the study on the use of technology in the organizational context invites a review of the role of technology and its implications for professional practices and routines (D'Adderio, 2010; Krogh, 2018), to understand how new technology-based practices and routines reconfigure processes (Gegenhuber et al., 2019), to theorize the rise and impact of technology-based human decision-making (Lindebaum et al., 2020; Shrestha et al., 2019) and to analyze how materiality and artifacts affect organizational processes and routines (Pittino & Steigenberger, 2020; D'Adderio, 2010; Murray et al., 2020).

Sociomateriality

Sociomateriality can be understood as the relationship perceived in the interaction between individuals and artifacts (Leonardi, 2010; 2012; 2013), and is not limited to

material objects (e.g. machines and infrastructures), it also extends its reach to immaterial objects (e.g., software and users' perception); it is "technology in practice" (Leonardi, 2012). Literature points to studies seeking to investigate and theorize the roles that materiality plays in social and organizational dynamics (Vaujany, Boxembaum & Leca, 2019).

I take a sociomateriality view, in ontology of critical realism (see Hultin, 2019; Tunçalp, 2016; Leonardi, 2013), as I assume that digital and social are different and separate components, and when we experience the imbrication between them, we have sociomateriality.

Practices, Routines & Artefacts

In social sciences, technology's relationship with social practices and how technology shape and is shaped by humans is still somewhat explored (Kallinikos et al., 2010) although its relevance for organizational researchers (Murray et al., 2020). Technology is increasingly interactive, influencing its consumers directly and deriving its meaning from social practices. Therefore, there is no way to separate digital technologies and organizations as the organization is seen as the set of people, knowledge, and technologies that make it up.

Practices' analysis enables researchers to engage in direct speech with the practitioners, allowing for a theoretical understanding of the phenomenon in a manner that is applicable to practical use for managers and other organizational members (Golsorkhi, Rouleau, Seidl & Vaara, 2010). Offers an opportunity to explore the micro-level of social interaction in a real social context, shifting from general and abstract reflection to an increasingly focused social reality study.

Routines are "repeated patterns of behavior" (Murray et al., 2020), and organizational routines are repeated patterns of interdependent actions of multiple actors (Feldman & Pentland, 2003: 95). Contracting, budgeting and operation schedules importing and developing new products are examples of organizational routines.

These organizational routines are carried out using artefacts such as schedules whiteboards, spreadsheets, furniture, equipment, computers, and software.

Digital artefacts such technologies transform organizational routines and practices into roles and habits (Bruni & Parolin, 2014; D'Adderio, 2020; Murray et al., 2020). In a broad context, understanding how technology influences organizations and individuals can have significant implications for researching innovation and digital transformation.

Public sector auditing (in Brazil)

Like other organizational functions, auditing comprises a set of routines that are partially embarked on technologies (Munoko et al., 2020; Beridze, 2017). Auditors use technology-based practices to perform analysis on large volumes of data, for financial control, process automation, and decision-making support (Silva, 2018; Felisdoro, 2019; Sousa et al., 2019; Aquino, Azevedo & Lino, 2016). The enhancing of technology on auditing jobs pushed forward remote audits based on collected databases and automated analysis.

There are 33 State Audit Courts in Brazil, each one with its own data collection system, which is basically a set of software developed by the Courts to collect, process and store data to support audit activities. Such software is also known as Computer Assisted Audit Tools (CAATs), used to collect and analyze data.

Method design (an initial proposal)

In a multiple case studies, using semi-structured interviews with developers, analysts, and users of these systems, I intend to analyze how the use of these technologies affects practices and routines in public sector audit organizations. At the initial stage of this project, I identified whether public sector audit organizations use technology systems to enhance the capabilities of the auditors.

Initial hunches

A material effect given by automated analysis of a narrow-collected database is the reflection of a contextual reality in an abstract portrayal that the auditor does not observe in the real world. Such an image (figures 1 and 2) is just one of the many possible drawn by the data mediated by a technological artifact. Such representation depends on the protocols embedded in the AI algorithms, to understand a reality that he cannot visualize empirically to make a judgment about it. Therefore, depending on the scope embarked on protocols and dataset, algorithms constrain the reality observed by the auditor and restrict the auditors' potential action and perception of the fact.



Figure 1 – dashboard of an auditing system.
Source: Personal archive.

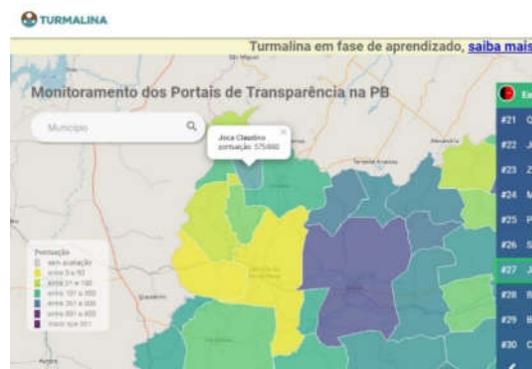


Figure 2 – Municipalities' transparency ranking (from an auditing system view).
Source: Personal archive.

The first interviews showed that the technologies used in audit practices and routines do not develop protocols and are able (or not) to select actions, acting as "assisting technologies" or "arresting technologies" (Murray et al., 2020). For instance, the systems cross-check for inconsistencies, alerting the auditors to notify the local government to explain possible evidence of irregularities, which can impose, restrict, or bring about new practices, altering some audit routines.

Studies have shown the influences that the use and adoption of technologies have on practices and routines, depending on how humans use them (or avoid using them) (Murray et al., 2020; D'Adderio, 2010). For example: i) technology can limit auditors' skills or their understanding of reality; ii) the algorithms are designed by IT teams with the assistance of senior auditors, being able to load biases, leading to errors or failures in the outputs, making the auditor prefer to return to some analog tools; iii) different types of technologies can generate different types of actions by the auditor, restricting or boosting decision making, adopting practices and/or routines; and iv) the use of technologies can influence work memory, attention and distraction.

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