Of rules and trust: How does bureaucratic accountability affect public servants' disposition toward algorithm use?

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OF RULES AND TRUST

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It was just a couple of winters ago when I chose to formalize a longstanding interest in policy for data-driven innovation. While my outlook and concerns have certainly developed since, it would be disingenuous not to attribute part of this pursuit to William Gibson, Neal Stephenson, Harlan Ellison, and Hideo Kojima. Their worlds conveyed a concern for humanity's fundamental worth in the age of AI more sincere than any symposium or academic paper ever could.

However unsophisticated my motives might have been, years later, this thesis reaffirms my initial belief in human rights as the foundation for data-driven innovation. And I hope that, as part of the "Data-driven Policymaking for Complex, Societal Challenges" capstone, this thesis is able to deliver on that belief.

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But I digress. This one was a long time coming and some bore the weight of the final dash with me. I am thus most thankful for my family.

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This one is for me.

Abstract

This thesis explores the relationship between bureaucratic accountability and their disposition toward utilizing algorithms in their decision-making processes. Drawing upon the literature on government accountability and aversion to algorithmic decision-making, it hypothesizes that the more public officials are aware of the chains of accountability they are tied to, the less favorable they will be to utilizing algorithms.

The hypothesis is tested through a case study of the Chilean Institute of Social Services, which employs multiple algorithms to automate eligibility decisions for pension and other social benefit applications. To trace the organization's bureaucratic accountability chain, data collection is based on semi-structured interviews of public officials from different hierarchical levels. The results confirm several theoretical expectations on reduced discretion, muddled authority over the algorithm and algorithmic opacity, leading to blame avoidance within the organization. However, the results also disprove the hypothesized negative relationship, revealing that officials with high awareness and perceptions of individual accountability instead favor using algorithms to automate decisions.

Further analysis of the dependent variable reveals that a favorable disposition toward algorithm use is overwhelmingly tied to the perception of trust. The individual descriptions of bureaucrats convey clues for an alternative explanation of the outcome, suggesting that stringent evaluation and audit practices can help circumvent algorithm aversion resulting from opaque algorithms or reduced discretion. Such a potential explanation implies that bureaucratic accountability chains could serve as a substitute source of trust, allowing public servants to hold the algorithm to account by proxy. The qualitative accounts in this thesis offer insights into how bureaucrats feel personally accountable for the algorithms they use, expanding the literature of public officials' reliance on algorithmic decision-making.

Keywords

Bureaucratic accountability; Algorithmic accountability; Transparency; Algorithmic transparency; Algorithm aversion; Bureaucratic accountability chain; Trust

Table of contents

i. List of figures and tables

ii. List of abbreviations

ADS: Algorithmic decision-making system

AFP: Private pension fund organization ("Administradora de Fondos de Pensiones")

AI: Artificial Intelligence

BPH: Benefit for born child ("Bono por Hijo")

IPS: Institute of Social Services ("Instituto de Previsión Social")

IT: Information Technology

PGU: Guaranteed Universal Pension ("Pensión Garantizada Universal")

SPS: Pension allocations under the "Solidarity Pillar" program ("Pilar Solidario")

1. Introduction

In their drive to meet growing citizen demands and compete with private sector practices, public organizations must develop service delivery toward higher standards of effectiveness and efficiency. Initially sprouting from the 1980s New Public Management trend, public administrations have since adopted numerous doctrines to alter their operation: Greater specialization of organizational subunits, the underscoring of labor productivity through parsimony and automation, and an emphasis on goal-setting and measurable results, are among the principles that effectively transformed how government is held to account by society (Hood, 1991). While these trends have since grown in nuance across the public sector, the maxim of efficiently meeting goals arguably still influences the management of public organizations and the bureaucrats that comprise them.

Continuous digital technology adoption to augment processes reflects this paradigm, as demonstrated by data-driven government trends such as algorithmic decision-making. This technology continues to see extensive implementation, in part because it can hardly be dissociated from other disruptive technologies such as big data analytics (Janssen & Kuk, 2016). While scattered definitions abound, big data commonly emphasizes the "volume", "variety", "velocity" and "veracity" of such data (Vydra et al., 2021, pp. 24–25; Ylijoki & Porras, 2016). The ability to combine previously disconnected datasets allows for problem-solving across distant domains (de Mauro et al., 2015), while greater processing capacity enables speedier insights and real-time forecasting (Hammer et al., 2017). Such benefits are reaped in financial markets (Shah et al., 2021), healthcare (Bates et al., 2018; Hoque & Bao, 2016), urban planning (Löfgren & Webster, 2020), and criminal justice systems (Cale et al., 2020), as well as in citizen co-creation of public services (Criado & Gil-Garcia, 2019). These examples illustrate a transformative capacity to generate value, often utilizing data that was not generated for that purpose (Vydra et al., 2021).

This exponential increase of possibilities in data-driven government spurs algorithm implementation across fields, which combine and manage immense volumes of data and allow for the redesign of processes (Höchtl et al., 2016; Klievink et al., 2017). Thus the use of complex algorithmic models pushes public sector decision-making further, enabling anticipatory activity (Wong & C. Hinnant, 2022) and creates new service roles for data-driven government (Shah et al., 2021).

Moreover, their use defies prior notions of technology in public service design and provision. Previously viewed as complementary to established practices, these technologies transform the underlying decision-making processes (Höchtl et al., 2016), improving analytical capacity throughout the policy cycle (Pencheva et al., 2018). They allow for more precise problem definitions, lower processing time and errors, experimentation of policy alternatives or ongoing impact assessments of interventions, and can augment or even automate policy interventions (Daniell et al., 2016; Giest, 2017; Longo et al., 2018; Mergel et al., 2016). These attributes arguably tie into organizational needs to collect, interpret and

disseminate greater quantities and types of data, leading to a growing demand for algorithmic decision-making (Aragona & de Rosa, 2018; Giest, 2017).

In essence, the value of algorithmic decision-making lies in its ability to leverage new data sources to tackle issues, at a scope and rate that is virtually impossible for humans. It allows public organizations to reduce the time and cost of tasks, increase prediction accuracy and consistency, and even control for discretionary biases and corruption (Ingrams et al., 2022; Young et al., 2019). Furthermore, the mechanic nature of the model grants the overall process a rational undertone, as its output is easily interpreted as neutral evidence. In line with the public sector's maxim of improving policy effectiveness and efficiency, the prioritization of data in the process would serve risk mitigation of policy failure, by strengthening the analytical capacity of an organization (Howlett, 2009).

Their numerous advantages notwithstanding, mistrust due to the allegedly uninterpretable nature of algorithmic models, coined as "black boxes," raises questions about their use to guide or completely automate government services (König & Wenzelburger, 2021). As the merits of their adoption in the public sector continue to be discussed, additional concerns arise about organizational maturity and how to use them responsibly (Matheus et al., 2021; Loi & Spielkamp, 2021). An increased need for literacy, oversight and transparency has followed (Adadi & Berrada, 2018; Figueiredo et al., 2022; Andrada et al., 2022), due to the perceived threat of ineffective or even biased systems entrenching public management (Rainie & Anderson, 2017). Civil society and academia have subsequently decried the advancement toward a "governance by algorithms" (Campbell-Verduyn et al., 2016, p. 224), in which these decision-making systems would be harder to identify, understand and control. In other words, algorithmic decision-making systems (henceforth "ADS") would make it progressively harder to hold government to account.

However, discussions of government's "black box" are not new. As the discretion of bureaucrats in increasingly complex governance arrangements grows, elected politicians and their constituencies continue to challenge the legitimacy and trust in public institutions (Jarvis, 2014). Similar calls for transparency to improve accountability have produced policies such as the widespread freedom of information acts and open government initiatives (Roberts, 2006; Janssen et al., 2012; Gonzalez-Zapata & Heeks, 2016). However, the adaptation of these policies to ADS remains an unresolved challenge, with technical, legal, and ethical issues obstructing algorithmic transparency efforts (Mittelstadt et al., 2016; Edwards & Veale, 2017; Adadi & Berrada, 2018; Veale & Brass, 2019; Garrido et al., 2021; Figueiredo et al., 2022; Andrada et al., 2022). Furthermore, the tensions that greater algorithmic oversight entail for public organizations and managers are equally underexplored, with limited insight on the organizational transaction costs incurred by disclosing ADS (Ananny & Crawford, 2018; Smith et al., 2010, p. 3).

Concerns about ADS are arguably not exclusive to citizens affected by its decisions, but are also shared by the individuals that use them for their work. Perceptions of reduced agency compound criticisms of flawed and biased algorithms, as users cede or even relinquish it completely for automated decisions (Dietvorst et al., 2016; de Jong, 2020; Dietvorst et al., 2015, p. 124; Prahl & van Swol, 2017). The literature explores these concerns by analyzing individual perceptions and discretion, to explain cognitive biases that users may exhibit when using these systems (Burton et al., 2020; Castelo et al., 2019; Jussupow et al., 2020). However, the evidence is primarily derived from experimental research designs that pit algorithmic and human alternatives against each other (Alon-Barkat & Busuioc, 2022), which may only sometimes represent users' reality in organizations. Also, while substantial evidence has analyzed technology adoption from organizational perspectives, the disposition toward algorithm use of public sector officials remains relatively unexplored at the time of writing. Furthermore, while academic inquiry into algorithmic accountability is extensive, how bureaucratic accountability dynamics interact with said disposition constitutes another gap in the literature. Addressing this gap would expand our understanding of drivers for ADS adoption in the public sector.

With this backdrop in mind, one must wonder: "***How does bureaucratic accountability affect public servants' disposition toward algorithm use?***". Drawing on the theory of accountability, algorithmic decision-making, and algorithm aversion, this thesis' research question is examined through a case study of the Chilean **Institute of Social Services**. The organization manages the public pension system in Chile and employs multiple algorithms to automate eligibility decisions for pension benefit applications. Public officials from different hierarchical levels of the organization are interviewed to answer the research question.

The results of this thesis seek to contribute to the field by offering a conceptualization of the "bureaucratic accountability chain" which combines bureaucrats' ability to identify organizational connections of responsibility with notions of personal accountability. This thesis also expands the literature's breadth in the Global South, by drawing evidence from a Chilean organization. Finally, the findings could inspire new avenues for research on applying algorithmic oversight in government and help practitioners design regulation and policy that aligns with the reality of data analysts and decision-makers, that inform or automate decision-making.

1.1 Structure of the thesis

This thesis is divided into seven sections:

- **Section 1** consists of the thesis' **Introduction**.

- **Section 2** outlines the **Theoretical framework** upon which expectations and the hypothesis are constructed. It consists of two subsections, which cover the associated theory for the research question's main themes.

- **Section 3** details the **Research design** of the case study. In this section, expectations are derived from the theoretical framework to construct the thesis' hypothesis. Details of the method, case selection criteria, unit of analysis and operationalization are laid out in its subsections. Observations about the method's reliability and the findings' validity, along with design limitations, can be found here as well.

- **Section 4** outlines the **Case description**. Its subsections encompass an overview of the Chilean Institute of Social Services with explanations of the automated decision-making processes and the organizations' departments in charge of them. To contextualize the theory on algorithmic accountability, the state of algorithmic transparency in Chile is disclosed as well.

- **Section 5** consists of the case study's **Analysis**. It encompasses two subsections to scrutinize the hypothesis in light of the data. The **Analysis of results** subsection presents the data and links it with theoretical expectations. Then, the **Analysis of explanations** subsection further examines the data's explanatory power to answer the research question.

- **Section 6** closes the thesis with a **Conclusion**. It summarizes the sections above with an emphasis on the thesis' explanations, lays out additional limitations and proposes future avenues for research. A recommendation for practitioners is also included.

- **Section 7** lists the **References** of the thesis.

2. Theoretical framework

This section consists of a literature review of the theory for accountability, algorithmic decision-making, and algorithm aversion, to answer the research question, "***how does bureaucratic accountability affect public servants' disposition toward algorithm use?***".

Due to the diversity of associated issues, **government accountability** and **disposition toward algorithmic decision-making** are multifaceted topics. To home in on them, the following section reviews the theory of government accountability and the associated field of transparency. Then, the theory on algorithmic decision-making, as it pertains to accountability and disposition toward their use, is examined.

A summary of theoretical assumptions derived from the associated literature is provided at the end of each subsection. Together, they offer an approximation to issues that could arise from the relationship between bureaucratic accountability and disposition toward algorithm use in government.

2.1 Government accountability

2.1.1 What is accountability?

The literature on accountability in government commonly underscores the concept's evolving nature, traced back to a debate between political scientists Carl Friedrich and Herman Finer in the early 1940s about responsibility in public administration. Mulgan (2000) offers a synopsis of the debate and its theoretical relevance: Both were concerned about the government shirking from its responsibilities or engaging in corruption and finding a way to assure responsible management. Friedrich argued for the un-interfered discretion of bureaucrats due to their privileged expertise, professional standards, and moral values, making them ideal for ensuring effective administration. Finer contested this view by arguing that such internal aspects of the bureaucracy were insufficient and that elected officials were instead optimally prepared to direct government activity by being chosen (Stewart, 1985).

In both scenarios, either through internal principles or external influences, individuals answer or, more precisely, "are held to account" for their actions. Peer review systems, professional standards, regulation for bureaucratic control, client demands, policy effectiveness, and government responsiveness have subsequently been associated with accountability (Bovens et al., 2008; Mulgan, 2000; Page, 2006; Romzek & Dubnick, 1987). Four questions commonly structure its academic analysis: "'Who?', 'To whom?', 'For what?' and 'Why?'" (Aleksovska, 2021, p. 708).

The first question distinguishes accountability from responsiveness, as only actors who hold the necessary discretion "to make authoritative decisions can be the objects of accountability" (Lindberg,

2013, p. 208), by being the "identifiable locus of authority" (p.208). In that sense, an actor's discretion over actions that affect another encourage the need to hold the former accountable.

Academic inquiry has distinguished two broad perceptions of accountability, one normative and another as a mechanism (Bovens, 2010). The former alludes to a virtue held by actors, a desirable quality of public officials that projects trustworthiness, equitability, fairness, or even effectiveness (Page, 2006). Political discourse leverages this conceptual ambiguity to convey an image of trustworthiness and transparency (Bovens et al., 2008). The latter, answering the "to whom?" question, alludes to a descriptive notion of institutional arrangements and relationships that are implemented to hold actors accountable. Accountability is thereby understood as an arrangement between parties: a bond between the actor and an "accountability forum," which is holding it accountable (Bovens, 2010).

This definition has coalesced into three constituent elements over time: First, an individual or organization gives account to another individual or organization. Second, an account is given to obtain answers, rectify, and to impose potential sanctions. Third, it implies the rights of superior authority over the individual or organization to demand answers or impose sanctions. In this sense, accountability is a relationship that implies social interaction and exchange, entailing the rights of authority of an actor to demand explanation and justification from another, who can be sanctioned upon failure to do so (Lindberg, 2013; Mulgan, 2000).

Furthermore, "being accountable" entails an element of potentiality, which can be demanded in different forms and time frames by the accountability forum. This potential dynamic occurs in sequential stages of information disclosure by the actor held to account, debate by (and perhaps with) the forum, and potential consequences or sanctions that may result from it (Bovens, 2007; Brandsma & Schillemans, 2013). Brandsma & Schillemans (2013) note that these distinct phases of "information," "discussion," and "consequences" can vary in quantity and intensity, effectively producing a myriad of different accountability arrangements. Some may involve substantial disclosure of information but few consequences in the form of sanctions. Others may spur intense discussions in the forum and several consequences, even with limited information disclosed.

Consistent with the "for what?" question, such relationships imply that an actor is accountable for a specific domain. In public administration, this can range from ensuring the primacy of democratically legitimated actors; to the regulatory compliance of public authority; the effectiveness of learning for continuous policy improvement; and policy success per performance measures (Bovens et al., 2008; Jarvis, 2014). These domains define different sources of accountability and the degree of control exerted by them. Lindberg's (2013) synthesis of accountability systems distinguishes between the source (internal or external from the organization), direction (upward or downward), and intensity of control over agency actions as defining elements to understand the dynamics of accountability relationships. The literature frequently identifies the following arrangements:

- **Bureaucratic**: The domain of bureaucratic supervision between a superior and her subordinate, as exemplified by managers requesting operation-related data from lower rungs of the hierarchy. Commonly defined by vertical control from an internal source. Bureaucrats are held accountable by their supervisors based on performance measures and goals.
- **Professional**: The domain of deference to standards shared with peers, either through informal self-adherence or peer review. It is defined by horizontal control from an internal source.
- **Political and democratic**: The domain of influence from elected officials over the bureaucracy and from the citizenry over public organizations, respectively. It is defined by vertical control from an external source.

These arrangements are tied to an actor's relationship with its accountability forum (Page, 2006; Romzek & Dubnick, 1987). Therefore, different compositions of these elements lead to different accountability relationships, encouraging different approaches from account holders and those held to account (Lindberg, 2013).

Within organizations, bureaucratic accountability can be traced in chains of delegation, where on-the-ground bureaucrats are effectively held accountable by public managers, which are themselves accountable to elected officials (Brandsma & Schillemans, 2013; Romzek & Dubnick, 1987). It follows that as the complexity of public service provision increases, so do the associated roles of public officials and administrative subsystems expand across the chain. Due to the growing discretionary links of the chain, such relationships are dubbed the "black box" of bureaucracy and are associated with Principal-Agent logic (Jarvis, 2014). This is because principal-agent theory recognizes a contractual arrangement where citizens (the principal) delegate functions to democratically elected public officials (their agents), expecting that the trade-off for surrendering authority results in positive outcomes (Tallberg, 2002).

The increasingly limited or nonexistent oversight over public servants' discretionary space would be evidence of a democratic deficit in the bureaucratic accountability chains laid out above. With limited direct control of principals over non-elected bureaucrats, the aforementioned black box challenges the relationship, justifying a degree of knowledge of involvement in an actor's discretionary space and preventing "agency drift and manage information asymmetries" (Brandsma & Schillemans, 2013, p. 956). This ties into the final question of "why" actors are held to account. In principle, forums hold actors accountable to ensure conformity with specific standards of behavior.

2.1.2 Bureaucratic accountability

Bureaucratic accountability is the domain of supervision between a superior and her subordinate and is commonly exemplified by feedback processes, formal evaluation procedures and internal audit processes. The standards of behavior that define such arrangements are numerous. For example, law-compliant and public service consistent use of authority and resources have been tied to assurance or constitutional purposes. In addition, continuous improvement of public service through learning and efficiency of public service delivery have also been associated to bureaucratic accountability (Bovens et al., 2008; Jarvis, 2014).

Public officials commonly deal with a multiplicity of accountability relationships: An organization might be externally accountable to the consumers of their services, performance-measuring agencies or the professional communities that influence their work, and internally to parent departments. Efforts to either reconcile or prioritize some pressures over others to avoid the threat of sanctions tend to result from officials facing these diverse and conflicting accountability demands (Aleksovska et al., 2022; Koppell, 2005; Page, 2006). Criteria such as organizational reputation (Busuioc & Lodge, 2017), responsiveness (Koppell, 2005), or customer satisfaction in public-private services (Thomann et al., 2018) have been observed.

Furthermore, the increasing complexity of administrative decision-making processes requires that they be broken down into smaller segments to facilitate influence over each constituent part (Simon, 1997). Such chains of bureaucratic delegation assume that they secure the specific expertise of workers, allow for their coordination across units, and establish a relationship of responsibility towards hierarchical elements of authority (Simon, 1997). Therefore, the underlying assumption of bureaucratic accountability posits that oversight of bureaucrats by parent departments ensures greater compliance with organizational goals and thus leads to greater effectiveness.

However, how this translates into institutional practice varies (Schillemans et al., 2022). As an example, research on institutional accountability explores how bureaucrats respond to accountability demands by reacting to them or proactively engaging in transparency practices (Kosack & Fung, 2014), such as disclosing and disseminating mandate-relevant information. In addition, public officials deem different constituencies and stakeholders as strategic, which incentivizes their adherence to formal accountability directives and even motivates informal actions for the sake of reputation or avoidance of their objections (Aleksovska, 2021; Rohrer, 2020).

Accountability thereby becomes a “strategy for managing expectations” (O’loughlin, 1990, p. 279; Romzek & Dubnick, 1987), placing the weight of analysis on accountability forums’ influence on bureaucrats and how they communicate with each other. An effective arrangement would entail a high level of scrutiny placed by actors, gauged by the intensity and quality of examination demands or participation in agency activities (O’loughlin, 1990). Accountability arrangements are, in that way,

hardly one-dimensional, as it is often the forums that fail to exercise their duties, leading to a "forum drift" instead of the suspected "agent drift" that they mean to mitigate (Schillemans & Busuioc, 2015).

Bureaucratic accountability can be commonly traced along hierarchies and is, therefore, mainly conceptualized as a vertical relationship. Public administration theory highlights two key elements: the instructed goals or end states given by the principal and the mechanisms used to monitor implementation toward them (Reddick et al., 2020). Especially the latter has been shown to increase the intensity of bureaucrat's perceived obligation to respond for their actions vis-à-vis policy goals. Consequently, evidence suggests that vertical accountability positively impacts oversight clarity, making practitioners at lower rungs of delegation "feel more accountable" (Reddick et al., 2020, p.1433).

Schillemans et al.'s (2022) recent explorations of public sector accountability styles reveal how such bureaucratic arrangements play out across Bovens' (2007) three phases of "information", "debate," and "consequences". During the information phase, public servants inform higher bureaucratic tiers about conduct through periodic reporting and briefings or as responses to requests. The following debate phase encompasses processes that judge disclosed information according to established norms and expectations. Higher bureaucratic tiers may then utilize or threaten with sanctions for correction or reward in the final consequences phase. Bureaucratic behavior across these three stages commonly manifests through formal and informal actions, mostly in response to negative consequences (Schillemans et al., 2022).

These subtleties notwithstanding, bureaucratic accountability often trickles down and up a chain of delegation (Jarvis, 2014): Elected officials hold public managers accountable, and these, in turn, do the same with their subordinates. This vertical accountability chain rests on the purpose of control, for principals to deter mandate-divergent practices. However, as increasingly complex organizations utilize sign-off systems and technologies to approve activities, accountability is at times flipped upwards. Senior hierarchy levels become those that are held accountable, "by virtue of them having approved the work (…) of their subordinates" (Jarvis, 2014, p. 456). Such conventional vertical types differ from horizontal structures that position government performance agencies and interest groups, affected communities, and citizens on equal footing with public servants, leading to a coordinated, negotiated and overall more symmetrical accountability arrangement (Michels & Meijer, 2008). Despite their differences, these relationships often coexist within organizations, influencing public servant behavior (Aleksovska et al., 2022).

No matter its form, accountability is frequently coupled with democratic aspirations of designing public institutions that "are amenable to public control" (Mulgan, 2000, p. 565). It can thus be perceived as control by the actors held accountable, a constraint on bureaucrats' freedom of action that is formalized in demands from superiors, citizens, interest groups, and mass media, as well as compliance with regulation (Page, 2006). Research on accountability as a control mechanism explores the potential

trade-offs in administration practice, such as "accountability overloads," where shallow pursuits of accountability can lead to focus on "that things are done right, but not necessarily that the right things are done" (Halachmi, 2014, p. 563). In such dysfunctional instances, accountability arrangements curtail an organization's productivity, service quality, and overall responsiveness (Bovens et al., 2008; Koppell, 2005). Moreover, bureaucrats' perception of being oversaturated by strict rules, for which they are held accountable, translates into compliance costs: they can feel their autonomy reduced, their agency mistrusted, and their decision-making processes made inflexible (Aleksovska, 2021).

This can lead to a back-and-forth dynamic between performance-measuring agencies and public servants, who effectively learn how to game performance measures, which are then reformulated in response (Courty & Marschke, 2007). Such anticipatory activities are speculated as accountability's mirror image of blame avoidance and illustrate how accountability relationships often trigger a counter-balancing tactic from those held to account to minimize, shift, share or outright avoid blame (Hood, 2007, 2014; Tu, 2022).

2.1.3 Transparency as a mediating tool for accountability

As can be surmised, accountability reveals the necessary condition of a "locus of authority" being identifiable so that it may be held accountable. For that reason, accountability literature is often grouped with research on transparency, to the point that some scholars note an almost interchangeable conceptual use (Hood, 2006; Koppell, 2005; Strathern, 2013).

Hood (2006) ties its origin to the development of rule-based government, which rests on stable, documented, and thus predictable administration. Enlightenment discourse professed the wicked nature of secrecy, suggesting the need for openness. Jeremy Bentham's claim that "the more strictly we are watched, the better we behave" (Hood, 2006, p. 9) echoed Jean-Jacques Rousseau's argument that public servants should "operate 'in the eyes of the public'" (p.7). Secrecy was conceived as an instrument of conspiracy, anathema to accountable government, and transparency its remedying tool. Fittingly, Grimmelikhuijsen et al. (2012) define transparency as "disclosure of information (…) that enables external actors to monitor and assess its internal workings and performance" (p.563).

In general, the literature coincides with this view and recognizes an almost self-evident and historically consistent assumption: A higher degree of transparency is associated with an increase in trust towards accountable organizations, incentivized towards integral behavior, increasing their perceived legitimacy and the quality of service provision (Bovens et al., 2008; Ingrams et al., 2022; S. Kim & Lee, 2012; Kosack & Fung, 2014; Meijer et al., 2012). The evidence on how that trust is generated or mediated is less agreed upon (de Fine Licht, 2011; Hood, 2007; Kosack & Fung, 2014; O'Neill, 2006; Schmidthuber et al., 2021), as the incentive for integrity depends on organizations' capacity for self-reflection and

willingness of improvement (Strathern, 2013). Furthermore, excessive disclosure of information can lead to information overload, reducing beneficial effects (Bovens et al., 2008; Heald, 2006; Janssen et al., 2012; Matheus et al., 2021).

Moreover, Heald (2006) claims that while openness is an inherent attribute of an organization, "transparency also requires external receptors capable of processing the information made available" (p.26). In that sense, transparency transcends the concept of openness by incorporating comprehensibility. Other scholars expand this claim further, stating that transparency by itself does little to advance accountability and is fundamentally tied to the effectiveness of communication (Meijer et al., 2012; O'Neill, 2006) or even external participation in policymaking or service provision (S. Kim & Lee, 2012; Schmidthuber et al., 2021; Welch, 2012).

As hinted at by O'loughlin (1990) above on accountability arrangements, transparency also suggests a direction in which said information is disclosed. Transparency can be vertical, associated with Principal-Agent control mechanisms, where hierarchically superior figures observe the conduct of their subordinates or agents, or with democratic theory, where the ruled observe the behavior of their rulers (Heald, 2006, p. 27). Transparency, therefore, builds upon a tight relationship with surveillance, echoing the accountability trade-offs indicated above. In public administration, transparency has been associated with risk aversion and practices of blame avoidance both by bureaucrats and elected officials (Halachmi, 2014; Hood, 2007; Tu, 2022). Some organizations construe transparency as mere audit procedures, which officials often adjust their activities to instead of disclosing information that would be valuable to their account holders (Strathern, 2013). When bureaucracy merely adapts to auditing windows and formats, "the language of accountability takes over the language of trust" (Strathern, 2013, p. 314), undermining its original purpose (Roberts, 2006).

Lastly, a distinction is noted between the objects disclosed for transparency purposes. These can be inputs and outputs of an organization's activities or the procedural and operational aspects that generate them (Heald, 2006). As the latter pertains to rules, regulations, procedures, and processes adopted by the organization, they are more complex to disclose and thus often compound the "black box" of bureaucracy. Relatedly, the notion of "procedural justice" and the fairness of decision-making challenges the legitimacy of such bureaucratic discretion, increasing the demand for more oversight (de Fine Licht, 2011). Here, discretion plays a paradoxical role in how public servants are held accountable, as decision-makers can also use it to adjust or even advocate changes to the standards they are measured against (Yang, 2012, p. 267). It follows that transparency, particularly that of processes, is easily politicized by actors within the scrutinized department (Hood, 2007).

In fact, public organizations formally challenge norms by introducing barriers such as data request fees, interpreting legislation to restrict its scope and affected branches, or impeding information release on the grounds of national security (Roberts, 2006). Even more common, however, are informal resistance

practices, such as decreasing the quality and rate of record-keeping, understaffing or financing Freedom of Information departments, manipulating data, or restructuring organizations beyond the reach of legislation (Janssen et al., 2012; Roberts, 2006). Even in cases of apparent compliance, public organizations can obfuscate the quality of information by excessively disclosing material, generating information overload (Heald, 2006; Janssen et al., 2012; Matheus et al., 2021). In such cases, ineffective transparency stifles the effectiveness of the accountability chain.

Moreover, existing transparency initiatives can substantially influence accountability arrangements' implementation. Even with regulatory momentum behind it, an undeveloped culture of transparency can lead to public servants adopting a minimum-effort approach to meet accountability provisions (Gonzalez-Zapata & Heeks, 2016). These are examples of what Halachmi (2014) defines as "dysfunctional pathologies of accountability overloads" (p.561), which can also include public officials gaming indicators and engaging in blame games. Furthermore, policy change for more transparent internal accountability can move away from procedural compliance monitoring toward outcome measurement, paradoxically increasing public servants' discretion (Page, 2006).

Nevertheless, the theory suggests that transparency is a tool that enables the disclosure of information in the different phases of accountability, thereby mediating the relationship between the account holder and those held to account.

2.1.4 How public officials perceive accountability

Some scholars have leaned on organization theory to explain challenges to institutional change for accountability. The classical theory identifies organizations as stable constructs built on efficient tasks and procedures to maximize goal attainment (Rainey et al., 2021). Through this lens, the organizational change would be tied to objective, rule-based goal adjustments such as "more accountable subordinates." This requires mechanisms that accommodate demands for explanation from account holders, who can also judge and impose sanctions to correct the course of those held to account (Mulgan, 2000).

However, the literature has explored how public organizations can be exceptionally resilient to implementing accountability, often due to regulatory requirements, limiting the influence of such norms on internal processes. Scott (2008) suggests that coercive power, especially that born of regulation, is often "subject to interpretation, manipulation, revision, and elaboration by those subject to them" (p.430). Oversight norms would be partly endogenous to the organizations that adopt them, an element of a process that transforms accountability "into normative and cultural-cognitive elements" (p.431). Plainly, organization subsystems will often embrace or reject regulation through distinct processes of appropriation. Echoing Simon's (1997) inquiry into organizational incentives such as prestige and

altruistic service, this assertion has been expanded to the subjective experiences of individual employees (Han & Perry, 2019). It follows that while the performance of public organizations is overtly held to account, such performance is derived from the sum of accountability mechanisms that occur at an individual level.

Such notions of individual accountability theorize that actors involved in an accountability relationship personally perceive its intensity, salience, or even clarity. The elements measured by accountability arrangements are thereby the result of a complex translation process in which "felt accountability" is moderated by organizational and individual characteristics, resulting in organizational performance (Sinclair, 1995; Yang, 2012, p. 271). This notion of accountability as a subjective experience that can shift and grow independently from external evaluation systems put in place is formalized by Han & Perry's (2019) employee accountability model. It identifies five elements that determine why individuals feel accountable and how the systems put in place affect them:

- *Attributability*: the ability to link oneself to a specific action or inaction;
- *Observability*: the perception of being observed by someone outside the in-group;
- *Evaluability*: being subjected to formal and informal evaluation according to specified criteria;
- *Answerability*: the felt responsibility to explain or even justify actions;
- *Consequentiality*: the predicted possibilities of sanctions or rewards for said actions.

These elements coalesce into the collective behavior of public servants, to be scrutinized by account holders in a given accountability arrangement (Han & Perry, 2020).

2.1.5 Theoretical assumptions: Accountability

In sum, bureaucratic accountability is a relationship in which different actors, mainly within the organization, hold public servants accountable. Following Principal-Agent theory, chains of bureaucratic accountability are implemented on the basis that public officials and their supervising departments will contribute towards organizational goal achievement, compliance with regulation, and reduce mandate drifting or shirking. Stringent accountability arrangements lead to potential trade-offs to effectiveness, which can be met with resistance by bureaucrats. Like other accountability relationships, bureaucratic accountability is based on a sequence of disclosing role-specific information to the hierarchically superior, which in turn evaluates and then applies rewards or sanctions to adjust the agent's performance. Transparency mediates this sequence by identifying the locus of authority and enabling the transmission and comprehension of the information deemed relevant for the accountability arrangement. Finally, bureaucratic accountability is built upon a process of individual appropriation,

where public officials personally perceive the intensity and salience of, and their overall association with, the substance of the accountability relationship.

Having reviewed theoretical assumptions on bureaucratic accountability, the following section explores the literature behind the second half of the research question, "***how does bureaucratic accountability affect public servants' disposition toward algorithm use?***"

2.2 Disposition toward algorithmic decision-making

2.2.1 Government adoption of algorithms

Hill (2016) defines algorithms as constructs "with a finite, abstract, effective, compound control structure, imperatively given, accomplishing a given purpose under given provisions" (p. 47). Put simply, an algorithm is a sequential set of rules designed to solve a specific problem, leading to a decision. While algorithms are not tied to digital technologies, the scope of problems and the speed organizations require to solve them explains why they are more commonly programmed for computers: their potential is heightened, becoming an automated instruction (Louridas, 2020). In addition, more complex machine learning algorithms encompass "any methodology and set of techniques that can employ data to come up with novel patterns and knowledge, and generate models that can be used for effective predictions about the data" (Mittelstadt et al., 2016, p. 3). These attributes allow organizations to calculate correlations between vast and complex unstructured data sets.

Potential benefits of ADS are associated with increased prediction accuracy and consistency, mitigating discretionary bias and corruption, lowering perceived red tape, and cost-reductions for routinary, yet still discretionary, bureaucratic tasks (Ingrams et al., 2022; Young et al., 2019). Further opportunities for service personalization and improvements to efficiency, productivity, and user convenience are identified in combination with big data analytics (Valle-Cruz, 2019). However, the associated applications for public governance arguably garner more attention in research for technical rather than policy or regulation aspects (Zuiderwijk et al., 2021).

A distinction can be made between the more common algorithm models that augment public service processes as aides with forecasts and those that automate decisions based on classification and eligibility criteria (Edwards & Veale, 2017; Peeters, 2020). Other uses of algorithms in recruitment, financial management, or human resource allocation are similarly implemented by governments (van Noordt & Misuraca, 2022). Uses for policy formulation and implementation are less prevalent, possibly due to the disruptive effect that more advanced algorithms have on public organizations. This is because algorithms influence decision-making functions, levels of control, and discretion of bureaucrats (Giest & Klievink, 2022; Peeters, 2020), stressing the need for political implementation guidelines and organizational support at higher authority levels (Ali & Titah, 2021; Wirtz & Müller, 2018).

As a result, government adoption of algorithmic decision-making has been explored from overly optimistic or pessimistic perspectives: The former citing transformative analytical output, the latter proposing that the political nature of policymaking overshadows any potential it may have for public organizations (Vydra & Klievink, 2019). Competing logics held by data analysts and public managers on what constitutes better data thereby influences the decision-making process of designing and implementing ADS preferences (van der Voort et al., 2019).

On that note, Kolkman (2020) suggests that using ADS is inherently a social process. Users interact with algorithms differently, depending on their role: the distinct approaches of the developers, who create and implement the model, the analysts who operate it daily, and the service's beneficiaries create gaps in estimating impact and conducting cost-benefit analyses. Moreover, despite techno-optimistic discourse, unresolved questions of curbed discretion and algorithmic accountability overshadow academic inquiry into operational and organizational transformations of algorithmic decision-making (Arnaboldi et al., 2022; Ingrams et al., 2022; Young et al., 2019).

2.2.2 Accountability of algorithmic decision-making

The theory generally points to algorithms' inherent obscurity as a barrier to their accountability in government (Janssen et al., 2022; Sousa et al., 2019). Algorithms often lack management guidelines that establish objectives, task assignment, and decision-making authority and responsibility (Wirtz & Müller, 2018), which are vital elements of accountability relationships.

Algorithms can also challenge the notion of evidence in public sector decision-making. What data constitutes evidence and how its quality is determined, as well as how it is used to inform policy-making, has been a topic of contention in public administration literature (Boswell, 2014; Howlett, 2015). Wesselink et al. (2014) posit that data relevancy is ultimately tied to practice, emphasizing the role of context in collecting, interpreting, and using data for policy design and implementation. Concordantly, evidence-based policy-making is recognized as a "politically-embedded process" (Weldon & Parkhurst, 2022, p. 467), better understood as a "principle of avoiding error, rather than that of seeking truth" (Sayer, 2020, p. 243). Moreover, the validity of algorithmic evidence turns more complex as human mediator involvement is often blurred across algorithmic decision-making processes (Veale & Brass, 2019). In other words, the data used by algorithms would hardly classify as neutral, raising further questions about accountability (Wong & C. Hinnant, 2022).

Nevertheless, the growing eminence of such data in policy-making creates new power relations between actors with the expertise to manipulate algorithmic decision-making systems and the infrastructures and languages that sustain them (Ruppert et al., 2017). As a result, a transition from "governance through algorithms" to "governance with and by algorithms" is established, which is effectively dominated by unaccountable actors (Arnaboldi et al., 2022; Campbell-Verduyn et al., 2016, p. 224).

Scholars identify these developments as compounding effects on the "black box" of bureaucracy. Where humans base their decision-making on knowledge and experience, algorithms often operate on decision rules acquired from the aggregate distribution of previous outcomes (König & Wenzelburger, 2021). These can be manipulated to achieve different outcomes, inadvertently reinforcing systemic

discrimination or introducing biases (Janssen & Kuk, 2016). This risk is likely heightened when public agencies outsource or procure algorithms (Desouza et al., 2020).

Furthermore, holding algorithms accountable based on public reason, for example, would demand commonly endorsed epistemic and normative standards (Binns, 2017). This issue leads to a novel legitimacy gap, which challenges the traditional perspective on public sector decision-making and its relationship with the citizenry (Daniell et al., 2016; König & Wenzelburger, 2022). To complete a task, algorithms require unambiguous and stable objectives and a high degree of regularity in decision windows. In other words, for such a solid base to structure their reasoning, it is necessary to establish an agreed-upon standard of a "good" or "better" decision.

However, even experienced data analysts and developers cannot always discern if an algorithm has arrived at the correct recommendation or decision; that is, it has drawn the correct conclusion based on the data fed into it and its objectives (Janssen et al., 2022). This challenges traditional decision-making in the public sector, where it is common to decide on novel or wicked matters, widening the divide between traditional public servant- and algorithmic decision-making (König & Wenzelburger, 2022).

Due to an organization's decision not to disclose the inner workings of the model because of intellectual property provisions, personal data protection, or even national security, algorithms can be seen as inherently opaque (Burrell, 2016). More commonly, though, this opacity stems from the technical illiteracy of public managers that inform or automate their decision-making with algorithms. Missing "knowledge over the scope, provenance, and quality of data" (Mittelstadt et al., 2016, p. 4), mainly due to the lack of accessibility and comprehensibility of information, is a mounting concern of "inscrutable evidence" for parties working with or influenced by the algorithm.

Such issues motivate demands for greater algorithmic transparency, as seeing and understanding the system would enable the accountability relationship with actors who utilize these models (Ananny & Crawford, 2018). In that respect, algorithmic transparency is associated with improved perceptions of justice and trust (Bujold et al., 2022; S. Grimmelikhuijsen, 2022; Zerilli et al., 2022) and could empower public managers by enabling greater control over different policymaking process stages (Kolkman, 2020). However, "opening" algorithms likely does not improve their understanding and demands additional competence in data collection, processing, and protection (Desouza et al., 2020; Janssen & Kuk, 2016; Varley-Winter & Shah, 2016; Wong & C. Hinnant, 2022). In effect, expertise and data literacy asymmetries are seen as a primary hurdle for algorithmic transparency (Kemper & Kolkman, 2018; Kettl, 2016; Mikhaylov et al., 2018; Poel et al., 2018).

How to make algorithms transparent is, therefore, a disputed topic (Brauneis & Goodman, 2018; Buhmann & Fieseler, 2021; Janssen et al., 2022; König & Wenzelburger, 2021; Kroll et al., 2017). Different perspectives argue over whether responsibility should lie in individual citizens or specialized audit groups (Burrell, 2016; Loi & Spielkamp, 2021; Poel et al., 2018) and over how it would affect

accountability (Ananny & Crawford, 2018; Buhmann & Fieseler, 2021; Smith et al., 2010, p. 3). Others argue that algorithms are perhaps held to standards of transparency that not even public officials can achieve (Zerilli et al., 2018) and that the effects of transparency are inherently tied to understandings of human decision-making (Peeters, 2020). In any case, algorithmic transparency demands timeliness, veracity, exhaustiveness, and context, all of which introduce a balancing act with public management efficiency (Smith et al., 2010).

Research has consequently explored the merit of ethical, policy, or management-centric guidelines or normative frameworks such as the General Data Protection Regulation (GDPR) to steer solutions (Brkan, 2019; Edwards & Veale, 2017; Garrido et al., 2021; Goodman & Flaxman, 2016; T. W. Kim & Routledge, 2022; Mittelstadt et al., 2016; Veale & Brass, 2019). These efforts coincide with growing academic inquiry into Explainable Artificial Intelligence (Adadi & Berrada, 2018), as well as recent ethics research on "explainability" as an ethical principle for algorithmic decision-making (Figueiredo et al., 2022).

At any rate, researchers have pointed to the "unaccountable" nature of algorithms and the lack of transparency as relevant factors driving the behavior of public servants interacting with them (Busuioc, 2021). For even if one could hold an actor accountable for an automated decision, whom to hold liable for its design, implementation, or final decisions is often unclear (Wirtz et al., 2018). While some have assigned moral responsibility to "designers and data scientists" (Floridi & Taddeo, 2016, p. 3), Matheus et al. (2021) identify a lack of information-sharing plans, limited awareness of benefits, unclear ownership, and the inability to inspect opaque algorithms as common organizational barriers to close such an accountability gap. A remedying principle of process stewardship would entail greater collaboration between officials at different layers of the bureaucratic hierarchy.

Blurred or unassigned responsibility over algorithms can similarly lead to blame-shifting between actors who were either in charge of providing the data, building the algorithm, validating its implementation, or operating it daily (Mikhaylov et al., 2018). Additionally, recent evidence suggests that users more readily assign blame to humans than algorithms and feel more responsible for associated tasks (Chugunova & Sele, 2022).

Research also alludes to imperfect delegation of responsibility when algorithms are implemented in government decision-making, as bureaucrats end up accepting automation due to a lack of skills or an unfavorable position to understand the decision-making system (Loi & Spielkamp, 2021). In that regard, Andrada et al. (2022) allude to some algorithms being so profoundly embedded into activities and processes, that users effectively see *through* them without knowing they are there. This notion relates to the balancing act of public management efficiency mentioned above, implying that public officials are willing to accept varying degrees of algorithmic opacity if it enables or even improves their work (Andrada et al., 2022).

A product of algorithms' inherent opacity, these concern offer clues on their implementation in the public sector and, more specifically, public servants' disposition toward their use.

2.2.3 Disposition toward algorithm use

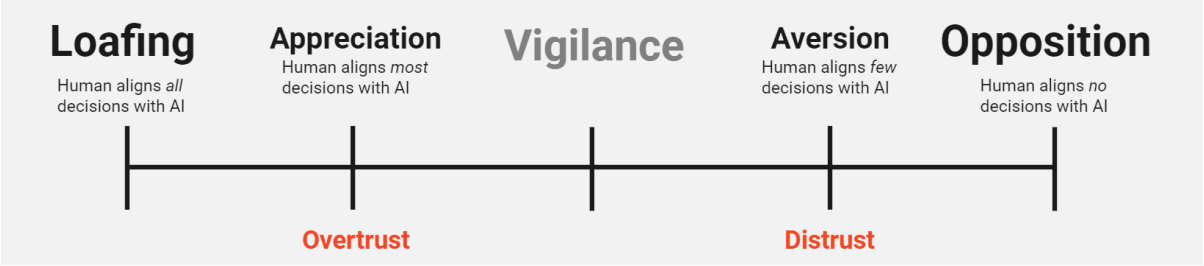
The factors behind algorithm adoption at an individual level are explored from different angles, and scholars point to the role of trust and discretion in explaining cognitive biases. Substantial evidence of these factors can be found in algorithm appreciation and aversion theory. This field studies the biased assessment of algorithms that translate into negative or positive attitudes toward and lack or too much trust in the algorithm (Jussupow et al., 2020). A subjective attitude, trust in the algorithms that users operate is noted as necessary for these systems to function effectively (Zerilli et al., 2022). In essence, algorithms that automate processes induce comparisons, where the model's merits are weighed against humans (Jago, 2019), which is arguably why associated evidence is primarily based on experimental designs that pit both against each other (Alon-Barkat & Busuioc, 2022). In general, greater trust is tied to less aversion and translates into a willingness to use the algorithm instead of relying on a human (Castelo et al., 2019).

While a general aversion toward algorithms is noted in the research (Burton et al., 2020; Castelo et al., 2019; Jussupow et al., 2020), four relevant dimensions of inquiry are common:

- Whether the algorithm advises a user or operates autonomously
- Whether the algorithm is reliable based on its failure rate
- Whether it is perceived to have the means necessary to perform its task
- How strongly humans are involved in training and using it

While findings on disposition toward algorithm use can ostensibly be relevant for all types of models, the literature distinguishes between the two types of algorithms described above: those that augment or advise decision-making with greater human oversight and those that automate processes and decisions (Burton et al., 2020; Jussupow et al., 2020). This straightforward distinction aside, algorithms employed by organizations in truth fall within a continuum with varying procedures and degrees of human intervention (Madhavan & Wiegmann, 2007a; Peeters, 2020). Accordingly, Zerilli et al. (2022) plot user attitudes toward algorithms on a scale (**Figure 1**): from "loafing," where the user aligns all decisions with the algorithmic decision-making system, and "opposition," where the user aligns no decision with it.

Figure 1 *- Scale of attitudes toward AI (Zerilli et al., 2022)*



Aversion to augment-type algorithms is associated with humans' "intolerance of inevitable error," a negative bias toward recommendation processes known to be flawed (Dietvorst et al., 2016, p. 5). Experiments on advisor-type algorithms show how people appear to hold them to higher standards than human decision-making, being more quickly to abandon them even if both commit the same error (de Jong, 2020; Dietvorst et al., 2015, p. 124; Prahl & van Swol, 2017). Human mistakes are seen as more amendable than systematic, algorithmic errors. Moreover, if users perceive that they can modify the output of algorithms, they are likely to have higher satisfaction and disposition toward their use, evaluating the model's performance better than their own (Dietvorst et al., 2016). Algorithmic recommendation processes are also often perceived as more complicated to understand than those from humans, increasing aversion (Yeomans et al., 2019).

The appropriateness of algorithms in the context they are implemented in is also relevant for users' disposition. As an example, people perceive algorithms as less capable of conveying sincere actions or the values behind them, making their output less authentic (Jago, 2019), a trait attached to greater leadership and persuasion capabilities in organizations (p.43). Moreover, even if the quality of the algorithm is recognized, people may still reject their use if it involves morally complex issues because they value the human capacity to discern and act beyond rigidly preestablished principles (Bigman & Gray, 2018; Jauernig et al., 2022; Lee, 2018). In that regard, information about the algorithm's previous adoption by others significantly contributes toward the user's trust (Alexander et al., 2018).

Aversion to more autonomously operating algorithms is related to a decision's appropriateness, the authenticity of the algorithm's action, and perceived accountability and trust in the model (Jussupow et al., 2020, p. 5; Shin & Park, 2019). Such ADS challenge psychological "needs for agency, autonomy, and control" (Burton et al., 2020, p. 224), which is why trust in them is moderated by perceived predictability, dependability, and the user's technical competence. It is also suggested that keeping a human "in the loop" of the decision-making process through avenues for intervention and providing input would counteract such aversion. In short, users generally prefer making their own decisions or delegating them to another human (Chugunova & Sele, 2022).

A user's perceived control over the algorithm, expressed by discounting its output or adjusting its processes, is commonly linked with less aversion. Limiting algorithms to an advisory role is therefore proposed as a way to reduce algorithm aversion, particularly in morally complex domains such as medicine, military, and autonomous vehicles (Bigman & Gray, 2018). Tying into the unobservable nature of algorithms, a more favorable disposition is observed when information on their performance is unavailable (Castelo et al., 2019). Additionally, perceived fairness and procedural justice are higher when complex decision-making is assisted and not replaced by algorithms (Kern et al., 2022; Nagtegaal, 2021), though the literature appears to be less consistent in that regard, alluding to the relevance of context and user-related predictors (Starke et al., 2022).

Evidence also points towards scenarios where algorithms are appreciated over human judgment. This is the case when the task is an otherwise "objective" matter based mainly on quantitative analysis (Alon-Barkat & Busuioc, 2022; Castelo et al., 2019; Chugunova & Sele, 2022; Lee, 2018; Logg et al., 2019) or when it can reduce excessive cognitive burden produced by multiple, complex tasks (Lyell & Coiera, 2017). Such data, however, suggests that support for the algorithm is lower when users can opt for their own advice. This trend is more prevalent among experienced professionals who regularly discount the advice of others (Logg et al., 2019). In a similar vein, while algorithms are generally perceived as more reliable than humans, the associated trust in them by users is moderated by expertise and pedigree, with higher algorithm aversion if both are perceived as equally expert advisors (Madhavan & Wiegmann, 2007b).

High workload and the associated risk and complexity of the task automated by the algorithm are other sources of algorithm appreciation (Madhavan & Wiegmann, 2007a). If the source of the data used by the algorithm is known, the system is perceived as reliable, and task complexity curtails the perceived reliability of human control, greater trust in the algorithm is expected (Madhavan & Wiegmann, 2007a, p. 292; Zerilli et al., 2022). This ties in with theoretical frameworks that position AI in a dominating position over bureaucratic discretion. This would be the case of tasks with low uncertainty, complexity, and limited deviations (Bullock, 2019). Furthermore, while humans are overall preferred to automated algorithms for carrying out disciplinary and mentoring activities, the latter are perceived to be higher in integrity and transparency, which would condition workers' trust in them (Höddinghaus et al., 2021).

While there is evidence of users engaging in a "loafing" overreliance on automated systems due to a "belief in scientific validity, neutrality or rationality" (Peeters, 2020, p.517), dependence on algorithmic decision-making has only recently been explored in the public sector. Alon-Barkat & Busuioc (2022) proposed that bureaucrats do not automatically defer to algorithms. Instead, they rely, however possible, on their discretion and more frequently engage in the selective adoption of algorithmic advice. Externally induced factors, such as delegation structure, limited training, and role-specific time constraints, are also associated with "loafing," as public officials perceive limited or no alternatives to

the algorithm (Loi & Spielkamp, 2021). On that note, a recent review of AI adoption in the public sector from an organizational perspective also highlights higher perceived distance toward the decision-making process, as per the organizational chain of delegation, as a possible predictor for "loafing" behaviors (Neumann et al., 2022).

Such findings echo public administration research on algorithms' impact on public officials' agency, specifically with algorithms that provide administrative decisions, compared to those that advise public officials based on predictions (Peeters, 2020). Moreover, algorithms for administrative decisions imply a more significant shift in public officials' discretion by automating the process for determining eligibility for citizen rights or obligations, even when the user has the final say (Ranerup & Henriksen, 2022). In effect, algorithms that operate without contestation of data and model quality, or interpretation of its results, can negatively influence the discretionary space of bureaucrats, while its experts can feel restricted by goals set by management (Busch & Henriksen, 2018; Giest & Klievink, 2022). This is coined as algorithms' "curtailing effect on frontline discretion" (Bullock, 2019, para. 30), which transfers discretionary power to system designers. Lastly, Peeters (2020) succinctly observes that the ability to control algorithms may be designed in their organizational context (p.518), accentuating the questions on how bureaucratic accountability interacts with users' disposition toward algorithms.

2.2.4 Theoretical assumptions: Disposition toward algorithmic decision-making

In sum, individual disposition toward algorithm use is a nuanced discussion. Evidence suggests it is influenced by perceptions of trust, which are moderated by the knowledge of errors incurred by the algorithm. While users tend to trust algorithms with objective tasks that are perceived to be low in uncertainty and complexity, they often engage in selective adoption of algorithmic advice in favor of their discretion, especially in moral domains. While the lack of transparency of an ADS' logic is strongly tied to aversion, hidden or otherwise obscurely integrated algorithms appear to receive less contestation. Furthermore, their unaccountable nature also appears to influence aversion, with bureaucrats expected to engage in blame-shifting and those that perceive themselves as more distant to it being less averse. Finally, human involvement increases appreciation through perceived personal discretion and control over the decision-making process or knowledge of other humans utilizing the algorithm.

3. Research design

After reviewing the literature on bureaucratic accountability and disposition toward algorithm use, this section lays out the method to answer the research question: "***How does bureaucratic accountability affect public servants' disposition toward algorithm use?***"

Accountability theory indicates that public officials associate greater clarity and consistency of roles in the chain of accountability with potential trade-offs to effectiveness due to perceptions of surveillance by their principals encroaching on their discretion. The mediating role of transparency plays a crucial role in this, conflicting with inherently opaque algorithms that stifle the sequence of "information," "discussion," and "consequences" that enable accountability relationships. Thus, formalizing and enforcing a bureaucratic accountability relationship would thereby force bureaucrats to clear up blurred notions of responsibility over the algorithm to identify the locus of authority in the decision-making chain. Therefore, the more the bureaucratic accountability relationship is formalized and enforced, the more likely it is that bureaucrats perceive themselves or colleagues as responsible for the algorithm.

This would have consequences on the disposition toward algorithm use. As the bureaucratic accountability arrangement makes public servants feel more responsible for embedded algorithms, the more importance they will place on human agency, both in the form of human involvement to ensure trust in the system's capabilities and effectiveness, as well as their discretion to increase perceived control over the automated decision. Associated demands for transparency due to pressures to assign responsibility over the algorithm could lead to accountability's mirror image of blame-shifting, which, according to the literature, is more commonly directed toward other humans.

It was expected that these elements would be moderated by the hierarchical features of bureaucratic accountability, such as perceived distance to the algorithm and comprehension of its reliability and error rate. As described by the literature, a lack of management guidelines and objectives for implementation of algorithmic decision-making systems could have further influenced the intensity and nature of interaction with the model. More pronounced levels of algorithm appreciation among director levels, compared to operational and managerial levels who interact more closely with the algorithmic decision-making system, were also expected.

Considering the above, this thesis hypothesized that ***the more aware bureaucrats are of the accountability chain, the less favorable they will be to using algorithms***.

The following subsections outline the method, case, unit of analysis, and concepts with which the hypothesis was examined. Limitations of the method are also pointed out.

3.1 Method

To put the hypothesis above to the test, a case study of bureaucratic accountability relationships within a public organization was conducted, with one or more algorithms in place to automate a decision-making process for service provision. Since the research question centers on personal perceptions of accountability, data collection was based on individual interviews with public officials.

The interviews were guided by a set of base questions derived from the assumptions in the form of interview guidelines. Before data collection, the guidelines were refined through a pilot interview with an organization's public official at the supervisor-level (see **3.3**), which similarly utilized an automated decision-making system for service provision.

The concepts used for this research method were the **bureaucratic accountability chain** and **disposition toward algorithm use** (see **3.4**).

3.2 Case selection

To test the hypothesis, case selection was primarily based on criteria that would allow for observation of the thesis' concepts. The research question demanded a government organization with an established and compound bureaucratic structure to manage a specific public service, with one or more algorithms operating in its decision-making process. Since the theory suggested that transparency had a mediating role in accountability relationships, nascent transparency regulation for algorithms was also considered a relevant selection criterion, as it would likely increase public officials' awareness and perception of bureaucratic accountability relationships. For this reason, an additional selection criterion was a high degree of embeddedness of the algorithm. These were cases where the algorithm could be imperceptible to the public officials interacting with it or its output. Finally, to expand the coverage of research on algorithmic decision-making and accountable algorithms in the public sector, organizations in the Global South were preferred as well.

For that reason, the **Institute of Social Services (IPS)**, under the Chilean Ministry of Labor and Social Provision, was selected as the case for this thesis. At the time of writing, it had over 2,500 employees distributed across five hierarchical management levels. The case focused on public officials from the Benefits Management Division and the Customer Service Channels Division, which were in charge of various pension benefits and allocations. The reason for this was twofold: First, pension benefits and allocations were handled by the IPS through applications, which had back- and front-office elements with collaborating, hierarchical interdependencies. Second, these applications triggered a decision-making process based on the applicant's eligibility, which was automated by different algorithms (see

section 4). These eligibility algorithms, embedded in each division's decision-making processes, allowed for exploring expectations on discretion and perceived algorithmic opacity.

On a related note, the automated decision-making systems used by the abovementioned divisions were participating in a pilot initiative led by the country's Council for Transparency at the time of writing. The pilot's outcome was set to inform a new general instruction for algorithmic transparency, which would legally bind government organizations to disclose the logic of ADS that are used to inform or automate public services. This adoption of algorithmic transparency, expected to enter force in 2023, allowed greater access to the systems' business rules. It also arguably served as an ideal backdrop to explore the embeddedness of the algorithm in the decision-making process within bureaucratic accountability chains.

Finally, the IPS was also chosen due to the continued recognition of its services' reliability and quality (Dirección Nacional del Servicio Civil, 2022; IPS, 2022), as it would increase the pertinence of findings for practitioners, especially in the Latin American public administration context.

3.3 Unit of analysis and sample

To collect data and derive assumptions for IPS officials' felt accountability, the unit of analysis was designated to public servants involved in an automated eligibility process across a bureaucratic accountability chain. Respondents were selected among three general tiers of hierarchy to address the literature's suggested differences of disposition toward algorithms across organizational roles.

A semi-structured interview structure was used to trace each participant's perceptions of their bureaucratic accountability relationships and to trace a chain across the different hierarchy tiers. Because of the nuanced evidence related to algorithm aversion and bureaucrat's disposition toward algorithm use, a more open interview structure was favored. This allowed for potentially relevant evidence not covered by the theoretical assumptions to be detected and analyzed as well.

Data collection was conducted in the IPS' Benefits Management and Customer Service Channels Divisions by grouping participating public servants into three hierarchical levels, broadly classified and selected, as described below.

- **Operative level:** The tasks of this official concerned the operation of the algorithmic decision-making system by ensuring that the system's input, throughput, and output were running as per institutional objectives. While the officials at this level may not have programmed the algorithm or know its inner workings, it was assumed that they had the most detailed knowledge of the system's functions and output.

- **Management level:** The tasks of this official concerned the management of the benefit or allocation itself, which depended on the automated eligibility processes' output. These tasks interacted with the algorithm by making decisions over specific services based on the system's output of the system. It was assumed that officials at this level had a less detailed knowledge of the system's functions.

- **Supervisor level:** The tasks of this official concerned the supervision of a department branch under which the automated eligibility system operates. The official therefore could have been in charge of multiple such benefits and allocations. Tasks interacted indirectly with the algorithm, by making decisions over specific services, based on actions taken at the management level. It was assumed that officials at this level had the least nuanced and detailed knowledge of the system's functions. It was also assumed that political concerns could have been more prevalent at this level than at the management and operational level.

A sample of 9 participants was interviewed, of which four corresponded to the Operative level, three corresponded to the Management level, and two corresponded to the Supervisor level. **Table 1** displays the list of the sample's interviewees, along with their associated source code. The complete interviews, identified with the respective source code of the participant, are in **Appendix B**.

Table 1 *- Interview list*

Level	Role	Description	Interview date	Code
Supervisor	Head of Department	Supervises a staff of 19 across three sub-departments	5.12.2022	Sup_A
Management	Pension benefit coordinator	Manages Death Grant and PGU benefits	2.12.2022	Mg_A
Management	Project management coordinator	Manages development team for grant eligibility and service channel infrastructure	2.12.2022	Mg_B
Supervisor	Head of Department	Supervises a staff of 151 across five sub-departments	12.12.2022	Sup_B
Management	Grant manager	Manages benefits for the grant eligibility process	2.12.2022	Mg_C
Operative	Process analyst	IT specialist in charge of managing grant business rules adjustments	30.11.2022	Op_A
Operative	Grant analyst	Analyzes eligibility rulings of the ADS	1.12.2022	Op_B
Operative	Grant analyst	Analyzes eligibility rulings of the ADS	1.12.2022	Op_C
Operative	Grant analyst	Analyzes eligibility rulings of the ADS	2.12.2022	Op_D

Due to the expected differences in perceived accountability and awareness of the bureaucratic accountability chain, the interview guidelines were adjusted according to expectations for the different hierarchical levels. The guidelines included descriptive and structural questions to guide the interview (Neuman, 2014), allowing for comparisons across accountability perceptions. Furthermore, open-ended and probe questions were also prepared to elicit descriptions of how participants perceive accountability over the actions associated with the algorithm. The descriptive questions were intended to compare perceived accountability relationships among officials while probing questions about the algorithm's

functions and relationship with a given service were worded to offer fresh commentary about them (Yin, 2009, p. 107). Probes regarding delegation and supervision structure were more frequently used with interviewees at the management and supervisor levels. In contrast, probes regarding individual perceptions of accountability were more commonly used with participants at the operative level.

Based on the theoretical assumptions, preliminary themes were devised to orient the analysis and inform the first coding cycle. Next, newfound and more prevalent themes identified during data collection and subsequent coding rounds were added. Finally, data analysis was further advised by IPS organizational maps facilitated by supervisors, and information on the automated decision-making system's logic, as disclosed by the organization's transparency provisions, to contextualize the degree of algorithmic opacity among bureaucrats.

3.4 Operationalization

To measure relevant data to test the hypothesis, two variables were specified. The **bureaucratic accountability chain** was defined as the independent variable, and **disposition toward algorithms** was defined as the dependent variable. The following subsections first conceptualize each variable, referring to the theory they were derived from. Then, **Table 2** outlines the associated indicators.

3.4.1 Bureaucratic accountability chain

The bureaucratic accountability chain was conceptualized as *an uninterrupted, clear, agreed-upon, and cadenced accountability relationship*. A bureaucratic accountability chain would imply that no responsibility gap would be present and that there would be clarity on who would be liable and responsible for an action and its potential shortcomings. O'loughlin's (1990) continuum of accountability, based on the degree of influence on decisions, the communications between levels, and the clarity between discretionary and non-discretionary aspects of the decision-making process, would serve as the ideal model of the accountability chain.

Considering assumptions by Han & Perry (2019, 2020), differences in perceived accountability and awareness of the accountability chain's structure were expected, depending on factors such as the interviewee's role. To account for these differences in individual perceptions in the organization, the concept was operationalized in two dimensions: **Awareness of the bureaucratic accountability chain** and **Perception of the bureaucratic accountability chain**. The former conveyed the actor's ability to identify links in the chain, whereas the latter conveyed how the actor held to account felt accountable. Additionally, to cover for potential inconsistencies about the actor assigned to the ADS and the one

responsible for remedying any process deviations, Matheus et al.'s (2021) stewardship principle was expanded into additional awareness indicators.

While data collection covered and data analysis allowed for elements of awareness and perception, it was expected that supervisor-level officials would offer more detailed evidence of the former. In contrast, it was expected that management and operative-level officials would offer more diverse evidence of individual accountability perceptions.

3.4.2 Disposition toward algorithm use

The **disposition toward algorithm use** was conceptualized as *the degree of preference of the user over the algorithm's decision*. This conceptualization was based on the spectrum of AI vigilance by Zerilli et al. (2022), from a "loafing" attitude of complete alignment with the algorithm's decisions to an "opposition" attitude of limited alignment. Since automated eligibility systems were expected to offer limited deviation beyond accepting and rejecting the automated decision, "preference" was used to reflect respondents' disposition toward algorithm use more realistically. To reflect this, the indicators also drew upon the theory's focus on trust and the act of comparing human and algorithmic alternatives.

Table 2 displays the research method's variables with their associated indicators. The data source consisted of public officials' opinions collected in interviews, as laid out in **section 3.3**.

***Table 2** - Operationalization of concepts*

Variable	Definition	Subdimension	Indicators	Theory
Independent variable				
Bureaucratic accountability chain	An uninterrupted, clear, agreed-upon, and cadenced accountability relationship	Awareness	Awareness of the actors held to account and the account holder	(Bovens, 2007; O'loughlin, 1990)
			Awareness of feedback mechanisms to facilitate explanation and justification	
			Awareness of discretionary and non-discretionary elements	
			Awareness of the actor assigned to the automated process	Matheus et al. (2021)
			Awareness of the actor assigned to explain or justify the automated process	
		Perception	Ability to link her/himself to the decision or task	Han & Perry (2019)
			Perception of being observed by an account holder	
			Perception of being subjected to formal and/or informal evaluation processes	
			Perception of responsibility for explaining or justifying the decision or task	
			Ability to predict possible sanctions or rewards for the decision or task	
Dependent variable				
Disposition toward algorithm use	The degree of preference of the user over the algorithm's decision		Presence of instances of contestation or non-alignment with the ADS	(Zerilli et al., 2022)
			Perception of overall trust in the ADS	(Burton et al., 2020; Jussupow et al., 2020)
			Preference of the ADS over a human alternative	(Alon-Barkat & Busuioc, 2022; Castelo et al., 2019)

3.5 Validity and reliability of the research method

As laid out in section 3.2, the selected case involved a large organization built upon arguably complex bureaucratic relationships that were highly specialized and distributed across multiple units. The ADS covered by this research (see **section 4**) influenced officials with diverse responsibilities related to the benefit's provision across the bureaucratic accountability chain. These included IT systems continuity, customer attention at branch offices, management of the algorithm's business rules, and eligibility supervision, among others. The diversity of roles across the chain enhanced internal validity by more properly representing bureaucrats' perceptions of accountability in the IPS. Moreover, interviews were conducted in a focused timespan to ensure that time-related factors would not confound potential findings.

To ensure construct validity, the design included subdimensions of the independent variable to address the expansiveness of accountability literature and, more relevantly, improve the sensitivity of independent variable measures. Furthermore, the semi-structured interview form not only allowed for more targeted inquiry but also the ability to reveal causal inferences perceived by bureaucrats themselves. This design choice sought to improve precision of the construct to more properly scrutinize the hypothesis.

The unit of analysis focused on bureaucrats' individual perceptions, with a qualitative method applied at an individual level. While generalizability of personal accounts are arguably more complex, the method was selected to convey rich and detailed accountability perceptions and attitudes toward algorithms. Furthermore, a sample size of 9 interviewees was established, covering multiples of each hierarchical level, to facilitate generalizability beyond the IPS. The different levels were selected to reduce the overrepresentation of biases that may arise from the idiosyncrasies, (lack of) expertise, or other motivations of participants. Nevertheless, the findings were expected to be generalizable to bureaucrats working in hierarchical social services organizations that receive citizen applications, determine eligibility, and pay out benefits such as pensions.

As for reliability of the research method, an interview guideline was developed, based on the theoretical assumptions and the operationalized concepts. The guidelines were calibrated utilizing a pilot interview with a public official at the supervisor level. The order and priority of questions were calibrated to ensure that all interviews followed the same overarching thematic structure within an established time limit. Considering the evidence on blame shifting in accountability literature, the interviews were conducted anonymously so that interviewees could freely share information with as little fear of repercussions as possible.

3.6 Limitations of the design

While efforts were made to involve as many actors in the case study's bureaucratic accountability chain, the sample had more data from operative-level bureaucrats than from the supervisor level. Even though the analysis accounted for these differences, collected data could was arguably slightly skewed toward the former.

While interviews were selected to convey rich perspectives and attitudes related to the variables and were examined with organizational information facilitated by supervisors, they were this thesis' only data source. This created challenges to ensure data quality to avoid bias resulting from inadequately formulated questions or inaccuracies due to reliance on individual recall ability.

During data collection, the IPS was in the process of instating changes to one of the ADS due to the introduction of the PGU (see **section 4**). While it arguably allowed for more detailed descriptions of the processes that such changes entail as well as their relationship with perceived accountability, the resulting data would perhaps be representative of Kosack & Fung's (2014) "willing officials." In other words, the sample could be less representative of bureaucrats who were less amenable toward policy adjustments or questioned transparency measures more intensively (in this case, applied to algorithms).

Finally, theoretical approaches covering automation bias and technology adoption at an organizational level, such as the User Acceptance of Information Technology, could also have helped explaining the relationship of bureaucratic accountability with disposition toward algorithm use. While the independent and dependent variables were operationalized for qualitative, individual-level evidence, this associated body of literature could have portrayed clues from an organizational standpoint for greater context.

4. Case description

This section offers information about the thesis' case study, which was utilized to guide data collection and contextualize its analysis. The subsections encompass an overview of the Chilean Institute of Social Services, the automated decision-making processes, and the organizations' departments in charge of them. Furthermore, to align the theory of algorithmic accountability to the national environment, the state of algorithmic transparency in Chile is disclosed as well.

4.1 The Institute of Social Services

The IPS was instated as a successor to the previous "Instituto de Normalización Previsional" ("Institute for Social Security Standardization"), following the Pension System Reform law, number 20.255, in 2008. Its main tasks are managing Chile's public pension system by collecting social security contributions and paying out social security, along with its associated benefits and allowances. The organization is decentralized, with legal personality and its own patrimony. With over 2,500 employees, it offers services through analog channels across more than 140 branch offices and 100 payment centers, as well as through its online network "ChileAtiende" ("ChileServes"). Citizens utilize both avenues to apply for allowances or grants tied to the "Pilar Solidario" ("Solidarity Pillar"), a set of pension benefits created with the 2008 reform. Said set of pension benefits, directed to the country's lower-earning population, was complemented with an additional non-contributory benefit, which was formalized in 2022 with the Guaranteed Universal Pension (PGU).

In addition to this new pension, the IPS grants several allowances and benefits that are augmented by ADS. Citizens can apply for the PGU or specialized grants such as the "Benefit for born child" and the "Death Grant," for example, by applying either online through "ChileAtiende" or in person through one of the branch offices. In either case, applications pass through an eligibility process managed by either the **Benefits Management Division** or the **Customer Service Channels Division**. The former manages the eligibility process of former "Solidarity Pillar" benefits and the newly instated PGU, as well as additional allowances such as the "Benefit for born child." The latter manages in-person applications for the aforementioned benefits and one-time allocations such as the "Death Grant." While the PGU entered force in 2022 as an all-encompassing pension, the IPS still maintains and pays out several complementary benefits such as the ones above.

Participants of this case study were linked to the accountability chains of the **Department of Benefits Management** and the **Department for On-site Service**, in charge of the "Benefit for born child" and the "Death Grant."

- "**Benefit for born child**": A bonus applied to women's pensions for each child given birth or adopted. The associated algorithms determine the applicants' eligibility, calculate the amount to be granted to those deemed eligible, and determine the number of installments for the payment. The automated process is supervised and its business rules adjusted by the **Department of Benefits Management**, under the **Benefits Management Division**.
- "**Death grant**": A benefit to cover funerary costs, equal to three minimum wage payments. Since the benefit is commonly applied for by funeral homes or family members of the deceased through IPS branch offices, the associated ADS is supervised and its business rules adjusted by the **Department for On-site Service**, under the **Customer Service Channels Division**.

4.2 The eligibility processes

An automated process assesses the eligibility of each application, checking for up to 94 conditions and criteria, such as salary thresholds, affiliation to private pension organizations, and other conflicting allocations that have been granted, among others. Applications come in through online application forms on "ChileAtiende" or through local branch offices. In either case, ensuring that the ADS' business rules for the aforementioned benefits are in order depends on their respective department.

Public officials tasked with granting a specific benefit receive an eligibility code for each application, determined by the ADS, which rules what benefit scheme and amount the applicant would have right to. Officials review approximately 100 thousand such eligibility decisions as part of preemptive actions to control for "edge cases," where missing data leads to an inconclusive or erroneous result. This involves cross-referencing associated citizen data provided by external entities, such as pension fund organizations, insurance companies, the Internal Revenue Service, and the Chilean Civil registry. Applications are approved or denied based on the citizen data displayed by the eligibility system and are reviewed every month to maintain or suspend pension benefits.

For the sake of clarity, all further mentions of an "eligibility system" or "ADS" allude to the collection of algorithms that automate the benefit-granting process. **Figure 2** and **Figure 3** display the eligibility processes and the actors involved in each step for the "**Benefit for born child**" and "**Death grant**" benefits.

Figure 2 *- The eligibility process for the Benefit for Born Child*

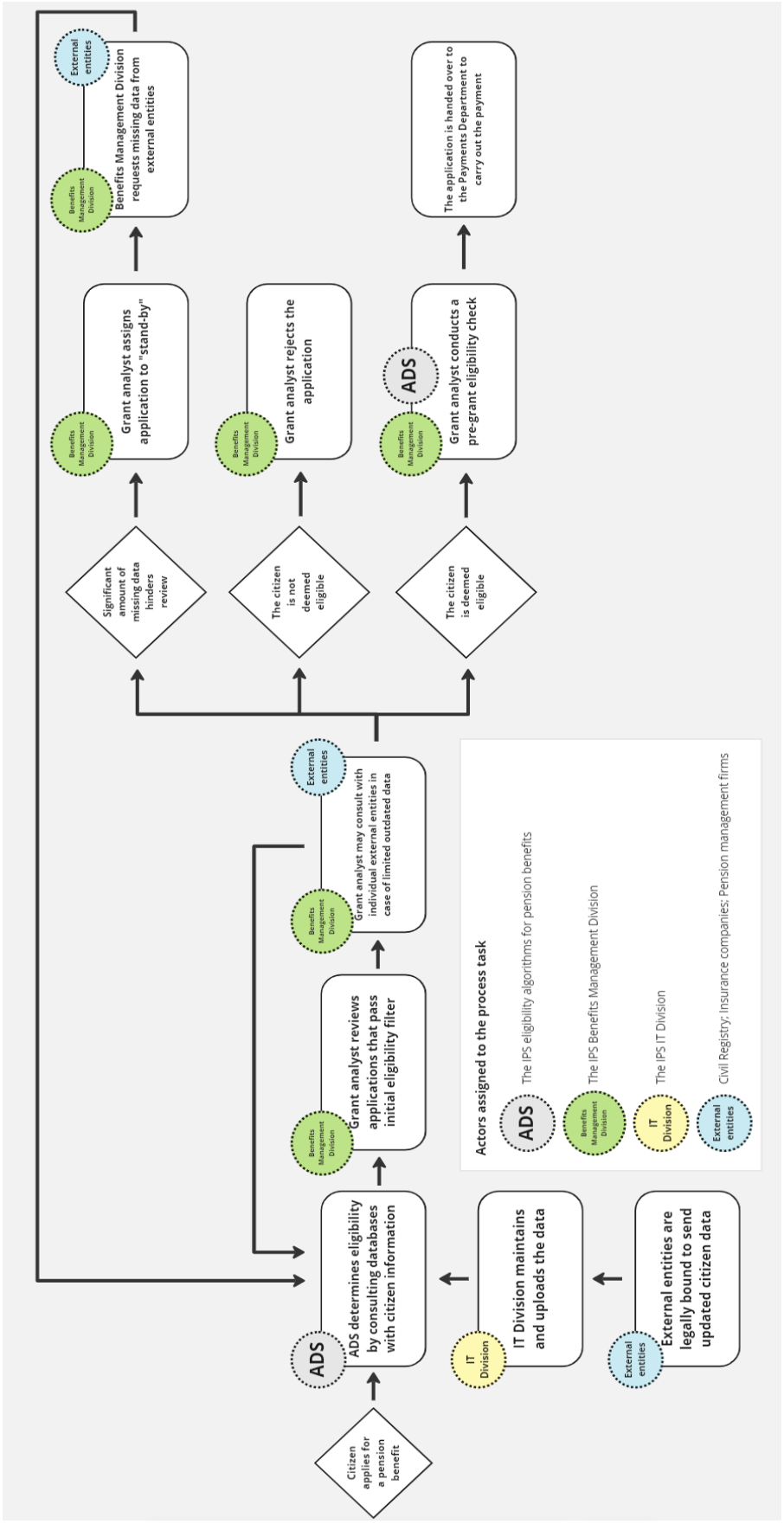
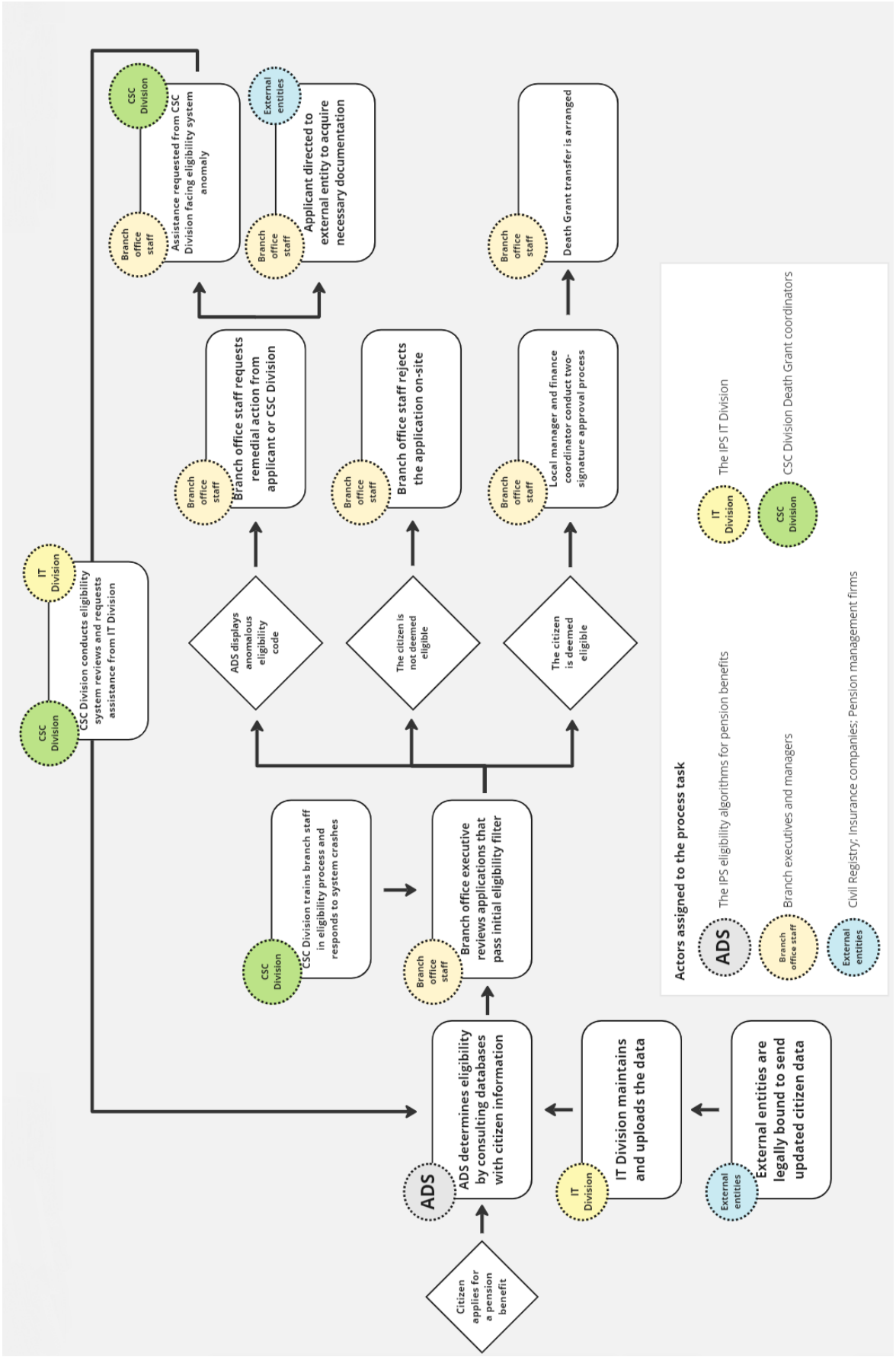


Figure 3 *- The eligibility process for the Death Grant*



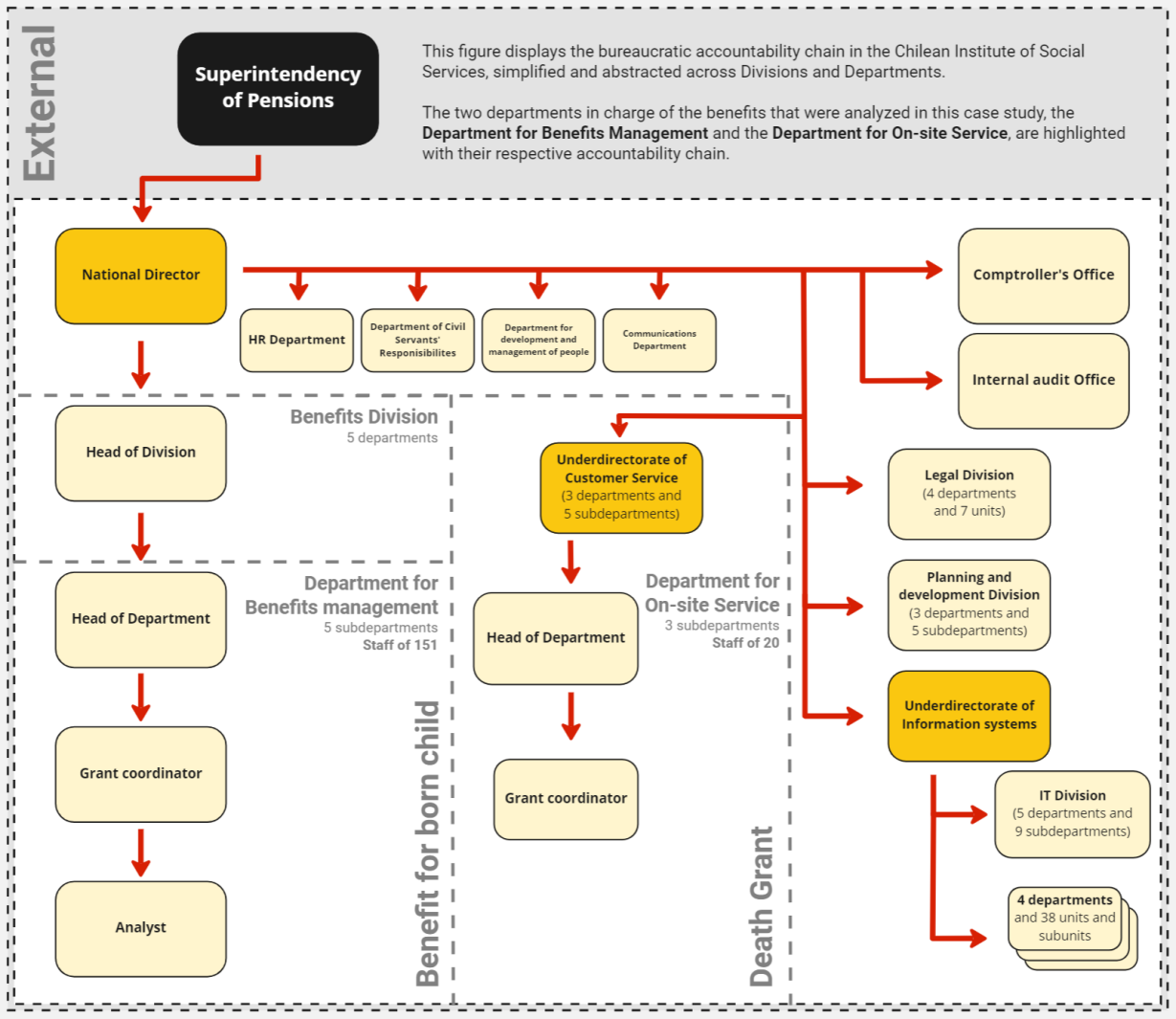
4.3 Bureaucratic accountability chains in the IPS

All eligibility measures are determined by pension laws and enforced by the Superintendency of Pensions. This regulatory body is mandated by the Chilean state to guarantee citizens' pension rights and consequently holds the IPS accountable through legal instructions and yearly auditing processes. It is, therefore, the upper link in the bureaucratic accountability chain, which holds the IPS' national director accountable.

The following link is the IPS national director, who distributes responsibility over the Institute's mandate across two sub-directorates and three divisions, each with their respective Sub-director or Head of Division held responsible for specific duties. Accordingly, the Head of Departments (supervisor level) of this case study, the **Department for Benefits Management** and the **Department for On-Site Service**, are respectively held to account for the timely approval of eligible benefit applications and customer service metrics for applications at local branch offices. The performance of grant coordinators (management level) is measured against these goals, with the most critical performance metrics being a low "time to grant" a benefit and a low amount of unresolved cases. Specifically for the "Death Grant," a low downtime of the "ChileAtiende" system used by local offices to serve citizens, is also a domain of accountability. Finally, in the case of the "Benefit for born Child," essentially a Backoffice process, the analysts (operative level) who review the automated eligibility decisions are held to account by their respective coordinators with the aforementioned metrics.

Figure 4 displays the IPS' bureaucratic accountability chains, emphasizing the case study departments.

Figure 4 *- The IPS' bureaucratic accountability chains*



4.4 The state of algorithmic transparency in Chile

Research in Chilean public administration suggests that national transparency policy has both "an ideological and operational influence, (…) which have limited its institutionalization and appropriateness" (Gonzalez-Zapata & Heeks, 2016, p. 156). In the span of ten years, the country introduced laws for "Administrative Integrity," Public Procurement, Transparency, and Lobbying, all of which disclose internal public administration processes. These regulatory milestones appear to have "created an intra-governmental perception that transparency may represent (…) work overload for civil servants" (p.162), resulting from a "culture of obliged transparency" (p.160).

To date, the country has no legal, administrative, or voluntary transparency requirements for algorithmic decision-making systems. In the public sector, disclosure of such systems is not an established practice but is limited and voluntary (Garrido et al., 2021).

At the time of writing, a general instruction for algorithmic transparency was being drafted, which would legally bind government organizations to disclose the logic of algorithmic decision-making systems used to inform or automate public services. This new general instruction was being piloted with four public organizations, including the IPS and civil society organizations, to test the comprehensiveness of disclosed information. The pilot was part of the Inter-American Development Bank project "**CH-T1246: Oportunidades de mercado para las empresas de tecnología - Compras públicas de algoritmos responsables, éticos y transparentes**" ("Market opportunities for technology companies - Public procurement of responsible, ethical and transparent algorithms"), which was implemented by Adolfo Ibáñez University.

The IPS participated in the pilot with its eligibility algorithms for the "Benefit for born child" and the "Death Grant."

5. Analysis

This thesis explored the research question, "***How does bureaucratic accountability affect public servants' disposition toward algorithm use?***" Using a qualitative research method, the bureaucratic accountability chains in charge of two IPS pension benefits were examined. The evidence of public officials' awareness and perception of the bureaucratic accountability chain, along with their disposition toward algorithm use, was used to scrutinize the thesis' hypothesis, ***the more aware bureaucrats are of the accountability chain, the less favorable they will be to using algorithms***.

The analysis section is divided into two parts. First, the outcomes are laid out in the **Analysis of Results** subsection, linking theoretical expectations to the data. Second, the **Analysis of explanations** subsection, after assessing the evidence in light of the hypothesis, further examines the data's explanatory power to answer the research question.

5.1 Analysis of results

The data offered evidence of awareness (the actor's ability to identify links in the chain) and individual perceptions (how the actor felt accountable) of the bureaucratic accountability chain, and favorable disposition toward algorithm use.

For the sake of brevity, the subsections for each variable only display sample data from the interviews. The compiled coded data is displayed in **Appendix A**. The full interviews are in **Appendix B**.

5.1.1 Bureaucratic accountability chain

Across all interviews, awareness of the bureaucratic accountability chain was highly represented, with detailed accounts of vertical sign-off procedures and feedback mechanisms to assess changes to the decision-making process. In general, interviewees were able to identify links in the bureaucratic accountability chain with specific individual names and IPS divisions.

As expected by the theoretical framework, expressions of accountability were essentially bureaucratic and scarcely mentioned civil society as an account holder, which would be more commonly associated with political or democratic accountability (Bovens et al., 2008; Lindberg, 2013). However, interviewees' perception of the chain, regardless of their hierarchical level, traced a variety of simultaneous accountability relationships concerning the same algorithm: between them and their department, other bodies within the IPS organizational structure, and external organizations.

The first subtitle reviews the findings related to awareness of the chain. The second reviews the findings related to how IPS officials individually perceive accountability.

a. Awareness of the chain

External entities, such as pension fund organizations, insurance companies and the Chilean Civil registry, are legally bound to deliver eligibility-relevant citizen data every month to the IPS following the 2008 pension reform. Public servants at higher tiers stressed this when recalling the introduction of the ADS, describing a structural bond that defines the IPS accountability chain.

The "**Awareness of actors held to account and the account holder**" indicator (**Table 3**) demonstrated this. Each participant was aware of their direct superiors, to whom they were accountable. Beyond that link in the chain, the Superintendency of Pensions was regularly mentioned as the definitive account holder of the IPS, as the source of the regulation that substantiates benefit rights from which the algorithm's business rules are derived.

Officials from all levels of analysis directly referred to the Superintendency, though operatives only in response to probes about who was in charge of supervising the eligibility process. This confirmed assumptions that higher levels would be more conscious of political concerns beyond the IPS, and that different accountability relationships would coexist within the organization (Aleksovska et al., 2022).

***Table 3** - Awareness of actors held to account and the account holder*

	Sample data	**Analysis level**	**Source**
Awareness of actors held to account and the account holder	"*the reform was conceived, it was expected that there would be more people applying. (…) The reform, and that was the good thing, forced different institutions to provide us with information so that (…) we could grant through these eligibility mechanisms."*	Supervisor	Sup_A
	"*We have a regulation from the Superintendency. Every month (the IT Division) sends all the inconsistent data (…) to each (pension fund organization) (…), saying, 'Hey, I'm missing a record that you didn't send me. Send it to me'. And they have to respond to that on the seventh day of the month.*"	Management	Mg_C
	"*Eligibility is a completely digital procedure where we have set out each of the business rules that the Superintendency has given us, to be able to grant a benefit.*"	Operative	Op_A

The relationship with the Superintendency as the definitive account holder was also apparent in associated data on "**Awareness of discretionary and non-discretionary elements**" (**Tables 4** and **5**). Officials noted that rulings from the Superintendency were sovereign over the IPS and that tasks tied to granting benefits were ultimately accountable to such statutory provisions. Evidence was prevalent across all levels of analysis, with operative roles quick to insist that their responsibilities only concerned "operative work."

Table 4 *- Awareness of discretionary and non-discretionary elements*

	Sample data	Analysis level	Source
Awareness of discretionary and non-discretionary elements	*"If the Comptroller or the 'Super' comes and says 'from now on, this is yellow', you can refute it and say 'no, I see it clearly, I see it as light blue'. But if she keeps insisting that it's yellow, it's going to be yellow."*	Supervisor	Sup_A
	"The legal frameworks come to us. We are a technical institution that applies public policies. We do not dictate public policies."		
	"The Death Grant system, like most of the systems at the Institute, are based on business rules. Obviously, you have to abide by certain rules according to the law (to which the) benefit adheres."	Management	Mg_B
	"Me and my peer, we do 100% operational work. Any modification, because we are constantly reviewing and improving our processes, is channeled through (direct supervisor) or (department lead). We do this with the 'Super', which is the entity that supervises us, that tells us... we have to ask them if we have doubts about a process."	Operative	Op_B

The primacy of the Superintendency of Pensions not only manifested itself through a strong position as a final account holder in the bureaucratic accountability chain, but also as the source of a rules-based ethos depicted in the organizational sample. A case that exemplified this primacy of legislation and rules over discretion, recalled by a participant at the operative level, described a vertical sign-off process following one of the biannual audits conducted by the IPS' Internal Audit Office. The inspection discovered benefits that were being paid out despite beneficiaries not claiming them for several months.

> *"When the audit came, and they saw why there were so many payments, they told us: 'Why is it still being paid?' They saw that nothing was being done with that payment. And that's when we asked the Superintendency if these benefits could be suspended (…) and then the Superintendent said: 'Yes, it is appropriate to suspend.'" (Operative level)*

More evidence on the primacy of rules, related to the awareness of the bureaucratic accountability chain, was especially prevalent in descriptions of how the algorithm's business rules were set up and revised. Public servants emphasized that their hands were often tied here as well. Legislation structured any potential changes, usually triggering a vertical sign-off process with their managers and beyond, comparable to those described by Jarvis (2014).

***Table 5** - Awareness of discretionary and non-discretionary elements (continued)*

	Sample data	Analysis level	Source
Awareness of discretionary and non-discretionary elements	*"Every month we are either granting or reviewing what is in (the) regime. In these reviews or grants, each person in charge verifies the business rules established by the Superintendency. They are in the compendium of norms. In reality, we have been doing this for so long that they are already internalized."* *"The truth is that with the times that we're dealing with, we don't have time to be more informal. I mean, it's either this or it's nothing. But analyzing a lot more in the background, to find something that's not established, is quite difficult."*	Operative	Op_A
	"*The eligibility system needs to be constantly updated (...) according to the instructions of the Superintendency. Because they create a new benefit, a new law, and the algorithm has to be adjusted.*"	Management	Mg_C
	"*That's all tied to IPS resolutions. (...) We have a stage called "prior controls", in which, before granting, we send requests to other entities within IPS.*"	Operative	Op_C
	"*We have had to make some inquiries. All these are channeled by (Direct superior) and (Department supervisor). (...) They have the capacities and the competencies to do it. And the communication with the corresponding entities, which is the Superintendency*." *"Because she is our direct boss. So, respecting the hierarchical roles (...) any improvement to make, we communicate it to (direct supervisor) and if it's in (their) hands, (they) channel it. Or if it is more complex, through (Department supervisor)."*	Operative	Op_B

Feedback processes were all described similarly, with respondents explaining a variety of accountability relationships to facilitate explanation and justification: With their direct management, other bodies within the IPS and external entities.[1] These feedback practices combined face-to-face instances between vertically accountable actors, department-wide meetings to review new regulation that would necessitate changes to the algorithm's business rules, and personal performance metrics evaluations. Respondents appeared to coincide in their depictions of the feedback mechanisms for the explanation and justification of the eligibility algorithm.

However, superior-level respondents described the mechanism itself, whereas operative and especially management-level officials emphasized an essentially distributed feedback procedure to enable the granting of pension benefits. As a result, established practices for explaining and justifying the process were quickly identified but also dispersed across officials in the lower rungs of the hierarchy. Also, while the Department for Benefits Management strictly alluded to performance measures as the feedback focus, the Department for On-Site Service emphasized a more collaborative approach with local branch managers and the IPS Legal Division to calibrate process adjustments. The ADS was portrayed as practically hidden in these mechanisms, without explicit mention of its role in the process

[1] Refer to the "Perception of the chain" subtitle for the associated findings of officials' felt accountability.

or its influence on performance. The above notwithstanding, feedback mechanisms were depicted as a space for collaborative work with direct supervisors, implying a relevant degree of discretion.

***Table 6** - Awareness of feedback mechanisms to facilitate explanation and justification*

	Sample data	**Analysis level**	**Source**
Awareness of feedback mechanisms to facilitate explanation and justification	"*We have a meeting that is specific to the project area, and obviously, our bosses also give us feedback (…). So we are always giving each other feedback and trying to improve the operation of the area with the lessons learned. We are getting different flavors within the meeting.*"	Management	Mg_B
	"*There's always feedback between Business and us, regarding this process. Because there are many regulatory things that change every year.*"	Operative	Op_A
	"*There is a process of face-to-face or verbal feedback with each of the staff members to be able to say that, during the evaluated period, the people met their goals (…) And in those cases where there are any shortcomings, what recommendations for improvement can be made.*"	Supervisor	Sup_A
	"I think that feedback is given in particular problem situations. I mean, if the process comes out clean in terms of there being no incident during the process, there is no feedback."	Supervisor	Sup_B

This opacity was also apparent in the less cohesive evidence for officials' awareness of ADS ownership. Several officials offered vague assessments of who was "assigned" to the eligibility system and who would be accountable for explaining or justifying its operation. Common responses at the operative level depicted a shared ownership distributed across the ADS' process stages, such as initial eligibility assessment, monthly eligibility reviews, and payment calculations. When probed about algorithm decisions that would deviate from the norm, such as "anomalies" or "edge cases", respondents scattered their definition of the assigned actor, pointing toward multiple roles and IPS departments.

The most common view, held by operatives and managers, expressed that they themselves were assigned to the eligibility process. But upon further inquiry, they specified that either a computer specialist within the department or the IT Division was accountable for adjusting the automated system. These responses revealed unclear ownership of the ADS, echoing the organizational barriers to transparency detected by Matheus et al. (2021) and muddled authority related to automated decisions (Wirtz et al., 2018). This confirmed expectations of blame-avoidance due to unclear ADS ownership.

Moreover, the eligibility system was effectively seen through by officials, as proposed by Andrada et al. (2022).

> *"We're now doing two monthly grant processes. And that's when (the algorithm) is explicitly mentioned. When you specifically say, 'I'm going to run the process.' (…) But if there is no (problem), the thing flows and the truth is that (the algorithm) is transparent." (Supervisor level)*

Accordingly, the understanding of the bureaucratic accountability chain was less straightforward regarding the ADS. Establishing this distinction was significant because this thesis' definition of the bureaucratic accountability chain necessitates clarity and consensus over its links.

As can be seen in **Table 7**, officials usually made a distinction between the actor that owned the process in the chain ("**Awareness of the actor assigned to the automated process**") and the one that was assigned to make adjustments or assume responsibility for process deviations ("**Awareness of the actor assigned to explain or justify the automated process**"). For example, to verify the eligibility decision of approximately 70 thousand monthly benefit applications that enter the IPS' Backoffice, analysts needed the department's Mass Processing unit to "run" the eligibility algorithm at a large scale. When probed to trace the accountability chain to the algorithm, respondents correspondingly pointed to the process analyst in charge of the ADS' maintenance, consistent with assumptions about system designers being held morally responsible for algorithms (Floridi & Taddeo, 2016).

Despite the apparent lack of clarity, officials agreed on ADS responsibility being split between analysts in charge of reviewing the automated decisions and the IPS' IT Division. In this way, the specialized team of process analysts, part of the "Mass Processing" unit, served as the link in the bureaucratic accountability chain. By being in charge of introducing business rule changes through an Oracle interface, which interacted with the databases maintained by IT, officials' awareness closed a possible gap in the chain. These intricacies also confirmed expectations of blurred responsibility for algorithms leading to blame-shifting among officials (Mikhaylov et al., 2018).

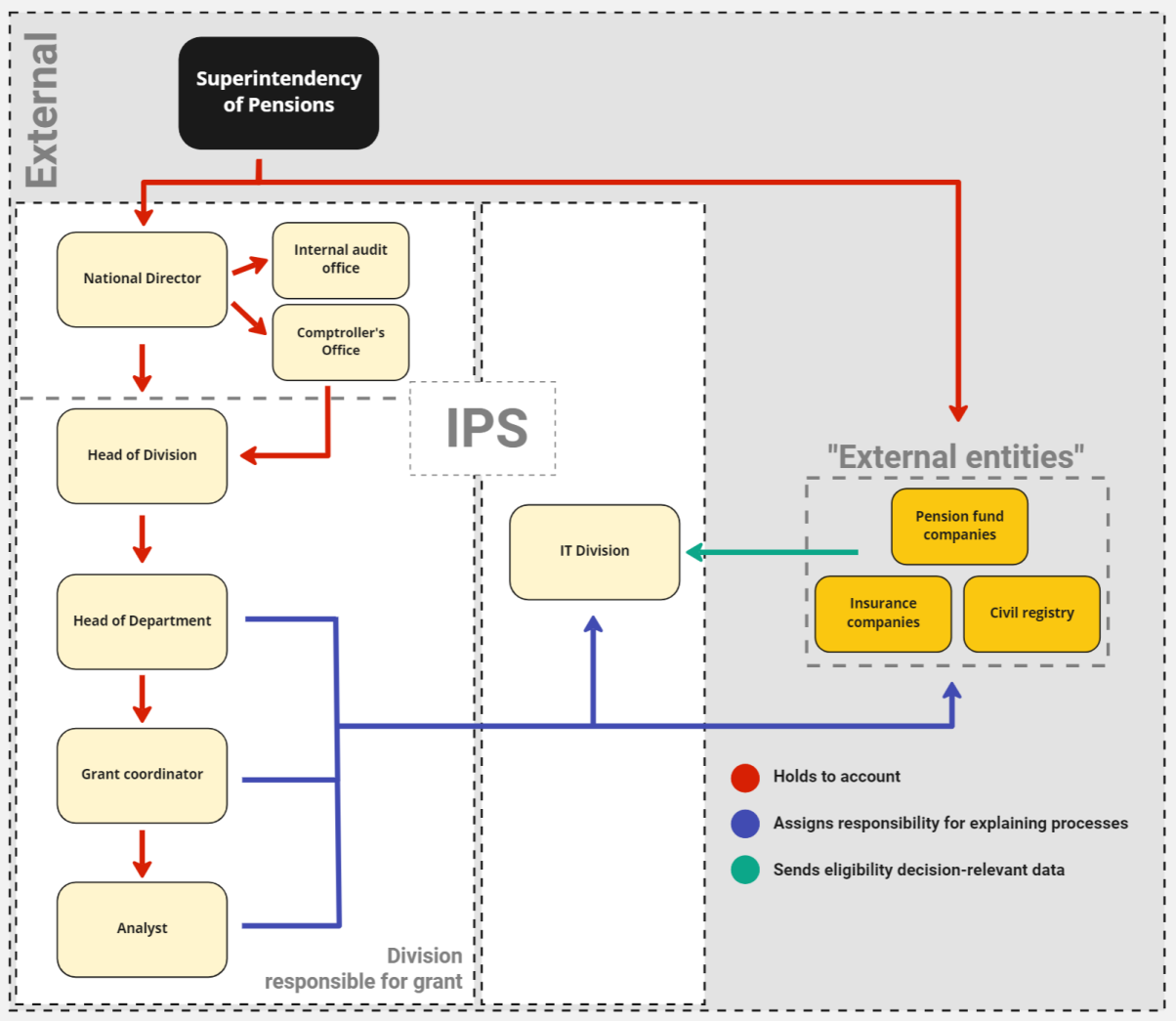
Some public servants relayed this distinction in their answers, particularly when probed further about who had access to the algorithm or who was responsible for updating the business rules. Others instead claimed ownership of the process initially, before admitting limited involvement with the system in response to probes about the algorithm's supervision. Despite these differences, all respondents eventually assigned the role of explanation and justification to the IT Division. Process analysts were the most precise in portraying this distinction, consistent with the theoretical assumption that expertise and access to the ADS enable accountability relationships (Ananny & Crawford, 2018).

Examples of these differences are laid out in **Table 7**. An overview of the bureaucratic accountability chain, as per respondents' descriptions, is displayed in **Figure 5**.

***Table 7** - Differences between actors assigned to the automated process and to explain it*

Benefit	Awareness of the actor assigned to the automated process	Awareness of the actor assigned to explain or justify the automated process	Source
Benefit for Born Child	*"Another thing that I am responsible for is the maintenance of what we call the Eligibility."* *"I have to correct (the business rules) so that Eligibility meets the actual rules."*	*"IT should have taken it, but IT never understood the business rules. Or they never took the time to understand the business rules. And so it never supported this application. And well, obviously we took it ourselves."*	Op_A
	"If there's a modification to the business rules, as a result of some change, (Op_A) modifies the package. He is the only one who modifies it."	*"I imagine they have a lot of activities related to uploading payment (data), sending a lot of files, which are really for the IT (Division). That's what they are in charge of."*	Op_B
	"*Their names are (Op_A) and (name). They're the computer guys."*	*"We don't intervene much there. We just analyze. There's a whole IT department that reports that information to us."*	Op_C
	"We, for our part, we have the unresolved requests. We identify these requests. And (Op_A), who oversees Massive Processing, we ask him to run the eligibility for those requests or procedures."	"*That's why the support of the IT division is also important. They have to make sure that the files are correctly available, so that we can update the applications."*	Op_D
	"Op_A and (name) are the ones who supervise that this is done. I mean, they check... I don't know how they actually do it, but they verify that the information sent by the entity is correct"	"*I think (IT) should have been in charge from the beginning (...) they are the ones who should be in charge of (eligibility). If they're the data guys. They have a data department. I mean, they should know all of this."*	Mg_C
	"If you're asking me about the correct functioning of the algorithm, I would say (Op_A) (...)"	*"(...) but if you're asking me about the system, where the algorithms are programmed to give the answers that we expect, that's the IT Division."*	Sup_B
Death Grant	*"Well, I have to be in charge of making the system itself operational, so that the branches don't have problems entering the Death Grants. (...) So I am the one who is in charge there, on behalf of the Presential Channel, to collaborate with that."*	"*The branches send me the borderline cases (...), then I evaluate the case, (...) see if this person really has the right (...) Then I tell IT to please upload this case to the system. And then they just, like, out of the back, they upload this case. So I'm the one who authorizes IT to upload the case into the system.*"	Mg_A

Figure 5 - Awareness of the accountability chain and the actors assigned to explain the ADS



Overall, this distinction also exposed the algorithm's opacity, which appeared to produce a dependence upon the IT Division across case study participants. A few officials recalled instances in which their hands were effectively tied without intervention from "the computer guys."

> *"I mean, like I tell you I'm... I'm not a computer scientist by any stretch of imagination. But basically, when I came here, eligibility was like Chinese."*
> *(Operative level).*

> *"That's a modification that (Op_A) had to make to the algorithm, so that we could have what we need. Because otherwise, those cases could not be solved."*
> *(Management level)*

As surmised from these factors, the accountability felt by bureaucrats was less straightforward than their delegation structure and assigned roles would suggest. To dissect these nuances, data for the independent variable's "**Perception of the chain**" subdimension is laid out below.

b. Perception of the chain

Officials across all levels revealed that an essential part of their responsibilities involved consulting with entities external to their department to close a gap in the accountability chain: Either with the aforementioned IT Division, the Legal Division to interpret new regulations, the Payments Divisions to clear up outstanding grants, the Superintendency to develop the ADS' business rules, or pension fund organizations, insurance companies and the Civil Registry to request or corroborate citizen data.

This influenced public officials' **ability to link themselves to the decision-making process**. Officials at the operative and management levels mainly described their responsibility for analyzing or indirectly "supervising" the correct functioning of the automated process. This involved conducting batch reviews of decisions, and analyzing "edge cases" that the system or the branch offices were unable to assign a favorable decision to immediately. Participants with IT-related functions additionally conveyed a sense of responsibility over operational continuity, often alluding to interoperability issues due to several of the IPS' legacy systems and expressing a greater degree of agency over the algorithm's business rules. Supervisor-level respondents offered a more ample perspective on the process, which distinguished itself by alluding to how the eligibility decision served citizens' rights. In any case, participating officials could all link themselves to the decision-making process, if in varying degrees of distance to the algorithm itself.

Descriptions of their relationship with the eligibility decision were primarily task-centric, describing how their assigned duties fit into the benefit's granting process. While officials could link themselves to the eligibility decision, their perception of the actual granting of pension benefits conveyed varying degrees of responsibility. Allusions to a limited field of action due to the primacy of legislation, as well as delays or wrongly input data by insurance companies and pension fund organizations, were common among the operative and management levels. Challenging Lindberg's (2013) notion of a downward and vertical bureaucratic accountability arrangement, when benefit applications or requests for information at on-site branch offices were involved, perceived accountability relationships appeared to flow bidirectionally and horizontally as well. An explanation of the revision process for the Death Grant's business rules encapsulated this:

> *"For the death grant, (…) our functional leader is the face-to-face channel, who are the ones who manage it. (…) And they're the ones who define to us, 'Look, for this benefit, we need these rules.' And obviously, once they raise those requirements, we (…) start to see, okay, where can we get this rule?"*
> *(Management level).*

This comment displayed how the branches, despite their inability to impose formal sanctions on the respondent, still induced a sense of responsibility in them.

Therefore, the common perception of the bureaucratic accountability chain was not limited to a respondent's involvement in the eligibility process. Officials expressed how they associated themselves with the eligibility process but simultaneously mentioned another actor that would enable the completion of their responsibilities (**Table 8**). Without input from an external entity or an enabling green light from the Superintendency of Pensions, bureaucrats expressed that their hands were effectively tied, affecting their perceived link with the decision. In other words, they associated themselves with the decision if other, allegedly responsible, actors were doing their part.

Table 8 *- Ability to link oneself to the task or decision*

	Sample data	**Analysis level**	**Source**
Ability to link oneself to the task or decision	"*We have systems available to see the history of the person. (…) If they reported it at '200' and now it is reported (at another value), that's when you make some consultations with the corresponding entity*."	Operative	Op_D
	"*We left the request pending until they sent the correct information (…) It is the responsibility of each entity to send us the information*".	Management	Mg_C
	"*All these cases have to be rejected, even though they were pending for several months, because we were waiting for them to give us some kind of information that was missing. (…) As long as the residency information has not arrived, they cannot make a decision*".	Operative	Op_A
	"(…) there could be mistakes in the concession. And well, you have to determine the responsibilities first. Why was that mistake made? If it was because the data was wrong, you have no way of validating whether it is correct."	Supervisor	Sup_B

This ability of bureaucrats to link themselves to the decision was accompanied by depictions of their allegedly limited responsibility for explaining or justifying it. While officials had a clear notion of the organizational structure and consistently recalled hierarchical relationships concerning the benefits they were assigned to, descriptions were seldom concentrated on respondents themselves but almost always tied to another actor.

Bureaucrats' "**Perception of responsibility for explaining or justifying the decision or task**" (**Table 9**) offered evidence of this. When probed about who would be responsible for addressing the anomalous data that led to "edge cases", officials would first point to other departments or branch office managers who were allegedly in charge of notifying when something diverged from procedure. Similarly, the Civil registry and pension fund organizations were pointed at for not providing citizen birth, residence and contributory payment data, on which the ADS based its eligibility decision. In other words, inconsistencies were perceived as the direct result of a third party's setbacks or negligence. Such accounts once again confirmed theoretical expectations of blame avoidance (Hood, 2007, 2014; Tu, 2022), as respondents persistently shifted responsibility over the decision to other actors in the bureaucratic accountability chain.

More complex anomalies, due to impending regulatory change or the introduction of new pension allocations, also prompted responses that assigned responsibility to direct supervisors. Responsibility for explaining or justifying the algorithm was mostly perceived as a shared effort and, in some cases, wholly relegated to third parties.

Table 9 *- Perception of responsibility for explaining or justifying the decision or task*

Perception of responsibility for explaining or justifying the decision or task	**Sample data**	**Analysis level**	**Source**
	"*It's the branch manager who gives the approval, to be able to decide if everything is in order, check and (continue with) the process*" *"(The branch manager) has to supervise. In other words, he signs. (...) If he signed and didn't look, it's a horrible mistake"*	Supervisor	Sup_A
	"*The Payments department. If something seems strange to them, they all get up and cry out*".	Operative	Op_A
	"*We make a request to the IT Division. And they, according to the protocols they have established and with dates, ask different institutions for the information. (...) And after that (...), they report to us*".	Operative	Op_D
	"We report and in the end, it's up to headquarters to make the corrections there."	Operative	Op_C
	"*The headquarters is supposed to be in charge of asking us for what they need or for us to review what, by virtue of what comes in, what really relates to us. With the stuff that we are in charge of.*"	Management	Mg_A
	"*If the application didn't allow you to pass a Death Grant that you were entitled to, that's still triggered by my business. Because I have no way of knowing that someone came to the branch. The business triggers it for me, we analyze it together*".	Management	Mg_B

This perception appeared to be accentuated by the objective of granting benefits to eligible applicants on time, particularly in the context of the newly instated PGU pensions. Related to officials' accountability relationship with the Superintendency and the primacy of legislation over the IPS, perceptions of "**being subjected to formal evaluation processes**" (**Table 10**) and of "**being observed by an account holder**" (**Table 11**) were almost exclusively detected in unison. That is, perceptions of evaluation processes appeared to go in hand with notions of an audit culture at the IPS. Seen as the direct result of regulation, these processes were depicted as incontestable. However, individual goal-setting methods, done together with direct supervisors, appeared to counterbalance this rules-dominant notion shared by officials.

The average "time to grant" and the number of approved applications, as well as the proportion of unresolved ones, were commonly shared performance indicators among respondents. However, upon further probes, some officials would concede that performance indicators were derived from IPS' institutional commitments, which were determined at a national directorate level and overseen by the Ministry of Economy's "Management Improvement Program". These commitments were underscored as critical enablers for timely measures and avoiding mistakes.

Lastly, the performance of the eligibility system was only explicitly mentioned for the Massive Processing unit's evaluation processes, arguably contributing to algorithmic opacity.

Table 10 *- Perception of being subjected to formal evaluation processes*

	Sample data	**Analysis level**	**Source**
Perception of being subjected to formal evaluation processes	*"I tell (direct supervisor) about how it's done, how the data is seen, how I get this information that I'm giving him. The times that I estimate. And as far as how we talk about it, (direct supervisor) gives me ideas."*	Management	Mg_A
	"*There are institutional goals, departmental goals, and personal goals. Those are the three areas of evaluation (...) The only ones I have a say in are the personal goals. And in my case, the concept is quite simple. It is the normal delivery within the stipulated time, which is five days from the review of the benefits that are in the scheme."*	Operative	Op_A
	"Each official has goal commitments. Management goals that are committed to at the beginning of the period. Goals that are qualitative of quantitative. And there is a goal that the person commits to and a goal that the management assigns to him/her. (...) We evaluate four times a year."	Supervisor	Sup_A
	"That's all regulated. We have institutional commitments (...) The deadlines that they put on us: In a certain amount of days, to have the cases resolved. That's regulated"	Operative	Op_C

Supervision of individual tasks and the eligibility process, through external audits carried out by the Superintendency of Pensions and internal audits carried out by the IPS' Internal Audit Office and Comptroller's Office, were alluded to in different ways. Operative-level officials more effusively described "constant audits", implying it influenced their discretion. However, time constraints resulting from the overarching goal of efficiency appeared to nullify possible negative attitudes towards them. Management and especially Supervisor levels similarly referred to the frequency of audits when explaining the eligibility process' control measures.

All levels, though, appeared to share a view of auditing procedures as a means to ensure operational excellence and to drive continuous improvement and learning. This suggested that IPS officials have internalized accountability as an inducement to increase effectiveness and efficiency, as per Bovens et al.'s (2008) public accountability perspectives. Indeed, several answers referred to being observed as necessary, eliciting positive responses over audits carried out by the IPS and the Superintendency.

***Table 11** - Perception of being observed by an account holder*

	Sample data	Analysis level	Source
Perception of being observed by an account holder	*"The Comptroller. It's permanently on top of us. It's reviewing our whole process every minute. In fact, we are now already in another review."* *"Annually, they do two or three supervisions, to see that the rules are being followed and that the procedures are being carried out in the correct order. And as they should be. They know what the results should be, and they verify that the results are correct."*	Operative	Op_A
	"*Yeah, we get audited quite a bit. Look, years ago, we were audited by the 'Super'. We have had audits from the Comptroller's Office, and lately internal audits. Over the years, I think it's good because, in the end, it's about getting better. It allows us to automate or improve certain processes in which we are not controlling so much.*"	Operative	Op_B
	"They audit us regarding the concessions, the processes, and the rejections. They audit everything, to verify that we are complying with the norms and all that." *"I think it's necessary and good. All these audits are useful for us to see if we are working well, or doing it wrong."*	Operative	Op_C
	"Audits are done on all the benefits of the institution. And the focus of any audit is that the money is well spent (...) in the agreed time, according to the regulations."	Management	Mg_B
	"I feel that this is a great value of this institution (...) That everything has been formalized. We have an audit department that controls us, that makes preventive controls. (...) We have our own audits, the validations and audits carried out by each work team. (...) And that is the best that can happen." *"It's something that I always tell our civil servants. The procedures are (there) to take care of the civil servant."*	Supervisor	Sup_A

Finally, the analyzed data revealed no direct evidence of bureaucrats' "**ability to predict possible sanctions or rewards for the decision or task**" except when explicitly asked for consequences related to benefit provision. In effect, no official expressed a specific notion of the consequences of a system failure unless specifically probed for sanctions resulting from eligibility errors. Errors were categorically disregarded (see **5.1.2**), and only one respondent alluded to the IPS merely making sure "that (other entities) don't attack us" (Operative level, Op_B). Instead, consequences in the bureaucratic accountability relationship were described as opportunities for continuous improvement.

> *"No, there are no sanctions or consequences. We always look for, try to improve this or see how we're going to work, for example, in contingencies. If the system goes down." (Management level)*

> *"Sanctions? No. No, they're mostly suggestions (...) Everything has to be regulated." (Operative level)*

It is, however, unlikely that officials were unaware of the consequences if they did not accomplish goals or follow institutional procedures. A supervisor claimed:

> *"He knows that he cannot run this way. Because (…) he knows what the consequences could be. So, as long as he moves within his framework, which is well defined and clear, this institution functions as it does." (Supervisor level)*

While respondents did not allude to sanctions, the rules-based ethos of the IPS and the perception of constantly being evaluated confirmed Schillemans et al.'s (2022) assumption that officials act in the shadow of accountability's "consequences" phase.

Considering these findings about the independent variable, the following subsection lays out evidence for the dependent variable: IPS officials' disposition toward algorithm use.

5.1.2 Disposition toward algorithm use

Overall, public servants expressed a high disposition toward algorithm use. This was mainly noted in allusions to trust in the algorithmic decision-making system, a lack of overt contestation against its judgment, and, in some cases, a tacit preference for the algorithm over a human alternative.

While distinctions were made during coding between direct references and more indirect "predictors" for each associated indicator (see **Appendix B**), the results for the dependent variable nevertheless appeared to be more straightforward than the independent variable. In general, public officials declared themselves favorable toward the eligibility system even when probed.

a. Instances of contestation or non-alignment with the ADS

According to interviewees, the 2008 reform began an institutionalized effort toward automatic decision-making for the IPS. While simple eligibility tools were in place to support grant assessment procedures at an operative level, the creation of the various Solidarity Pillar pensions demanded a more sophisticated and efficient eligibility mechanism. Over the years, this led to a significant expansion of the Department of Benefits Management, creating specialized subunits to manage the eligibility system's increasingly dense business rules.

An official who had been working in the organization since before the reform stressed the transformational impact caused by automated eligibility procedures:

> *"Me and (colleague), who has already retired, who was the boss before (current head of department), we did everything. There was no leadership. We were all the same. And we would grant (benefits), and we would suspend (them). Now we are only in charge of granting" (Management level).*

As the accountability chain matured, the stance of the IPS toward automated eligibility evolved from "loafing" to one of increased vigilance, as per Zerilli et al.'s (2022) scale of attitudes toward AI.

> *"I mean, we relied a hundred percent on what (the algorithm) gave us. They would say, 'Yeah, here's the eligibility record for the applications. Load it up.' And we loaded it, but without further analysis (…) There was no questioning on our part as analysts" (Management level).*

The Department's expansion led to more actors interacting with the growing eligibility system, and thus scrutiny over it, in line with theoretical assumptions of a general human aversion toward algorithms (Burton et al., 2020; Castelo et al., 2019; Jussupow et al., 2020).

Nevertheless, analysts in charge of reviewing applications for the Benefit for Born Child, whose daily tasks involve decisions of (non-)alignment with the algorithm, offered no evidence of overt contestation. This was also the case for respondents at the management and supervisor level, who

referred to the system's favorable track record and the lack of alternatives. This was consistent with Loi & Spielkamp's (2021) assumption that role-specific time constraints and limited alternatives could foster "loafing" behaviors.

The Death Grant, which had its business rules adjusted during the case study, exhibited some evidence of contestation with the ADS: Eligible applicants were being left out by the system's decision due to obsolete business rules following a bill that reduced eligibility restrictions. In general, while such "borderline cases" were noted as an instance of non-alignment and grant analysts continuously scrutinized the algorithm's decision, reported cases of outright rejection of the system were missing, as shown in **Table 12**.

Table 12 *- Instances of contestation or non-alignment with the ADS*

Instances of contestation or non-alignment with the ADS	**Sample data**	**Analysis level**	**Source**
	"We obviously have a series of controls in place. But what we check is that the code that was given effectively corresponds to the pension situation. But everything is correct. (The algorithm) works perfectly. In other words, there are no errors." *"(Errors) are differences in information, because these databases are loaded in one month (...) others we are using in another month. Therefore, it can give us a difference there. And you have to analyze."*	Operative	Op_B
	"*I think that when the information arrives... I think that especially the amount, questioning the amounts of a benefit that another institution pays (...) I think that (...) I don't know. I don't think that's questionable. Because it is assumed that all the data that is transferred here is regulated by the superintendence and (...) it is done every month."*	Operative	Op_D
	"There are a lot of cases that are called "borderline cases". Because of (...) these new rules that were created by the PGU, many cases were left out."	Management	Mg_B
	"Today, it's the process that exists. It's no longer questioned. Because there is no manual. There is no alternative. Because, at first, we were (using) both of them. (...) today there is only one. So since there is only one, there is no longer any conflict.	Supervisor	Sup_A

b. Perception of overall trust in the algorithmic decision-making system

In line with the data above, officials were eager to express their trust in the eligibility system. All levels categorically rejected the definition of "errors" or "failures" due to the algorithm's decisions, as shown in **Tables 13** and **14**. In line with data on **Awareness of the Bureaucratic chain**, incorrect rulings by the system were attributed to an external actor not facilitating adequate information, with which the algorithm made its eligibility decision. As suggested by Chugunova & Sele (2022), users preferred to assign the responsibility for the process' shortcomings to other humans than the automated system.

Different substitute concepts were used to describe the associated procedures in these instances, such as "edge cases", "borderline cases", "anomalies", and "casuistry". Process analyst and management roles expressed more nuanced depictions, referring to the system as "missing a leg" or "not being smart enough" at that time. Nevertheless, public servants directly expressed the absence of errors as one of the reasons why they trusted the automated eligibility system.

Table 13 *- Perception of overall trust in the ADS*

	Sample data	**Analysis level**	**Source**
Perception of overall trust in the algorithmic decision-making system	*"It's a tool that's there. That works. (…) I feel that it's positively evaluated by everybody. Ultimately, the only negative perceptions we can have about the process have nothing to do with the algorithm."*	Supervisor	Sup_B
	"Sometimes there are not only entry problems in the system, but also when you type the RUT of the deceased in the system, the eligibility registry or the Civil Registry shows another name. This is a casuistry, because it does not happen all the time, but it does happen from time to time."	Management	Mg_A
	"*So that is where we detect errors. These errors do not mean that we have an error, but that (they) sent us the incorrect data. We call this inconsistency. It is not an error; it is an inconsistency because (they) should have informed us of that data."*	Management	Mg_C
	"I could say I'm asking you for four and let five in. That would be a flaw, something that doesn't happen because the system filters it out. All right? The eligibility is well-defined, so to speak. That's not the problem."	Supervisor	Sup_A
	"Personally, I wouldn't talk about errors, because it's data, it's information. And it's all automated. And as I said, it works quite well."	Operative	Op_B
	"I think that the system does not give errors per se. But what we see is the information that the institutions report. But maybe it's not a problem either, it's just that it calls our attention."	Operative	Op_D

Yet others were more explicit in how they trusted the algorithm's decisions. Efficiency, cognitive aids, experience in the data handled daily, and ease of use were cited as motives for trust.

***Table 14** - Perception of overall trust in the ADS (continued)*

	Sample data	Analysis level	Source
Perception of overall trust in the algorithmic decision-making system	*"That's our phrase. 'Eligibility is okay. It's always okay.' If there's any problem, it is because of the change of regulations or because the data is wrong. In fact (…) if you calculate from 2008 until now, they do two audits a year. And in all those audits, they have never found a problem in Eligibility."*	Operative	Op_A
	"*We have been growing and it has been integrated into our needs as an analyst, which gives us much greater security that what we are doing is right. That we are delivering a benefit in a timely manner and in the right way, which is our ultimate goal.*"	Operative	Op_B
	"I think it's experience. Because at the end of the day (…), if an entity gives you information, you trust that information. We can't be doubting all the data." *"I really like it. I mean, it's a super friendly way to summarize so much information about a person. Because there are so many conditions, so many possibilities that a person can have. And in my opinion, they're all clearly defined by the eligibility codes."*	Operative	Op_D

c. Preference of the ADS over a human alternative

As laid out above, IPS officials perceived that frequent audits not only ensured the correct functioning of processes but also promoted the efficient accomplishment of institutional objectives. Echoing Lyell & Coiera's (2017) assumptions on task complexity and algorithm appreciation, officials referred to the ADS as an asset, because it lessened cognitive load and reduced the time involved in checking each benefit application's eligibility. By handing over the eligibility decision to the ADS, operative and management level officials declared that they were able to cover more tasks: Examples included more thorough analysis, reviewing legislation to keep the algorithm's business rules up to date, assisting in data requests to external organizations, and increasing the number of citizens served in branch offices.

These descriptions expressed a favorable disposition toward the automated eligibility system, with some claiming that an alternative way of working was inconceivable (**Table 15**). Public servants with more tenure expanded these claims, alluding to transitional periods in which both ad hoc manual methods and algorithmic decision-making operated simultaneously. While partly motivated by government mandates for digitalization, the IPS had undergone a transitional period, during which it decidedly gravitated toward the automated decision-making system. Conversely, some respondents also conceded that there simply was no other option available to conduct their work.

Table 15 *- Preference of the ADS over a human alternative*

	Sample data	Analysis level	Source
Preference of the algorithmic decision-making system over a human alternative	*"We used to grant one by one, so to speak. I would take a file, review the traditional history of that file and grant. The analysts, the people who worked, were assigned daily quotas of files to work with."* *"They realized that it's faster, that it helps them more, that it creates less administrative workload for them."*	Supervisor	Sup_A
	"*The time to grant is five days. So, the evaluation falls in that line. Did you go over the five days? Why did you go over the five days? What is the reason why you went over the five days? (...) we are subordinated to time more than to the eligibility process itself."*	Operative	Op_A
	"What interests (the IPS) most here is to meet the goals: to deliver timely payment of the grants." *"I insist. We couldn't work without the eligibility system. I mean, that's our input (...) to be able to assess an application. Without that, we can't do anything. I mean, it's super important for us."*	Management	Mg_C
	"It's a great working tool. Because when I came, in the beginning, there wasn't so much automation. It was all very manual, so there were a lot of errors. Many, many, many, many." *"In the beginning (...), it was manual. There was nothing automated. I would imagine that the files would be generated by IT; here, they would be reviewed manually. There were no programs like the ones we have where they tell us 'this is here, this is the amount, this is the difference.'"*	Operative	Op_B
	"Everything has to be coherent, and this simplifies things a lot. And also, this translates it into our grant system through its rules, recognizing these codes as 'candidate to grant' or 'candidate to reject.' I can't imagine any other way of working with so much information."	Operative	Op_D
	"When the Death Grant (algorithm) came out, they thanked us a lot (...) Imagine, all day long, going through paperwork, going through the steps to get them to sign off, 'I paid it, I didn't pay it.' You didn't have automated control. It was all manual. So, at the most, they had Excel spreadsheets (...), and that was shared with the branches so that the same funeral home wouldn't do the same thing at another branch."	Management	Mg_B

5.2 Analysis of explanations

The case study revealed substantial evidence for the independent and dependent variables.

Regarding the independent variable, awareness of the bureaucratic accountability chain was widespread. The Superintendency's primacy as the definitive account holder, with its authority cascading down a hierarchical chain of authority, was traced by all participants. Feedback mechanisms to facilitate explanation and the scope of discretion across the chain links were illustrated in detail, with recurring allusions to vertical sign-off processes to amend deviations from the algorithm's established patterns. This confirmed Reddick et al.'s (2020) claim of vertical accountability increasing oversight clarity by making officials feel more accountable and offered evidence for Brandsma & Schillemans' (2013) "discussion" phase of accountability.

Awareness of ownership, or who was explicitly assigned to the ADS, garnered less consistent responses among bureaucrats. While almost all could identify their own supervisory role concerning the ADS, the continued operation, maintenance and justification of its decisions were dispersed across "the computer guys"; either in the respective department's own tech support unit or the IPS' central IT Division. At times, probes prompted inconsistent responses, with most public officials confessing a limited understanding of the algorithm beyond the business rules they conducted their work with. Nevertheless, despite this apparent dependence on the IT staff and evidence of algorithmic opacity, all respondents could trace the chain to the IT Division.

Indicators for the awareness of the chain revealed more nuance, with individually felt accountability dispersed across actors. Their ability to associate themselves with the ADS' decisions was strictly task-specific; that is, only supervisor-level officials alluded to the process output and its consequences. Similarly, no interviewee expressed a direct obligation to explain or justify the system, pointing instead to other actors: External entities, legally bound by the Superintendency to deliver citizen data, and the IPS IT Division, tasked with uploading said data, were responsible. By establishing a link with these actors responsible for explanation, Brandsma & Schillemans' (2013) "information" phase of accountability was made apparent by IPS officials.

Moreover, predictions of possible sanctions, either for themselves, their team or the IPS as a whole, were strictly tied to regulation and only arrived upon with probes about process deviations. However, public officials were all quick to point out how they were constantly audited and observed by their account holder, which was tied to an overarching culture of rules and established procedures. While a restraining effect on discretion was noted, this ethos was praised as very positive, with audits seen as opportunities for learning and security. This echoed Bovens et al.'s (2008) perspective of accountability for learning and completed Brandsma & Schillemans' (2013) three phases of accountability with the final step of "consequences".

Thus, despite high algorithmic opacity, perceptions across all levels identified **an uninterrupted, clear, agreed-upon and cadenced accountability relationship across multiple actors**, both within and without the IPS.

As for the dependent variable, interviewees exhibited a high perception of trust in the algorithm, particularly at the operative level. At times, the system was referred to as another colleague with a specific task in the chain. Descriptions of contestation or non-alignment of the ADS were limited, both in amount and in detail. Officials outright rejected the notion of algorithm "errors", preferring to attribute any process deviations to other actors in the chain or even themselves. On a related note, some interviewees decidedly expressed their preference for the ADS over human alternatives, alluding to benefits in cognitive load, administrative efficiency, and reduced incidence of errors. Some substantiated their favorable stance by comparing the algorithm to manual alternatives previously employed by the IPS. Other explanations admitted that they did not know anything different, that they had gotten accustomed to it, or that their role did not allow for contesting expressions beyond accepting or rejecting the automated decision.

All in all, users, especially those from the Department for On-Site Service, expressed a significant degree of algorithm appreciation and, therefore, **a favorable disposition toward algorithm use**.

Considering the above, the data offered no evidence to sustain the hypothesized relationship, which proposed that ***the more aware bureaucrats are of the accountability chain, the less favorable they will be to using algorithms***.

Two implications can be derived from this: There is no causal relationship between the variables or the relationship is positive. The following subsections analyze these possible explanations in light of the evidence. As a primary step, the possible absence of a causal relationship will be outlined. This thesis will then propose a possible alternative explanation for a positive causal relationship.

5.2.1 A possible explanation: No correlation

A possible explanation of the outcome would be a non-existent causal relationship between the bureaucratic accountability chain and disposition toward algorithm use. The theory underscores that algorithm aversion is more prevalent in morally complex issues (Bigman & Gray, 2018; Jauernig et al., 2022; Lee, 2018) and that algorithm appreciation is, conversely, more likely with rational and quantitative tasks (Alon-Barkat & Busuioc, 2022; Castelo et al., 2019; Chugunova & Sele, 2022; Lee, 2018; Logg et al., 2019). While pension benefits were a highly politically salient issue during the case study, due to the introduction of the PGU, it could be argued that eligibility processes remained mainly rational tasks.

Furthermore, all actors in the accountability chain knew and relied on business rules to substantiate their attitudes toward the ADS. These business rules were derived from eligibility criteria laid out by pension laws, such as gender, salary thresholds, and affiliation to private pension organizations. As mostly rational and quantitative criteria, they left little room for moral interpretation and thus favored the perceived adequacy of the ADS. Accentuated by principles of operational efficiency and the pressures of meeting individual grant metrics, it could have overwhelmingly favored the perks of algorithms related to cognitive load reduction.

Such an explanation would lend weight to Andrada et al.'s (2022) argument that a degree of algorithmic opacity can be preferable if it enables effective interactions with the technology and the task it is meant to address. All participants, except an IT specialist at the operative level, portrayed an eligibility process in which the algorithm is effectively "seen through", as described by Andrada et al. (2022), suggesting significant algorithmic opacity. No correlation between the variables would therefore imply that the pervasiveness of efficiency moderated bureaucrats' disposition toward algorithm use, and that discretion and algorithmic opacity were perhaps comparatively less important. Further research on their comparative influence on algorithm aversion and appreciation would be needed to confirm such suspicions.

This notwithstanding, officials' disposition toward algorithm use predominantly converged around feelings of trust which, however, did not always tie into the indicators of the dependent variable. In fact, several respondents conceded that they trusted the process, their direct colleagues, or the organization's IT Division, without referring to the ADS itself. Despite being embedded in this process, the algorithms were often not explicitly referred to, probably due to algorithmic opacity, unless prompted in probes. Moreover, while evidence was also present for the dependent variable's other indicators, the theory hinted that "**instances of non-alignment**" and "**preference over a human alternative**" on occasion held less explanatory power. This gap became apparent through further analysis of the case study results, especially when examining the data for the dependent variable.

Therefore, the following sections further scrutinize the explanatory power of the dependent variable's data, before converging on a possible explanation for a positive causal relationship.

5.2.2 Explanatory power: Non-alignment and preference over a human alternative

The IPS' degree of contestation of the algorithms' decisions was identified as one of institutionalized vigilance, as outlined by Zerilli et al. (2022). That is to say, several of the roles assigned to granting pension benefits, across the Department of Benefits Management and the Department of Customer Service Channels, were effectively tasked with scrutinizing the system's decisions on a daily basis. Officials thereby engaged in formalized actions of algorithmic vigilance by conducting batch analyses of eligibility decisions and reaching out to external entities to validate "anomalous" data and rulings.

However, findings revealed that operational continuity was paramount, as were the institutional and personal goals related to efficiently granting benefit applications. This suggested that vigilance was not a direct result of personal feelings of algorithmic aversion or appreciation but rather of institutional procedures. The primacy of legislation imposed by the definitive account holder, the Superintendency of Pensions, and the resulting regulation-driven work culture that most officials promptly alluded to, lent weight to this conjecture. Furthermore, greater distance in the hierarchical chain toward the algorithm did not produce significant differences in alignment either, contrary to expectations derived from Neumann et al. (2022). Indeed, participants across three hierarchical levels and two departments echoed this formalized stance of vigilance.

Similarly, the case study revealed how officials either consciously or reflexively compared the automated system and a human alternative, as proposed by Jago (2019). The merits of the algorithms were preferred over more extensive, cognitively arduous and slower human methods to accomplish tasks, as Lyell & Coiera (2017) predicted. Officials with lengthier tenure spoke on this comparison, drawing on their personal experiences with each alternative. However, supervisor-level data also revealed that the algorithms were gradually implemented in the IPS as part of a "state modernization" mandate following the 2008 pension reform, which involved extensive process digitalization. Said mandate led to a transitional period, reinforcing user preferences for the ADS. The COVID-19 pandemic allegedly consolidated this, as more digital applications increased time pressure for bureaucrats in charge of the eligibility process. A respondent described this priority as follows:

> *"(...) in 2016, we also started to digitize some procedures. There was a commitment from the State, that we had to digitize some procedures and we committed to (this ADS). First of all, we were going to comply with what State Modernization was asking us to do." (Supervisor level)*

In effect, public officials preferred the algorithm to a human alternative due to the abovementioned reasons, likely accentuated by institutional context. While Loi & Spielkamp (2021) proposed that "loafing" behaviors could stem from limited alternatives, which several respondents alluded to, it could be less reasonable to propose that a lack of alternatives fundamentally led to a preference for algorithms over human decision-making.

In other words, proposing that IPS officials preferred using an ADS when several conceded that they had no real alternative is perhaps too broad of a claim. This is especially relevant considering IPS officials' stance of institutionalized vigilance, which nevertheless appeared to "over-trust" the algorithm, as theorized by Zerilli et al. (2022). Therefore, the evidence of trust in the eligibility system feasibly holds higher explanatory power to account for the case's outcome.

5.2.3 Public officials' trust in the ADS

Castelo et al. (2019) proposes that greater trust leads to a willingness to use the algorithm. As suggested by the literature, four factors influence the subjective attitude of trust: The degree of autonomy of the algorithm; the reliability of the algorithm; the perceived capability of the algorithm; and perceived human involvement in the training and use of the algorithm (Burton et al., 2020; Jussupow et al., 2020). The data offered significant evidence for all four factors, detailed below.

a. **Degree of autonomy of the algorithm:** Even if seemingly autonomous, automated decision-making systems fall within a continuum of varying degrees of human intervention (Madhavan & Wiegmann, 2007a; Peeters, 2020). IPS grant analysts and process analysts at the operative level, in unison with their direct managers, exerted a supervisory role by conducting the tasks of institutionalized vigilance. Despite the system's wholly automated processing of an application's 94 eligibility criteria and payment calculations, it was never entirely off the leash of bureaucrats, who readily associated themselves with eligibility tasks. The term "tool", used by some respondents at operative levels to describe the algorithm, conveyed attitudes of selective adoption (Alon-Barkat & Busuioc, 2022), despite allusions to limited discretion beyond "granting" and "rejecting," and high algorithmic opacity. Moreover, for benefits assessed and granted by the Department of Customer Service Channels, managers and supervisors knew that the eligibility process entailed a two-step approval process of the algorithm's eligibility ruling by branch managers.

b. **Reliability of the algorithm:** Numerous statements of the algorithms' reliability were underscored by the categorical rejection of "errors" to describe atypical performance. This practice was critical to appease humans' natural aversion toward algorithms that results from the "intolerance of inevitable error" (Dietvorst et al., 2016) and to prevent outright rejection that commonly occurs when users are informed of errors incurred by the algorithm (Prahl & van Swol, 2017). Flexible nomenclature for incorrect decisions was substantiated by bureaucrats' perceived responsibility over explaining the automated decision, which was mainly relegated to other actors. Confirming the hypothesis' expectations of blame avoidance, as per Hood (2007, 2014), and of humans more willingly assigning responsibility to other

humans than to ADS (Chugunova & Sele, 2022), the eligibility system was made incapable of committing errors. Alternatively, as several participants explained, it was only subject to continuous improvement and thereby reliable and trustworthy.

c. **Perceived capability of the algorithm**: The literature has documented algorithm appreciation when algorithm-assisted tasks are based on quantitative analysis or otherwise "objective" matters (Alon-Barkat & Busuioc, 2022; Castelo et al., 2019; Chugunova & Sele, 2022; Lee, 2018; Logg et al., 2019), which applied to the strict law-derived business rules of the IPS' eligibility system. Furthermore, the many references to ease of use, mental aids, and cognitive load reduction similarly favored the system's perceived capability to tackle the complex task of determining eligibility.

d. **Perceived human involvement**: Even with dispersed ownership of the ADS, IPS officials perceived human involvement during all stages of the eligibility process. When they were not the users analyzing the decisions, other actors in the chain were perceived to be in charge of the process. New business rules triggered by forthcoming legislation resulted in operative and management-level officials projecting responsibility upwards toward their superiors, much like in a vertical sign-off process (Jarvis, 2014). Likewise, when it came to adjusting the business rules, "the computer guys," or the IT Division, were described as being in control. This translated into a sense of human authority over the decision-making process, which would increase trust in the algorithm (Burton et al., 2020).

While the analysis above explained IPS officials' trust in the eligibility system in line with several expectations, two elements of the hypothesis remain unsettled. On the one hand, it does not account for the substantial evidence of algorithmic opacity expressed by all participants, an element that the theory consistently identifies as a source of algorithm aversion. On the other, it does not account for the curtailing effect on discretion, another source of algorithm aversion (Bullock, 2019; Busch & Henriksen, 2018; Ranerup & Henriksen, 2022), due to its transfer to IPS system designers and IT administrators.

The following explanation, which suggests a positive causal relationship, includes both of these elements by incorporating the prevalent mentions of trust in the process and other actors in the organization.

5.2.4 The bureaucratic accountability chain as a source of trust

The IPS is an organization with highly specialized tasks, that can be traced along intricate and at times dispersed bureaucratic accountability chains. In line with theoretical assumptions of bureaucratic accountability, officials stressed the primacy of rules and regulation as both the foundation of their work and the logic with which they would be held to account. Hence, the eligibility algorithm was essentially perceived as a technical implementation of legislation. Moreover, being constantly observed and evaluated by an account holder was perceived by bureaucrats at all levels, either by the Superintendency of Pensions or the IPS Comptroller's Office and Internal Audit Office (**Table 11**). Contrary to theoretical assumptions, which warn of excessive auditing as a challenge to trust (Strathern, 2013), potentially undermining their original purpose (Roberts, 2006), officials viewed them positively despite being constant and time-consuming. Cited reasons mainly alluded to audits instilling more confidence in the process by establishing that "the right thing" was being done. This meant that, despite its pervasiveness, the IPS audit culture did not induce an accountability overload (Halachmi, 2014).

Case data suggests that the bureaucratic accountability chain resulted from this backdrop of strict supervision, emphasized by institutional deadlines and feedback protocols set by the Superintendency of Pensions. This saturation by rules arguably evoked Page's (2006) notion of accountability as "control itself" but did not translate into high compliance costs for public servants, as suggested by Aleksovska (2021). Instead, highly coordinated ways of working and transparent feedback mechanisms were enabled, fostering close links between public servants, their respective supervisors and other units within the department and the IT Division (**Tables 6** and **10**).

This appeared to have a relevant effect on perceptions of trust in the algorithms. O'Loughlin (1990) proposes that effective accountability arrangements imply excellent communication, clarity of decisions, and high intensity of demands between the account holder and the actor held to account. In the IPS, these elements arguably translated into a "tightness" of the bureaucratic accountability chain, which seemingly led to greater confidence in each respondent's tasks.

Conversely, the high degree of task specialization and hierarchical depth in the organization allowed for responsibility to be shifted to other actors in the chain. Examples included the IT Division being assigned responsibility for explaining or justifying the ADS (**Table 7**) and superiors being the go-to actor to manage complex data requests with external entities (**Table 5**). Public servants confidently pointed to external organizations that were legally bound to deliver eligibility-relevant data. With the 2008 Pension System Reform legally binding entities external to the IPS to facilitate citizen data (**Table 3**), officials were confident of the "scope, provenance and quality of data" (Mittelstadt et al., 2016, p. 4), enabling perceptions that the algorithms can be held to account. Thus, while officials engaged in blame avoidance, the "tight" accountability relationship was not perceived as a dysfunctional element, as could be surmised from Halachmi's (2014) claim about accountability overloads.

The favorable disposition toward regulation appeared to accentuate this, instilling trust in that, whatever happens, other actors would be held accountable for delivering task relevant data. By being able to close the gap in the chain, trust in embedded processes was maintained.

In other words, the "tightness" of the bureaucratic accountability chain was a source of trust of its own, perceived by actors linked in it. **Table 16** exhibits how trust was built upon regular feedback processes and by tackling challenges with close supervision of their account holder. Despite the "tightness" of the chain, discretion did not appear to be affected, as formalized instances for feedback were perceived as opportunities for collaboration with direct supervisors. Moreover, the salience of rules possibly attenuated the perceived adverse effects of the "consequences" phase by precisely lining out bureaucratic procedures. A tight bureaucratic accountability chain could thereby reduce uncertainty, complexity and deviations, factors identified as conducive to perceptions of the algorithm's capability and appropriateness (Bullock, 2019).

Table 16 *- The bureaucratic accountability chain as a source of trust*

	Sample data	**Analysis level**	**Source**
The bureaucratic accountability chain as a source of trust	*"There have been several changes that imply that we are very up to date with the new challenges that have come to us through the new benefits. But we are always in communication. (…) And the important thing is not to keep quiet. If you find something, always be talking."*	Operative	Op_D
	"*Everything is very structured. And that also allows us to carry out controls in a better way. (…) Besides, in public administration, there is a dogma that says that 'what is not written does not exist'. Therefore, if there is something that is not written, no matter how much you say 'that's the way it's been done all my life', it doesn't exist."*	Supervisor	Sup_A
	"We make sure it's well implemented and it goes to production. And that's channeled through (Department lead), who is obviously the boss (…) I personally like it a lot. Because it gives me confidence (…) because everything that comes from the 'Super' is simply channeled through the headquarters (…) That is very important."	Operative	Op_B
	"We work together in an orderly way, but each one with their own subject. And well."	Management	Mg_A

This assumption was even more apparent when assessing the prevalent issue of algorithmic opacity in public organizations. In the IPS, respondents associated themselves with the algorithm through specialized tasks and, upon further inquiry, relegated overall responsibility over the system to the IT Division. Understanding of the algorithm, its hosting location and its inner workings were negligible. Nevertheless, officials expressed their trust in the system even in the face of changes due to the new PGU pension scheme, largely because everyone was aware of the business rules. This challenged theoretical expectations that users who perceived themselves as equal in experience and expertise, compared to the algorithm, would trust it less (Madhavan & Wiegmann, 2007b) or discount its advice

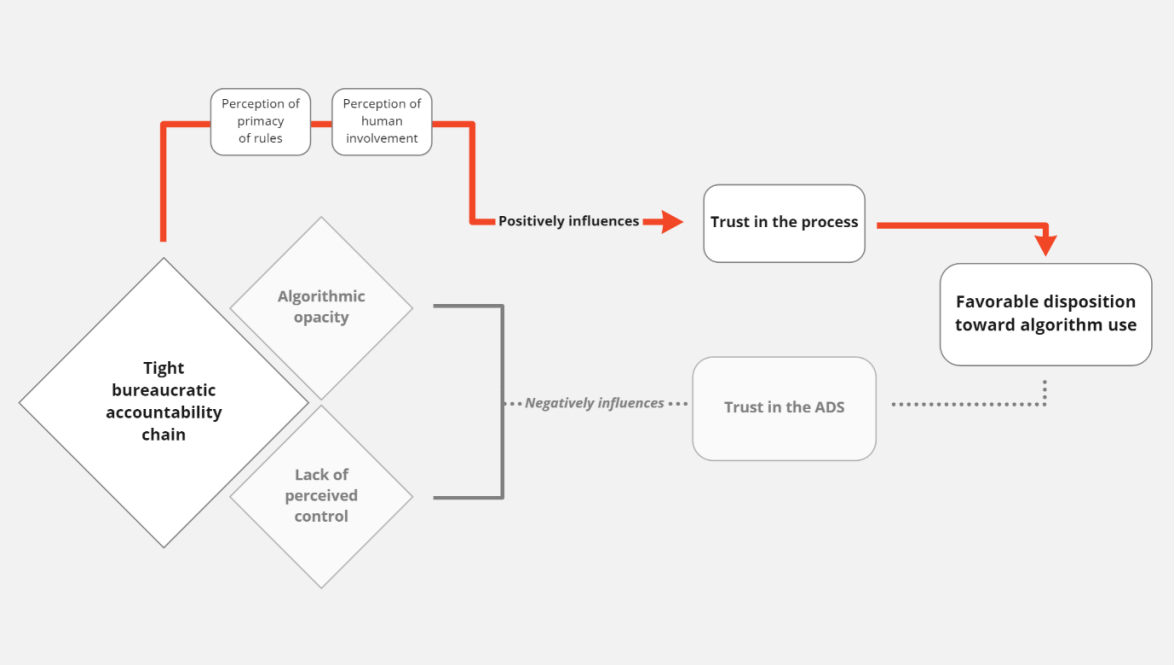
altogether (Logg et al., 2019). Instead, by holding a tight, agreed-upon link with the Massive Processing unit, which managed the relationship with IT, officials appeared to circumvent algorithm aversion resulting from algorithmic opacity or any inclination for their own judgements. In that sense, the bureaucratic accountability chain would have enabled greater collaboration with a process steward in charge of the ADS (Matheus et al., 2021), increasing perceived transparency and thus reducing algorithm aversion.

Hence, the "tightness" of the bureaucratic accountability chain appeared to serve the theoretical assumption that when the source of the data used by the algorithm is known, the system is perceived as reliable, and task complexity curtails the perceived reliability of human control, greater trust is expected (Madhavan & Wiegmann, 2007a, p. 292; Zerilli et al., 2022). In this case, the tight relationship with the IT Division, through the Mass Processing unit, allowed for the constant and active sharing of decision-critical information, possibly contributing to perceptions of human involvement with the ADS. Such an effect would align with Alexander et al.'s (2018) claim that information about an algorithm's previous adoption significantly influenced user trust. It also appeared to mitigate any adverse effects of ADS as "unaccountable actors", described by Campbell-Verduyn et al. (2016). While blame-avoidance was common and officials attributed responsibility to different actors, coherent awareness of the chain allowed for trust in the process nonetheless.

In line with theoretical assumptions of algorithm appreciation, perceptions of human involvement are not limited to perceived personal control but also encompass knowledge of other humans utilizing the algorithm. Put differently, the bureaucratic accountability chain's clear, cadenced and agreed-upon nature could help convey the notion of humans being "in the loop" of any embedded algorithmic decision-making processes.

So "***how does bureaucratic accountability affect public servants' disposition toward algorithm use?***" Given the evidence of this case study, it could be argued that a tight bureaucratic accountability chain, employing formalized feedback mechanisms, evaluation procedures, and distributed yet linked perceptions of responsibility, could instill trust in officials despite discretionary limitations and algorithmic opacity. This trust in the process, subjugating perceived responsibility and consequences of ADS deviations to the primacy of rules, could allow bureaucrats to circumvent factors identified by the literature as sources of aversion. **Figure 6** displays the logic of this explanation.

Figure 6 *- The bureaucratic accountability chain as a source of trust*



It should be noted that this alternative explanation suggests a possible causal relationship. Evidence of the bureaucratic accountability chain producing feelings of trust in the process, despite sources of algorithm aversion, was apparent and widespread across IPS respondents of all hierarchical levels. Nevertheless, the explanatory power of such a conjecture should be considered within the case study's context. Another organization's bureaucratic accountability chain may well generate trust in the overall process, but might perhaps not lead to a favorable disposition toward algorithm use if the ADS is less embedded, efficiency is not paramount, or users are more averse to audits. Consequently, further study is needed to presume generalizability beyond the IPS. Such an endeavor is beyond the scope of this thesis, which is why this and other limitations are addressed in the following section.

6. Conclusion

Accountability is the expression of a right of authority, manifested through a transparent and sequenced relationship between actors. While such arrangements can be found in numerous areas, arguably few evoke the notion of an account holder's right as plainly as government accountability. As portrayed by Principal-Agent theory, public organizations, and the officials that comprise them, are essentially founded on their cause to serve civil society. Concordantly, public administration literature continues its endeavors to make sense of responsibility, liability, and ethics of automated decisions, for who to hold accountable in the age of algorithmic governance remains an unsettled matter. The challenge compounds issues in management practice, offering limited insights into how bureaucratic dynamics interact with the opaque systems with which officials are meant to augment their tasks. Given this context, this thesis sought to answer the research question, "***How does bureaucratic accountability affect public servants' disposition toward algorithm use?***"

To address the question, this thesis conducted a case study of the Chilean Institute of Social Services, by drawing upon the theory of accountability and algorithmic decision-making. To cover the first area of inquiry, a framework was built with the theory on bureaucratic accountability, the mediating role of transparency, and how accountability is individually perceived. The second homed into research on algorithmic decision-making in government and user aversion toward algorithms. Together, the associated theory was used to build the thesis' concepts of the "bureaucratic accountability chain" and "disposition toward algorithm use", and to hypothesize a causal relationship between them.

Guided by the theory, it was expected that the mechanisms of the bureaucratic accountability chain, such as strict supervision and evaluation procedures, would be perceived by officials as trade-offs to effectiveness and discretion. Additionally, heightened role clarity and consistency in the bureaucratic accountability chain were expected to induce more pressure among officials to assume responsibility for ADS embedded in their tasks. Along with blame-shifting over the ADS' performance, algorithm aversion was expected due to a perceived lack of personal agency, human control, and algorithmic opacity. Hierarchical features of the chain were assumed to moderate these effects, mainly because of differing understandings of the algorithm, its capabilities, and overall reliability. Hence, it was hypothesized that the more aware bureaucrats were of the accountability chain, the less favorable they would be to using algorithms.

The findings of this research, derived from semi-structured interviews of IPS officials in charge of automated eligibility processes, confirmed expectations of decreased discretion, algorithmic opacity, and blurred responsibility over the ADS leading to blame-shifting. However, the case's results also directly opposed the hypothesized relationship: Despite being aware of the bureaucratic accountability chain, IPS officials exhibited a favorable disposition toward using algorithms.

The sample coincided in identifying the Superintendency of Pensions as the highest link in the chain, from which a sequenced accountability relationship cascaded down to the grant analysts who utilized the ADS to assess pension benefit applications. Understanding of the "locus of authority" of the eligibility decision, identified by indicators for individual perceptions of accountability, offered a broader picture of the chain. One in which adjacent IT units and even external organizations were seen as responsible for the ADS' performance and decisions. Officials associated themselves with the automated decision in reference to their tasks but relegated responsibility to other actors to amend deviations from established procedures. Any potential gaps in the accountability chain were closed by assigning responsibility to the organization's IT division, challenging theoretical assumptions of the vertical direction of bureaucratic accountability. This perception was heightened by claims of the ADS' inability to commit "errors" and a widespread appreciation for its benefits for cognitive load and administrative efficiency.

Accordingly, the absence of a causal relationship was speculated and addressed as a possible explanation of the outcome. However, following further analysis of the evidence's explanatory power, an alternative explanation based on the widespread evidence of perceived trust was proposed. The perceived reliability of the algorithm and human involvement in its processes were the most common causes for bureaucrats' perceived trust in the ADS. Case study participants often associated these factors with elements of the bureaucratic accountability chain. Namely, the rules-based ethos of the organization enforced tight relationships between links in the chain through regular audit procedures and the primacy of law to guide the responsibility of explanation. While the "locus of responsibility" for the automated eligibility decision appeared to be diluted among multiple actors, the data suggested that the accountability relationship's intensity translated into greater confidence in officials' tasks and trust in the ADS. Said intensity was tentatively conceptualized as the "tightness" of the bureaucratic accountability chain.

This explanation echoed the assumption that knowledge of the "scope, provenance and quality of data" (Mittelstadt et al., 2016, p. 4) would lead to algorithm appreciation. By holding a tight, agreed-upon link with the IT Division, officials appeared to circumvent algorithm aversion resulting from algorithmic opacity, reduced discretion, and unclear authority over the automated decision suggested by Wirtz et al. (2018). This relationship with the "computer guys" of the Massive Processing unit, connecting with the IT Division, similarly evoked Matheus et al.'s (2021) design principle of process stewardship, which builds upon collaboration at different layers of the bureaucratic hierarchy. In this manner, the bureaucratic accountability chain appeared to serve as a substitute source of trust for algorithm appreciation, seemingly allowing public servants to hold the algorithm to account by proxy.

Thus, this thesis' findings and alternative explanation offer a detailed account of public servants' trust in algorithms and associated practices of blame avoidance, conveyed in a large organization with highly

specialized subunits and hierarchical accountability structures. Furthermore, the concept of the "bureaucratic accountability chain" was expanded upon by combining bureaucrats' ability to identify formal responsibility relationships with notions of personal accountability. With the evidence and the proposed explanation of the bureaucratic accountability chain as a source of trust, this thesis seeks to offer researchers and practitioners new clues for the drivers that enable ADS adoption among public servants. This is especially pertinent as public servants' disposition toward algorithm use remains underresearched at the time of writing.

Overall, ADS adoption in public administrations looks to expand the discussion on algorithmic accountability, which is laden with optimistic and pessimistic views about its transformative merits and moral dangers. Moreover, as long as service delivery encourages greater specialization and task complexity, ADS' prominent role in government organizations will in all likelihood persist. And with the performance of automated decisions affected by individual feelings of accountability, the need to understand sources of blame avoidance and trust is apparent. Continued research into the relationship between ADS responsibility and their use is thus not only critical for the development of public institutions, but for citizens to exert their right to hold government accountable.

6.1 Limitations and future research

As described in the **Research Design** and **Analysis** sections, this thesis' findings and the alternative explanation for a positive causal relationship are likely not generalizable to all ADS employed by public servants. While data collection covered multiple respondents at various hierarchical levels to improve internal validity, generalizability might be limited to organizations with a strict rules-based ethos, such as the IPS. Moreover, contemporary management trends inspired by Lean Startup, Agile, and Scrum methodologies arguably defy the vertical and highly hierarchical accountability structures of a Weberian ideal type of bureaucracy. This is not to say that the findings are not of use to more horizontal or hybrid delegation structures but that they would necessitate further evidence associated with the bureaucratic accountability chain. Specifically, the perceptions of dispersed accountability, detected at lower rungs of the hierarchy, could be a relevant hint for further research. For this purpose, the notion of an accountability chain's "tightness" would need to be conceptualized more comprehensively to scrutinize its purported effects on public servants' disposition toward algorithms at a broader scale.

Another limitation is the logical nature of pension benefit eligibility, which feasibly provoke less contestation from ADS users than predictive or more autonomous algorithms used in morally grey areas. Likewise, while responses in the sample did not associate the accountability chain with limited discretion, the evidence was mostly constrained to formal feedback mechanisms and interactions with the ADS. While relevant, these aspects feasibly do not cover all aspects of a public official's discretion,

which would stifle the strength of the proposed explanation. Moreover, while the theory on algorithm accountability and aversion stresses the role of user discretion and opacity, the results could suggest that they are not as decisive in determining human-algorithm relations. As a result, this thesis' hypothesis could have overestimated the causal strength of these elements, which is why future algorithm aversion research could inquire about their influence from a comparative standpoint.

One more limitation is tied to the embeddedness of the IPS eligibility algorithms. While the evidence of trust in the ADS is apparent in the IPS, the need for prompts during data collection could mean reduced generalizability for organizations with more visible algorithms. Algorithm aversion theory indicates that humans are more likely to blame other humans than an ADS, which is why less opaque algorithms could moderate the purported causal relationship. Future research that compares otherwise similar organizations utilizing ADS with different degrees of opacity could expand the understanding of blame avoidance concerning algorithms.

Additional limitations became evident during data collection when the theme of "the bureaucratic accountability chain as a source of trust" was detected and coded. In hindsight, the theoretical framework incorporated trust in relation to cognitive biases toward and disposition to ADS. However, trust is an established and rich field in management literature with different theoretical strands, which could feasibly enhance the alternative explanation proposed in this thesis. Other theoretical approaches covering automation bias and technology adoption at an organizational level, such as the User Acceptance of Information Technology, could complement explanations of the relationship of bureaucratic accountability with disposition toward algorithm use. While the independent and dependent variables were operationalized for qualitative, individual-level evidence, this associated body of literature could help contextualize attitudes at the supervisor level.

The role of the case study's IT Division is arguably another weakness of the analysis. Given that all respondents pointed to this actor as the final link in the chain, the accountability perceptions of those individuals would likely have expanded the findings and granted more weight to this thesis' alternative explanation. Future research could expand the design to include their perceptions.

Lastly, given the evidence of distributed ADS ownership, future research could also explore the differences in perceived trust between procured systems and those developed "in-house" by the organization's developers. Researchers could study potential sources of algorithm aversion potentially found in entrenched public-private partnerships due to asymmetries in literacy or limited control over the "black box."

6.2 Policy recommendation

Considering Zerilli et al.'s (2022) scale of attitudes toward AI, it is worth noting that trust can also breed overreliance on ADS. This arguably means that trust is, in and of itself, not a solution for the adverse effects caused by "loafing" behaviors and could, without the proper procedures, even favor it as officials simply stick to their tasks. High specialization across a complex and efficient chain could lead to a tunnel vision effect, where officials' reduced field of view influences their capacity to scrutinize the ADS' rulings. While the high degree of task specialization and hierarchical depth in the IPS allowed for responsibility to be shifted to other actors in the chain, no effects of "accountability overloads" (Halachmi, 2014) were detected. IPS officials' blame-avoidance practices and agreed-upon dependence on the IT Division stress the need for clear and coherent ADS ownership in organizations, as hinted at by Matheus et al. (2021) and Wirtz & Müller (2018).

The IPS' emphasis on norms and audits suggests how a comprehensive understanding of business rules can be a suitable compromise for algorithmic opacity and thereby increase trust. Therefore, the case findings could help public managers design or revise established accountability mechanisms, such as audit and feedback procedures, to formalize an attitude of institutionalized vigilance. Accounts of management- and operative-levels offered some clues for this, by alluding to work groups with the IT and Legal divisions to interpret demands from the Superintendency of Pensions. Implementation strategies for cooperatively translating ADS goals into commonly known business rules, as exemplified by IPS staff, could be a way to address this. The above could also offer policymakers clues for designing algorithmic transparency policy so that its implementation aligns with the responsibility perceptions of data analysts and process managers, to reduce blame avoidance.

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APPENDIX A: Coded data tables

The following tables lay out the full coded data sampled in **Section 5**, derived from interviews conducted for this thesis. In line with anonymity provisions laid out in Section 3, explicit mentions of names were substituted with a generic "(name)", unless referring to a participant from the sample. In these cases, their associated source code (see **Table 1**) was utilized instead.

To offer context, some questions were accompanied by their question. Furthermore, time annotations were included for each quote, to cross-reference the statements in the full interviews. The full interviews are laid out in **Appendix B**.

Awareness of the actors held to account and the account holder	
Data	**Source**
[00:07:14] "The department that I lead has 20 people (…) There is the head of the department, which has a unit that is a management support unit called Development and Monitoring, which is the unit that is in charge of monitoring the work at the branch level. (…) That is the monitoring and development unit that reports directly to me. (…) But for the functional aspects, for instructions, the service model, new procedures to be incorporated, adjustments to procedures, they go through this department." *[00:25:13] "First of all, we were going to comply with what State Modernization was asking us to do."* *[00:27:49] "And also, the reform... and that was the good thing... obliged different institutions to provide us with information so that we would have information to be able to do it, and not have to start sending letters to, I don't know, Internal Taxes, from the AFP. But to provide us with information so that we could grant through these eligibility mechanisms, as I was saying."* *[00:29:42] "But we are supervised by the Superintendence of Pensions, which is in charge of supervising all the benefits linked to the Universal Guaranteed Pension and the benefits of the solidarity pillar."* *[00:30:53] "The death benefit is also supervised by the Superintendency."*	Sup_A
[00:04:21] "The ones that report to me are the different heads of all the sub-departments that I already named you. And I report to the division chief." *[00:14:30] "As I was saying, the inputs that the different entities that participate in the process of granting benefits have to provide are regulated. The date by which they have to submit it, the format, the fields, everything is regulated. So, the first validations have to do with that."* *[00:25:39] "(Managers and analysts) report directly to me."* *[00:31:03] "Well, first of all, there's an audit department that runs this process. And the audit starts with their audit plan and they determine what they're going to audit each year. And you, as the area in charge, are notified of an audit. And they send you a form, which is the initiation report. And within this initiation document, the audited matter, the audited period, who is going to do the audit, and the time it will take to do it are established. And, in addition to that, they ask you for the first information (…) And once that is closed, then, finally, there is a process of formalization of that audit. Because there is the signature of the national director."*	Sup_B
[00:06:32] "Well, I belong to the external channel unit, okay? External channels. That's where we have PBSI, PGU, Payments and finally Death Benefits, which is me. And this sub-department reports to the Face-to-Face Channels Department, which is run by	Mg_A

Awareness of the actors held to account and the account holder	
(Sup_A). It has to do with the branch offices. So, in terms of what I do, who sends me or who I do support with, everything has to do with branches (…)My direct boss is (name) (…) head of the sub-department." *[00:27:16] "You know that we receive instructions from the Superintendence of Pensions and other entities. So, when we receive an instruction, that instruction obviously goes to the transparency department and from there to our headquarters. Our management takes it down and says, "How does it relate to your responsibilities? "Then we work there, but always by order of our headquarters."* *[00:28:22] "Here, our division, we have our division chief, who is the one who gives us instructions. Then comes the head of the face-to-face channel department, and then comes our head of the sub-department."*	
[00:03:32] (Asked if any people report to them) *"My team of developers, because I'm from the Projects area. I'm a project leader, as well as I have other colleagues. And we each specialize in the different applications that we handle as an area today."* *[00:05:18]* (Asked about direct supervisor) *"Yes, he's my direct boss. (…)I only (report) to my direct boss."* *[00:30:41] "And there's us, which is the ICT area, which was born with ChileAtiende. And we belong directly to the Channels Division, which are our clients. (…) It's the branches, it's the social networks, it's really all the remote channels that our customers use. (…) So, when these systems come out, and they have to go to the backoffice to see things, we interact between both units."*	Mg_B
[00:09:28] (Asked about the delegation of responsibilities) *"(I) supervise what the care and concession analyst does. Everything that I told you is what the analyst does. And my way of supervising is to take out a group, do the analysis and come to the same conclusion. (…) Overseeing that everything goes out on the dates that it's due."* *[00:40:24] "They inform the Institute. I mean, the project comes to us from the Superintendence and they inform us formally. And we have to be attentive. In other words, in January and February, while the PGU was not approved, we were in constant direct meetings with the Superintendence. (…) (Head of Division) arrives, the Division Chief would have to come and do it. And it comes down from there."* *[00:43:57] "We have a regulation from the Superintendency that every month they send them all the "inconsistent data", which is what we call it. Every month, that information is sent to each AFP, to each entity, saying, "Hey, you sent me all these people... I'm missing a record that you didn't send me. Send it to me." And they have to respond to that on the seventh day of the month, and send the correct data."*	Mg_C
[00:02:35] "(...) yeah, I report to (Sup_B), who is the head of the sub-department. And we are, we are in the Benefit Management Department, right? And well, from there it goes up. (…) More or less, the structure is like this. The National Director, then comes the Business Division, the Business Department, the Business Sub-department which includes the Operations and Reforms sub-department. So, according to the structure, that's where it ends. " *[00:06:24] "(I report) to (Sup_B) (…) the head of the subdepartment."* *[00:15:17] "Eligibility is a completely digital procedure where we have set out each of the business rules that the Superintendency has given us, in order to be able to grant a benefit."* *[00:34:56] "They both report to (Sup_B), the boss. Between them, since they share the work, I understand that (Op_D) reports to (Mg_C). And on the other hand, I understand*	Op_A

Awareness of the actors held to account and the account holder	
that sometimes (Op_D) reviews what (Mg_C) does. So they give each other feedback. (…) (They both report) to (Sup_B), of course."	
[00:03:26] "(Mg_C) is my direct boss. And (Sup_B) oversees all of our processes. And she's overseeing, reviewing, guiding. Making arrangements for different modifications." *[00:18:02] "Everything goes by the norm. By the Superintendency of Pensions."*	Op_B
[00:02:43] (Asked about who is in charge) *"(Sup_B) is the head of the Operations and Reform Subdepartment. She is in charge of what used to be the old basic solidarity pensions, which today are the PGU. And also the Bono por Hijo."* *[00:30:08] "(The audit process is) not so much an interaction. More than anything, they're asking us for information. "You know what, we need all the grants. All the rejections. The manuals. Everything." So we, more than anything, we send them information and they use their system to review it and analyze it. And then they generate a report that goes to (Sup_B)."*	Op_C
[00:02:24] "Who's the boss? (Mg_C) is my boss. She's the head of the unit, in this case, the SPS and Bono por Hijo benefits granting unit."	Op_D

Awareness of feedback mechanisms to facilitate explanation and justification	
Data	**Source**
[00:15:46] "The feedback process is done... at the time of evaluation there is a process of face-to-face or verbal feedback with each of the staff members to be able to say that, during the evaluated period, the people met their goals."	Sup_A
[00:08:05] "Speaking of the performance appraisal system, one of the innovations also has to do with that feedback process. As I say, there are the indicators as an innovation. There's now this aspect of feedback, and then there's self-evaluation. So now there is the possibility for the employee to self-evaluate all the items to be evaluated. And then that self-evaluation is discussed with the management."	Sup_B
[00:11:24] "Uh, well, we meet with my management and we talk about it. We see what the form is and that's how we do the feedback (…) Well, I tell him about how it's done, how the data is seen, how I get this information that I'm giving him. The times that I estimate. And as far as how we talk about it, he still gives me ideas."	Mg_A
[00:05:46] "Well, we have different instances actually. We have regular meetings every week. We have meetings with the different areas, where we participate, actually, the whole ICT area. And we follow up on activities. (…) So we are always giving each other feedback and trying to improve the operation of the area with the lessons learned. We are getting different flavors within the meeting." *[00:34:36] "What happens is that, for us, the business in this case is what prioritizes us. Obviously, if there's something normative that you have to meet by a certain date, I mean, there's nothing you can do."* *[00:44:27] "Because on the business side they have to be clear about how to define things for us, and on our side they also have to reach the objective that is needed and the expectations of the business. And that's why there are so many processes of... within the development you know that there are the QA, where we do the functional tests, and we also validate those tests with the business."* *[00:52:14] "Then obviously you start talking together to see the best solution, both on the business side to see what they need, and on our side to implement it. But if it is something new, as in the case of the mortuary fee, which is a new benefit, due to the new legislation."* *[00:53:12] "And within the same meeting, we give feedback to say "hey, look, this new regulation has arrived, the group is going to start working". Then right there, in those same meetings, and in particular meetings on specific business issues, all these issues are raised and discussed. And they are added to this list that we report every two months, and that we interact with the business itself, to give the status."*	Mg_B
[00:11:20] "It's excellent, excellent. Because, as I said, we have our functions very well defined. With our operational work, we report, we copy everything we do to the headquarters. And she, when they have to inform us, she channels all the information we need. (…) So we get feedback in that way. We copy, they see that we are doing our process and if there is any change or any measure, we are all copied. So, we are always informed of everything. That our feedback from the headquarters." *[00:17:19] "(Leaders) listen to our requests and our improvements that we require and we put them to them. They are always supporting us and helping us to improve our processes. That obviously comes out of you. All of a sudden, "You know we saw this, I want to improve this". And they are always helping us and being effective in what is required."*	Op_B
[00:02:41] "It's a process that is, in a way, shared. Part of it is done by your boss and part of it is done by you as a self-evaluation. There is a feedback interview. And that	Op_D

Awareness of feedback mechanisms to facilitate explanation and justification	
gives you, in the end, a grade to which you, if you are not satisfied, you can also appeal."	

Awareness of discretionary and non-discretionary elements	
Data	**Source**
[00:04:11] "Everything that has to do with payment is automated. That's all done by processes. Nothing is manual, except in very specific situations, when one cannot collect and manual transactions are made in order to be able to pay." *[00:51:33] "The person who was in charge and led the process was (name). She set up the work group with IT, with the different service channels that were going to participate. With the Finance area, which was also going to be involved in this. And they worked for several months to define the rules... I mean, not define, because the rules were defined in the law. But how to incorporate them into this new system. IT played a very important role there, because they had to interfere in the system."* *[00:54:33] "But the superintendency issued an instruction that says that "no, there are no longer authorized ministers of faith, but only the social workers are going to be in charge of this". So we had to set up the whole procedure to reformulate powers of attorney."* *[00:58:12] "What are norms are norms, because it's an instruction. If the Comptroller or the Super comes and says "from now on, this is yellow", you can refute and say "no, I see it clearly, I see it as light blue". But if she keeps insisting that it's yellow, it's going to be yellow. (…) With a legal framework that is already established. Because the legal frameworks come to us. We are a technical institution that applies public policies. We do not dictate public policies."*	Sup_A
[00:05:15] "Each sub-department has its own structure, its own head. And within, how they delegate it is up to each sub-department. I don't really interfere much in how they delegate within each sub-department." *[00:10:34] "Ultimately the decisions are not made by us, they're -- just like you were saying, they're automated."*	Sup_B
[00:36:57] (Asked about how the ADS is integrated into the system) *"I think it's really the understanding to be able to translate it into a programming language. Because when they give you the task, they usually allude to laws. That can be super interpretative. So, we have reached a consensus with the businesses, with so many years working here at the institute, where we have explained that, if they give us a norm that talks about pure laws, I can interpret something. But it turns out that the result had to be (something else). What we have arrived at is that they have to tell us, in simple terms, what they require. And that has helped us a lot to reduce errors and interpretations. Because as I say, each person can interpret the laws as they please."*	Mg_B
[00:12:45] "Everything I have to grant, I send it to block and I leave only 10,000 loose. Just to put it to you that way. And those 10,000 I grant, and (IT is) monitoring that the system doesn't crash. We finished that process. Yeah, now unblock me this group of 10,000. Do you understand? I'm telling him which ones to unblock for me, so I can grant, because if not, it couldn't be granted. Now, who told you to do it this way? No one. They ask you to grant the benefit, you see how you do it. Got it? So, anyway, because of the knowledge we have of the system, we can do it this way." *[00:24:39] "We created a listing and the AFP was asked, "Hey, are these people your affiliates? Because they did not report them in the corresponding file". Then they answered "Yes, they are members, we are going to send the correct information". And we left the request pending until they sent the correct information."* *[00:36:52] "(The eligibility criteria) are according to the instructions of the Superintendency. The Superintendency says "hey, non-pensioned affiliates are entitled." ... And the IPS has to report the PAFE record. That is a data, the pension that they would get if they had been pensioned."*	Mg_C

Awareness of discretionary and non-discretionary elements	
[00:37:56] "Of course, the eligibility system needs to be constantly updated, in the sense of adding fields, changing the parameters, whether it's the amount or... everything, in other words, it has to be constantly updated according to the instructions of the superintendence. Because they create a new benefit, a new law, and the algorithm has to be adjusted."	
[00:02:35] "The truth is that I'm not in charge of leading it. I'm just another operative within the structure." *[00:12:42] "The truth is that with the times that we're dealing with, we don't have time to be more informal. I mean, it's either this or it's nothing. But analyzing a lot more in the background, to find something that's not established, is quite difficult."* *[00:15:17] "There is a formula provided by the Superintendence that says that "you have to multiply the PGU by such factor". And that is the amount that corresponds to you."* *[00:43:16] "Every month we are either granting or reviewing what is in regime. In these reviews or grants, each person in charge verifies the business rules established by the Superintendency. They are in the compendium of norms. In reality, we have been doing this for so long that they are already internalized. We quickly realize if there is something that is out of the realm of what's normal."*	Op_A
[00:03:26] "Me, personally, and my partner who is my peer, we do 100% operational work. Only operational. Any modification, because we are constantly reviewing and improving our processes, is channeled through (name) or (name). We do this with the Super, which is the entity that supervises us, that tells us... we have to ask them if we have doubts about a process. We consult the Super. But all that is channeled through (name). Everything through her. We only do operational work. (…) (Mg_C) and (Sup_B). They do everything. They lead everything. If we have any concerns, precisely now because of this new benefit that obviously also impacts the BPH. We have had to make some inquiries. All these are channeled by them. It happens at the level of the headquarters. They have the capacities and the competencies to do it. And the communication with the corresponding entities, which is the Superintendence." *[00:24:32] "One can't decide so much because... I don't know what you mean, because I analyze a case, I look at their pension situation and based on that I have to see if the eligibility corresponds to them. And based on that, grant the different types of payments or reject. Or leave it pending and ask for information from the AFP, or another (entity). But here it is not ambiguous. This is concrete. You are entitled or not entitled. And if we lack information, you ask for it. (…) as I'm telling you, it's all automated. So, it effectively has to be that way. There is no ambiguity, it's concrete."* *[00:31:47] "Because we grant according to the information that we have. We have no say there in the databases that are loaded by IT."* *[00:34:00]* (Asked about who is in charge the process) *"Because she is our direct boss. So, here, respecting the hierarchical roles, if we have any difference, any improvement to make, we communicate it to (direct supervisor) and if it's in (their) hands, (they) channel it. Or if it is more complex, through (Department supervisor). (…) We, as I said, we only do the operational work."* *[00:41:01] "I remind you that everything is through headquarters. (name) consulted with the Super."*	Op_B
[00:05:08] "We don't intervene much (with the ADS). We just analyze. There's a whole IT department that reports that information to us. So we say, "Look, we have all these applications. We need to know what eligibility they have in order to grant the benefit". And that's what we organize. And if there is a person who is not eligible for the benefit, we make a rejection decision."	Op_C

Awareness of discretionary and non-discretionary elements	
[00:05:51] "We have the power to modify these eligibilities. What is being done now, for example, in relation to residency. As there are many foreigners living here in Chile and some of them for much more than 20 years, we ask for residency information. And, for example, we have the possibility of modifying the eligibility of that person if he/she did not meet the requirement, to reject the benefit. But as I was saying, this is all based on information from outside entities." *[00:07:43] "(Anomalous cases are) all tied to IPS resolutions. It's regulated (…) So, there are previous controls before granting. But everything is regulated and systematized"* *[00:19:40] "When the audit came and they saw why there were so many payments, they told us: "Why is it still being paid?" They saw that nothing was being done with that payment. And that's when we asked the Superintendency if these benefits could be suspended. Because (the beneficiaries) were not collecting them. And then the Superintendent said: "Yes, it is appropriate to suspend"."*	

Awareness of the actor assigned to the automated process	
Data	**Source**
[00:21:03] "The system is built... or all of our systems that have an eligibility process, are.... I'm going to start from the beginning. A working table is established with all the businesses that involve in this particular case the death allocation, so that they determine through a system, the business rules that people have to meet, the requirements that people have to meet, in order to be able to access." *[00:23:21] "It's not just arriving and being very (automated)... it's the branch manager who gives the approval, to be able to decide if everything is in order, check and (continue with) the process."* *[00:30:23] "Yeah, (Head of Division) owns the process herself."*	Sup_A
[00:23:46] "Yes, because by the internal structure of the subdepartment, specifically the grant unit, there are process analysts or grant analysts, specifically for the child bonus (…) And they're the ones that master the algorithm, the processes. If there's feedback to be given, you focus directly on working it with them." *[00:24:37] "(Name) and (name) are analysts. (Name) is the head of the concession unit. She also does the concession analyst work obviously. (Name) is a concession analyst, but they look at disability benefits and Universal Guaranteed Pension. (Name) and (name) are the Bono por Hijo analysts."* *[00:26:04] "You've had a chance to meet with (name), right? Yeah, (name) is the expert on all of this. He's the one who programs the eligibility rules, whether it's the SPS, PGU and the child bonus."*	Sup_B
[00:18:33] "There is a process that is automated. This automated process means that we can enter the death benefit request through the systems. And trace them along through the system." *[00:19:09] "As I was telling you, the branches send me the borderline cases. And they tell me "look, I have a pensioner here who has a survivor's pension from AFP". But it turns out that he also counts on us, because he has a benefit of a solidarity old age contribution that became a PGU. But that person is not affiliated with the decree law 3500. "I'm sending him to authorize his entry, because the system doesn't allow entry." "Ah, perfect". Then I evaluate the case, I see that he entered the system, I see if this person really has the right."* *[00:34:59] "We also have to keep the ChileAtiende page updated. So we are talking about these as more transversal channels, so we are talking about all the channels. So they are the ones who lead, so that this whole process is done in the same way through all the channels."*	Mg_A
[00:32:42] "It is done at the business level with IT. Our business, which is the channel division, with all the leaders of the different units, and they are raised and fed back, even though as a project leader, you are interacting all the time with your product owner, according to the process or the application of which he is the owner. You are always interacting." *[00:36:14] "The algorithm as such is created within the solution that you present to the user. But within the functional requirement, necessarily, the rules that the business has to implement have to be there, in order to give the benefit. Because if not, I have no way to making the algorithm."* *[00:49:30] "So we have to start making the various adjustments. And to make the different adjustments implies reviewing requirements, because they were new things. It was a totally new benefit that the institution did not know about. And this work group was set up, where the leading user was defined by the Business departments. "Who is going*	Mg_B

Awareness of the actor assigned to the automated process	
to be the lead user?" They give you the name of the person, and that person, as the product owner, starts to trigger the different work tables. In this case, as the process was only through channels, or the Channels Division, he triggers the same leaders that today act in the Death Allowance flow. But if, for example, the Benefit to be implemented triggers people from the Benefits area, which are the backoffice, this table should also incorporate the Benefit people. So, first of all, both businesses have to put together this requirement and, basically, see the impacts."	
[00:08:06] "Well, let's see. Responsibilities in this Subdepartment. There's a – (Op_A) team verifies that the data is loaded correctly into the databases. He gets to it first. They approve and then it goes to us. We, our responsibility is to grant correctly with the information available at the time of granting." *[00:18:38] "No, the eligibility works... It's just different. We get the eligibility ourselves. I mean, we ask (Op_A)'s group for it, right? Because when it's massive process, we ask them for it."* *[00:30:13]* (Asked about who is in charge of verifying the process with IT) *"Some civil servants. Almost all of them are already retired. I mean, before it was only (Op_A) and (name) who saw the eligibility issue. Me and (name), who has already retired, who was the boss before (Sup_B), we did everything. We did everything. There was no leadership. We were all the same. And we would grant, we would suspend grants. Now we only are in charge of grants. The unit used to be everything. It was concession, payment, all together in that team. In other words, if we were 10 people, the 10 people saw the whole process, today we do not. Today Payment is in another sub-department."* *[00:35:33] "So (Op_A) had to modify the algorithm and have that PAFE8 field incorporated into the eligibility registry. And so that we could identify which cases were involved that were non-contributory PGUs with PAFE8. That's a modification that (Op_A) had to make to the algorithm, so that we could have what we need. Because otherwise, those cases could not be solved. They were left there. No, we wouldn't have been able to solve it."* *[00:39:06] "Everything that the Super asks for is discussed and (Op_A) has to do it."*	Mg_C
[00:10:38] "I have to correct those problems from one month to the next. Then, if something comes up, I have to correct them so that Eligibility meets the actual rules." *[00:33:10] "Yes, there are two people that are assigned. But sometimes they require help and the other units support."* *[00:37:25] "IT should have taken (the ADS), but IT never understood the business rules. Or they never took the time to understand the business rules. And so it never supported this application. And well, obviously we took it ourselves. So we have supported this application, made in Oracle, under what they call a Package. Which has an input with a number of parameters. One of the parameters is the RUT and another parameter is the date. Those are the minimum parameters and, with those two, this application goes to the eligibility base, collects everything it needs to make decisions. It puts together everything it needs to make the decisions. And, finally, it goes into a function called eligibility. It applies all the business rules that are known, in the sequence that they need to be made."*	Op_A
[00:06:58] "There is a package that is managed by a colleague of ours. His intervention is that if there is a modification to the business rules, as a result of some change, he modifies the package. He is the only one who modifies it. (…) Yes, he's the only person who handles the package. (…) It's among the risks. It's considered and contemplated. Because people were added to IT... this team... people that don't handle it. Because that's obviously a risk. So now, in the next few days or what do I know, I think they're	Op_B

Awareness of the actor assigned to the automated process	
going to start working. But the people who are also going to be involved in this package have already been assigned. In other words, it has already been considered." *[00:07:54] "And there is an eligibility package that is administered by a person who, obviously, if there is a rule that needs to be modified, it is modified."* *[00:10:36] "I imagine (IT) have a lot of activities related to uploading payment (data), sending a lot of files, which are really for the IT (Division). That's what they are in charge of."*	
[00:09:54] "Their names are (Op_A) and (name). They're the computer guys." *[00:11:41] "What (Op_A) does is he maintains the database, the eligibility of the people as Mass Processing. So when people apply for the benefit, they appear for us to either grant or reject. When we are going to grant, we send it to them so that they can do the previous controls for the granting.(…) When the system reports to us that there's an anomalous problem, we analyze it and see why it's happening."*	Op_C
[00:07:04] "We, for our part, we have the unresolved requests. We identify these requests. And (Op_A), who sees the more massive processes, we ask him to run the eligibility of those requests or procedures. And he gives us back an eligibility, which is a complete record. (…) So, we in the background update, but based on this new updated eligibility that they give us, and that's loaded into our system." *[00:09:50] "And we ask our colleagues in Mass Processes, which is where (Op_A) works, to run the eligibility for us."* *[00:14:36] "If there is any amount that we say, I don't know, "this amount is strange compared to last month", we always consult with (name) and (Op_A), who are always ready to help. What do they think, what do they see."* *[00:32:50] "We consulted with (name) and (Op_A) from massive processing. And they made all the arrangements with (name) and everything, of course, to communicate. (…) I don't quite remember if it was them directly or (name) and (Op_A). But in the end, you ask them and they say yes, as a way of confirmation. "Yes, this and this happens, let's do this". And then it's solved immediately."* *[00:35:32] "Well, as I said, I'm not a computer scientist. And what I understand is that (Op_A) works with an eligibility package, which is everything that operates below. All the rules that tell us that an application with such and such characteristics is going to have such and such a code. Right? If it has such and such amount, it's going to be this. They do all that over there. And there's another part which is the IT part, where the eligibility database is."*	Op_D

Awareness of the actor assigned to explain or justify the automated process	
Data	**Source**
[00:59:03] "For the Death Grant, it's the branch manager and the Finance Coordinator."	Sup_A
[00:17:06] "Each one has its stage of supervision. Because there's the loading of the data, where there's supervision by the area in charge in IT. There is also supervision by the users of that data, which is us." *[00:20:06] "A specific person to take on the role? No. It's part of the process analysts' and the concession unit heads' own functions. There is no ad hoc person for it."* *[00:36:20] "Let's see. If you're asking me about the correct functioning of the algorithm, I would say (Op_A). But if you're asking me about the system, where in the background the algorithms are programmed to give the answers that we expect, that's the IT Division."*	Sup_B
[00:01:06] "Sometimes there are cases that cannot be entered into the system for some reason, and those cases are referred to me and I enter them there to analyze. See if it corresponds to them, why the system didn't allow it. And I end up making a special request for them to be entered, to be uploaded into the system when appropriate." *[00:19:09] "Then I take this case and send it to IT. I tell IT to please upload this case to the system. And then they just, like, out of the back, they upload this case. So I'm the one who authorizes IT to upload the case into the system. But it's still entered into the system. It's not like it's not registered, but it's still uploaded to the system. So it's still automated."*	Mg_A
[00:40:01] "On a day-to-day basis, for me the algorithm is maintenance. It's something that I always have to have in place and obviously it's going to evolve throughout the year, if there are things that change (at the) regulatory level." *[00:43:02]* (Asked about mistakes in the process) *"We enter them through tickets, as a daily support. And we are talking about around 20 to 30 requests per day that are entered through that channel. Until this new system comes out, which basically updates this algorithm that you mentioned with the new rules to be incorporated."* *[00:46:12] "Now, obviously, if you depend on a third party, unfortunately these incidents are communicated and escalated to the business management level, where they are warned that we are in the process of being able to return to the operation, but that we depend on a third party and the times of that third party, which are not necessarily instantaneous, as we can often do. Sometimes even they themselves depend on another third party. (…) Also, as an IT unit, we also have a check every morning, before the branches open, that the validation links are up."*	Mg_B
[00:26:01] "This is not done by us. This is done by the IT division. Whoever loads the base... I think the department is called Data. I'm not sure. They load all the eligibility records. (Op_A) and (Operative) are the ones who supervise that this is done. I mean, they check... I don't know how they actually do it, but they verify that the information sent by the entity is correct or that it is in accordance. (…) They are in charge of verifying and, basically, validating that it is correct. And when they find that everything is fine, they inform us so that we can carry out our process." *[00:27:20]* (Asked about verification processes for the ADS) *"You would have to ask (Op_A) and (name) about that. I can tell you what I do. But no, I have no idea."* *[00:41:34] "I think (the eligibility process) belongs to IT. (…) I think they should have been in charge from the beginning. But they have never assumed that role. So the guys here have to continue to maintain that. They would have to see... Yes, well, they are the ones who should be in charge of (eligibility). If they're the data guys. They have a data department. I mean, they should know all of this."*	Mg_C

Awareness of the actor assigned to explain or justify the automated process	
[00:46:28] (Asked who would be responsible for solving an eligibility error) *"IT. (…) If the system crashes, no applications are entered, we complain to IT. And IT has to see what is down. If it is our server, if it is the eligibility databases. But they have to fix that, right? Not us. (Op_A) sees the part of the eligibility algorithm. I mean, he does, he fixes his algorithm, I don't know. And he asks (…) to load the new package. They call it something like that. Package. They load the new package into the reform system. But that's done by IT, not us. That's their responsibility."*	
[00:50:10] "(The audits) find other problems (with the ADS). For example, there is little integration between systems. But that's not a problem with Eligibility. IT hasn't taken over Eligibility, but it's not an eligibility problem either."	Op_A
[00:09:14] "(The ADS) just works well. But obviously it works well for the rules that exist today. If there's a modification to the rule, the person in charge of the package has to come in." *[00:21:00] "It's the IT Division. It's not Mass Processing. IT Division. Mass Processing, as we said, is from the sub-department, which sees all of our processes. The whole IT side. You're asking me when the applicant comes in. And all this information that goes into this little black box, that is seen by the IPS IT division. (…) Here we only look at the eligibility package. That is, as I said, (Op_A) sees it, only if you need to make a modification to the rule, that can be put in."*	Op_B
[00:07:11] "(IT) are the ones who inform us when we review, for example, anomalous cases. We review what situation the person is in. If the system states (the person) to be rejected, and we verify that it shouldn't be rejected, we can change (...) the algorithm so that the case is reviewed." *[00:35:32] "It depends on the cases. For example, one person had the age date different than what was reported to us. And we review it and in IT it's corrected.(…) It depends on what the problem is. On the analysis of each case."*	Op_C
[00:05:21] "I'm not a computer scientist by any stretch of the imagination. But basically, when I came here, eligibility was like Chinese, so to speak. And basically it's like a concept that we use and that translates into a code, right? (…) That's why the support of the IT division is also important. They have to make sure that the files are correctly available, so that we can update the applications. And, as I say, with the new challenges, the package that (Op_A) is talking about is always being updated."	Op_D

Ability to link oneself to the decision or task	
Data	**Source**
[00:00:15] "And the main function of my role in this department is to control the good implementation of the public attention model, which are made in these 193 branches. With the quality standards that the institute has established for it. (…) we are responsible for what has to do with the administration of the payment contracts to be able to pay the benefits provided by the social security institute. (…) And in that role I have been responsible, as the name says, for coordinating with the different areas of the institution, the correct delivery of the Universal Guaranteed Pension." *[00:07:14] "And they are the ones that issue the management reports, which allow me to make decisions, to control, remediate on the fly, and make the decisions that you have to make to execute your work. (…) From time to time we have to verify that the re-evaluation process is taking place. Therefore, we have to have a relationship with the medical commission. We have to notify the branches that they have to start this process."* *[00:49:01] "Let's see, what happens is that we are only a small part of what I just told you."* *[00:53:06] "But in any case, in the whole institute, the person in charge of the business is the one who leads the procedures that need to be updated. There are some that require the creation or formation of a work group, and there are others that are much simpler, because it is only a matter of incorporating an instruction, which is worked on bilaterally between the corresponding departments."*	Sup_A
[00:00:35] "Well, we're in the benefits division, which is the heart of the institute. Because it's the one that grants and pays for all the benefits that the state delivers through the institute." *[00:11:02] "We take the norm and that norm is translated into eligibility rules, both for the granting of a benefit and for the maintenance of a benefit. So, that is what is finally done to make it transparent, and that there is no intervention... because there are processes that are executed that, although they are massive automated processes, there is a person who has to execute them. So it's not 100% automated either. But that's basically it. It is translating the norm into an eligibility algorithm, which determines the granting and maintenance of the benefits that we grant."* *[00:20:40] "If we've had to adjust it? Yes, because adjustments are made to the extent that there are rule changes. And now, for example, the last adjustment, for example, had to be made because of the PGU. We had to make some adjustments to the child bonus eligibility algorithm."* *[00:38:16] "We are (the) Benefit (Division). We grant, we don't serve the public. The public is served by the branches, or the digital web service channels. And that's the responsibility of (different Division). But we... we participate with (different Division) in making these customer service applications available. In what way? While they do the front end, we contribute with the business rules. So that we don't receive requests that we know are not going to end up in a concession, and we don't fill up with cases that don't make sense."* *[00:41:24] "The benefits that require an application in order for them to be processed, everything is going to come in through our branches or through the web channel. And those applications go into our care and allowance platform. They become available for us to look at. Then, extract the information and say "these are all the applications that have come in, I don't know, in the month of December to date". And then we can process them and grant them or reject them as appropriate."*	Sup_B
[00:00:26] "My responsibility is to handle death benefits and mortuary fees. What is related to system entry, manual (entries), edge cases. And business rules. (…) When we	Mg_A

Ability to link oneself to the decision or task	
talk about the system... Well, I have to be in charge of making the system itself operational, so that the branches don't have problems entering the Death Grants. In what way? If it's down, I make the appropriate reports. Working on improvements to the system in conjunction with different teams, so that, for example, right now the PGU Mortuary Fee is being incorporated into the system, which was created this year by Law 21,419. So I am the one who is in charge there, on behalf of the Presential Channel, to collaborate with that." *[00:21:04] "We had to bring that up ourselves, because the system could not recognize it. So, now we are working on a project, which should go into production, I believe, next week. And this is going to work, because improvements were made to the Death Benefit system."* *[00:46:38] "I, at least, as I see alerts generated about something, I say "yes, this alert was generated and this other one also tells me the same thing". I start to check what is going on there, because something is happening (…) Look, they arrive very few times. Because generally, since they know that I'm the ASIMU coordinator, when there's a problem or the system goes down and all that, they notify me."*	
[00:00:14] "We see everything that are the systems that the Channels Division face, that is, what the user and bureaucrats face." *[00:01:00] (Asked about role) "Maintain business continuity. Updating the systems. (…) So, my role, at the end of the day, is to maintain an operational system for the institution, so that the user can also apply for the benefit, obviously, without having to go to a branch office."* *[00:01:42] "I'm not only in charge of that system. That system is inserted within another one, which is called the internal management system, which is a consolidated or a platform where you have consolidated many other procedures, which the executives also do in the branches at the face-to-face level."* *[00:13:45] "This was all manual. There was no algorithm. I mean, I imagine that there was an algorithm in some operational recipe. So people would go into different systems to evaluate what benefit the person had and whether or not they were entitled to ASIMU. But there was also a degree of error in the evaluation. If the executive did not have the experience, because this is very cumbersome, right? It's a bunch of rules that, in reality, you have to be looking at. (…) Whether or not they had their last pension, when it was, and so on and so forth, a whole host of things that the executive had to validate. Not today."* *[00:18:30] "Every month they ask us as IT, for example, to draw up a report of the things that are pending payment."* *[00:44:27] "I feel that everything about the algorithm, regarding responsibilities, are shared responsibilities. Because obviously if the business tells me that "I had to do 'a'" I develop 'a', he proves that he gave 'a', but it turns out that it was not 'a', but it was 'c' when it goes to production, the responsibility is obviously his, because he misstated the rule. Now, if the application for whatever reason told me that it was 'a', but it turns out that I didn't let him enter 'a' and I'm letting him enter a 'b' that doesn't correspond, then it is also my responsibility because I misunderstood. So, that's why I say that the responsibility, in my opinion, is shared."* *[00:46:01] "Yeah, totally a shared responsibility."*	Mg_B
[00:00:51] "I had to participate in the processes, doing everything. Taking out the eligibility, analyzing the applications, granting. In short, carrying out the PGU's concession process itself."	Mg_C

Ability to link oneself to the decision or task	
[00:01:33] "It might be around 2016, maybe, when I was put in charge. I would say more like 2017. In charge of the Grants department they created those units. I can look up the resolution later and see since when, to send you the exact year. Because I don't remember. And from then I was in charge of the Concession Unit. And in February of this year I started executing for the PGU." *[00:27:51] "How you entered the application, the eligibility code that you had and the one you have now. We check all the columns on both sides. We see, I don't know, if he is an AFP member, which member, when he retired, if he retired. For example, we had to check from what date he obtained it, before he applied with us or after. If it was before, he was entitled to the benefit from the date on which he applied with us. If it was after, he was entitled to the benefit from the date he retired with us. We're verifying, through our analysis, whether or not we can load the eligibility record."* *[00:32:20] "Every month we have two processes of... I mean, let's see. For example, on Monday I have to deliver the internal Contributory PGU grants, right? On Wednesday, (name) would have to deliver the non-contributory UGUs. And on the 21st, after the update, comes the external Contributory PGU. And then a second process of non-contributory PGUs on the 22nd. There are four, which are separated into contributory and non-contributory."* *[00:39:15]* (Asked about who addresses changes demanded by the Superintendency) *"The team. (Names), myself, (name). All of us who are involved in the background, because we all have to contribute, I mean, we really know what we need and what it says and how it should be seen in the background in the system. According to the criteria that they... I mean, we know... let's see, a draft regulation or law comes out, we have to study it beforehand and be attentive to when the final one is approved, because it is never the same. And based on that, (Op_A)'s team has to be attentive to see how the changes in the algorithm are going to be made."*	
[00:01:17] "Another thing that I am responsible for is the maintenance of what we call the Eligibility, which contains all the rules to decide whether a person is eligible or not for a type of benefit. (…) we are charged with precisely that, with deciding who is or is not entitled to a benefit from the reform." *[00:05:42]* (Asked about eligibility calculations for the Benefit for born child) *"We also do it here because what we do is decide who is entitled to a type of benefit, and we calculate the amount of that benefit. We say "this has to be entered as Benefit for Born Child, it has to be entered as APSB, it has to be entered as a contributory PGU, non-contributory PGU, or as a heavy work complement which are the current benefits"."* *[00:25:19] "(Grant analysts and coordinators) are in charge of this analysis, of verifying that what people complain about is actually correct. If it isn't, they respond as they should."*	Op_A
[00:00:13] "I'm a Child Benefit grant analyst. Primarily, we do the operational work. And it's, as you say, awarding grants. It's to grant the Bono por Hijo benefit, to the applicant mothers. Those are our specific functions." *[00:14:11] "We see our candidates. We check, we go through those checks, we measure a lot of things. From the date of birth, that the amount is correct. (…) But we don't always grant the same month, for various reasons. It may be that the information at that time does not allow us to keep her among the candidates, because I remind you that this database is fed by all the external and internal institutions. They feed on that. So, when it's the candidate I pass that eligibility ... and it's usually the same. And if it's different, you have to see why she changed her pension situation, but that's a database issue."*	Op_B

Ability to link oneself to the decision or task	
[00:18:37] "I know the business rules perfectly. Yeah. For the BPH, obviously. I know them perfectly, of course." *[00:36:17] "We as analysts do the tests, obviously. And once the tests are done, the request is made to IT to go to production. And that is done by (name). (…) And we check everything, we do all the tests. We make sure it's well implemented and it goes to production. And that's channeled through (name), who is obviously the boss. We just do the operational work."*	
[00:02:11] "We work based on information that comes to us from external entities. AFP, insurance companies and so on. With that information, when people apply for the benefit, we review it, we analyze it and it is granted. And these concessions are made by us, in other words, we grant them, but with a resolution from our headquarters. In this case, she would be the one we notify of the decision." *[00:03:08] "In the Bono por Hijo there are two ways of granting the benefit. One is a monthly payment, and the other is a one-time payment. I am responsible for the single payment, which is a one-time transfer to the AFPs."* *[00:07:03] "We have to be aware of the business rules."* *[00:10:31] "I mean, we review it, because (Op_A's team) the ones that give us the information and we can verify there why this anomalous case occurred. And then we review it with them afterwards. But they report to us."* *[00:17:08] "We review there, depending on the eligibility, whether it's a monthly payment or a lump sum benefit. We review that, the eligibility to grant or deny."*	Op_C
[00:00:29] "My responsibilities are... we are in charge of working all the SPS applications. I'm talking about those for Invalidity and, today, the PGU. Basically, we are in charge of initiating all the processes involved in resolving an application. From the moment it comes in, we take it. We have to identify the path that the application is going to take, depending on the conditions under which it enters." *[00:09:50] "There are also the inconsistencies, which are also reported to external IPS channels, so that they can take the necessary steps with the corresponding entities. This is so that the inconsistency in the application can be corrected and resolved. In other words, to grant or reject. (…) Then we make a request to IT. We tell them "all these applications, we need the PFP to be calculated". And they, according to the protocols they have established and with dates, ask different institutions for the information."* *[00:16:11] "We have systems available to see the history of the person. So there one can look and realize that, if they reported it at 200 and now it is reported like this. That's when you make some consultations with the corresponding entity."*	Op_D

Perception of being observed by an account holder	
Data	**Source**
[00:26:53] "But if that information changes over time, it could be that a benefit that you granted at one point in time no longer applies. Those are the problems that we have. And I tell you this because, in the internal audits that we've had, one of our problems is this. This is the biggest problem. It has to do with benefits that were once granted with the data that were in force and available and that, with the passage of time, two years later, the same data are no longer available." *[00:30:30] "Every year, yes. This year there wasn't for the Bono por Hijo, it was last year. This year they are auditing the Universal Guaranteed Pension. It will depend on the audit plan of this external unit."*	Sup_B
[00:22:34] "Of course, look... not only because I have decided it that way, but because we are in permanent audits. And the last... I think it was the last audit, which was the audit of the 27th, at least for ASIMU, some cases like the ones I'm pointing out to you were detected. And other observations. With that, in addition to the new PGU law, and a general rule that was sent to us from the superintendence at some point. The Division Chief asked us to create a working group. So we created a working group and created this project of a new development and incorporation to the system that we have of death allowance."	Mg_A
[00:16:58] "And we also have annual audits of the Death Benefit system. Where they also raise casuistry, or sometimes also improvements to the things that are being applied. In fact, they raised several normative things that have been improved and that are going to be included in this whole update of the system that is coming now." *[00:18:30] "They make a study of the data there, a strong exploitation, to control all that. Because obviously this also goes to the Superintendent's office. Monthly reports, annual reports. So, there are many eyes on these procedures, these benefits."* *[00:56:05] "Look, audits are done on all the benefits of the institution. And the focus of any audit is that the money is well spent. And well allocated. So for this particular process, for the death benefit, the audit focuses on the payments. Mainly, that's their focus. Obviously, within that universe that they take as a sample, it may come out, for example, that a person was paid who was not entitled to it."*	Mg_B
[00:40:38] "Who else is crying out inside the Institute? The Comptroller. It's permanently on top of us. It's reviewing our whole process every minute. In fact, we are now already in another review. (…) Annually, they do two or three supervisions, to see that the rules are being followed and that the procedures are being carried out in the correct order. And as they should be. They know what the results should be and they verify that the results are correct. (…) We are here permanently under review. And the Office of the Comptroller General of the Republic also does its audits practically once a year."	Op_A
[00:26:43] (Evaluations are) super important, because this is data, but exactly, it's money. So, there are projections and a lot of things here that you have to inform and report. And we have to be supervised." *[00:40:28] "Yeah, we get audited quite a bit. Look, years ago, we were audited by the Super. We have had audits from the Comptroller's Office, and lately internal audits. Over the years, I think it's good, because in the end it's getting better."*	Op_B
[00:17:56] "We have annual audits and they do the review of our processes. (…) They audit us regarding the concessions, the processes, and the rejections. They audit everything, to verify that we are complying with the norms and all that." *[00:26:25] "There were four auditors that did the last audit. Because every year we get audited. They audit if the benefits are being well granted. The processes. In general they see everything. They're very detailed, in that sense. More than anything to see how it*	Op_C

Perception of being observed by an account holder	
works and if we are doing something wrong, to correct it. They try to ensure that there is no loss for the State. (…) And they ask us for concessions, benefits, processes, everything, everything. And it is always very dynamic. Each time new situations occur." *[00:31:27]* (Asked why audits take so much time) *"(…) because of the quantities. Because they're semi-annual processes. So we have to look for all the concessions, the rejections, the mailings. For example, last time they asked us for the mails that we sent to external entities. To the AFPs. They ask us for a lot of information."*	
[00:39:56] "There are internal audits and also the superintendence always... in fact, there are reports and statistics that are sent monthly. But they are always... In fact, the Bono por Hijo and other audits, but they are internal."	Op_D

Perception of being subjected to formal and/or informal evaluation processes	
Data	**Source**
[00:12:48] "We have management indicators... let's see, each official has goal commitments. Management goals that are committed to at the beginning of the period. Goals that are qualitative or quantitative. And there is a goal that the person commits to and a goal that the management assigns to him/her. As I am just returning to the department, it was not my job to assign that goal. And also, since we are finishing the process, 2023 is going to correspond to me in its entirety. We evaluate four times a year. There is a self-evaluation process and there is a quantitative evaluation and a qualitative evaluation regarding the work of the staff member. And that's graded on a list. (…) But we have other management indicators that have to do with customer service, such as, for example, the waiting time indicator in the branches. There is a percentage that I can't remember at the moment, that people can't wait more than 25 minutes in line. (…) And we measure ourselves with that satisfaction survey, which is the same survey that DIPRES is doing for all public services. The truth is that we are doing quite well. And we have a recurrent study survey, that every three months we evaluate what is happening in each of the care centers, which allows us to improve. Because we see the three-month x-ray." *[00:19:06] "From the first, I'll report to (Division head). She would have to do the same feedback process (with me). She would have to evaluate me, because it's the same for everybody. In other words, I have to have management indicators... even if I'm in an ADP position, which at some point I'm going to have to compete for it."* *[00:19:31] "So, my direct supervisor, who is (name), will have to assign me certain goals for the year 2023. I will have to commit to some of them. And there we will have to, between both of us, agree on what I am going to commit to for 2023 and she will have to evaluate me and carry out these feedback processes, in the same way that I do with my work team."* *[00:23:21] "So, since we had waiting time indicators, we would go to a funeral home and it could take us an hour or more than an hour to receive (records), because they accumulated them"* *[00:30:53] "We have an audit department that, year by year, determines which topics it is going to audit and which branches it is going to audit. And within that is the process of assignment by death. The superintendence also audits us and audits the processes that we have. And we as a department also have, uh, audits, so to speak, preventive audits to be able to see how the procedures are being complied with."*	Sup_A
[00:08:02] "For example, for border cases, I can download a spreadsheet there with all the cases that I've entered. Not with all the emails I receive, because there are many that I reject. Or I answer them right there. But the applications that are entered for borderline cases as beneficiaries are entered there. And that's one of the evaluations." *[00:09:20] "Look, those are part of the commitments. They're measurable that they do here at the Institute and the leadership roles do it. I think it's like two or three times a year. Where you make the commitments and you commit to things that are measurable for evaluation."* *[00:41:53]* (Asked about suggestions from audits) *"That's what it reflected to us, and that's what the audit told us. "Look here are five cases of payment by difference. Why was this payment paid if it doesn't correspond? If the person was supposed to have been paid $600,000, not $650,000." So, we in this bill also work on the issue of the enhanced deficiency payment. So, now funeral homes are no longer going to be able to enter a double payment. And that was a system error."*	Mg_A
[00:04:18] "Well, I'm evaluated by my boss, which in this case is (name), my direct boss who is (name), and also complemented by the vision of the head of the area, and that's through a system that IPS maintains for all the bosses, in which you are evaluated	Mg_B

Perception of being subjected to formal and/or informal evaluation processes	
annually. And based on those grades, I imagine that the renewal of your annual contracts influences a little bit, because we are on contract." *[00:18:30] "So, this point is one of the entry points that, at the level of the face-to-face channel, they emphasize to the branches and that they are always attentive there, at this point. The second point of control that they have here is the payment times. The payment processing times for the application cannot exceed five days. I believe that this is due to operational rules. The other one is also the payment as such. That is to say, the payment both in-person channel and at the centralized level of finance to the payment by transfers, can also not exceed three days. So it has different levels of verifications."* *[00:35:27] "Well, we have goals that we are given at the beginning of the year and at this time, when we are evaluated for our continuity, they are placed if they are met. In general, we are measured... one of the factors by which we are measured is the operational continuity of the systems of which each one of us is the leader. Projects also, executed and completed."*	
[00:10:23] "We have a description in the evaluation. And ours was to grant in a timely manner, in a timely manner, so that there are not so many unresolved applications in the system. Well, I am evaluated for the PGU, the Pilar Solidario and the Bono por Hijo. In other words, they are three different benefits. (…)What interests them most here is to meet the goals: to deliver timely payment of the concessions." *[00:45:07] "The most important thing is to grant (benefits)."*	Mg_C
[00:08:58] "There are institutional goals, departmental goals, and personal goals. Those are the three areas of evaluation. The institutional goals are already defined, right? The departmental ones are also defined by other entities. The only ones I have a say in are the personal goals. And in my case, the concept is quite simple. It is the normal delivery within the stipulated time, which is five days from the review of the benefits that are in the scheme."	Op_A
[00:05:24] "(Name), what is your goal? To grant, I don't know, as much as possible in a timely manner. And obviously, without errors! Something like that. So, our goal is to grant in a timely manner, without errors. And that's what we do here." *[00:25:48] "Once the benefit is granted, statistics are done for different types of payment different types of benefit. And also, the coverage report of what we resolved is reported on it. And that is communicated at the level of the whole Subdepartment. And from the Subdepartment it's sent to the institution. So, that is reported on a month-to-month basis. (…) That is done month by month. That is the report that we have. And they supervise everything, how much we are granting."*	Op_B
[00:13:22] (Asked about how performance is measured) *"Well, mostly, it's oversight. (…) If there are major problems, they are communicated to her. For example, if there is a new modification to the law, I don't know. I don't know, and then she knows what to do. (…) (evaluation goals are) also regulated. We have to comply with certain parameters for the concessions. We call them "Management Improvement Program". We have to meet goals. In this case, our goal for this year was to grant benefits within 27 days."* *[00:34:29] "That's all regulated. We have institutional commitments. (…) The deadlines that they put on us: In a certain amount of days, to have the cases resolved. That's regulated."*	Op_C

Perception of responsibility for explaining or justifying the decision or task	
Data	**Source**
[00:15:46] "Almost 98% is solved in the customer service platforms and experts are scaled to the extent that they are unable to respond, so that an expert can give the answer by telephone. And if this expert cannot do it by phone, he/she goes to a business expert, where he/she has a deadline to be able to give an answer." *[00:23:21] "It is automated, but it still has the approval of the branch manager, because in the end we are delivering benefits, state money."* *[00:31:36] "The branch manager, before the payment is processed, is the one who signs and supervises the process in a way. There is a preventive control that is part of our risk matrix, which he has to supervise. In other words, he signs. And his signature... I mean, if he signed and didn't look, it's a horrible mistake."* *[00:45:25] "For example, the happy outcome is that somebody applies, I say yes and I pay them. The sad way is that someone applies and I have to say no. That "no" has to be so well explained, so that the person who had high expectations can understand why it was a no. So, sometimes we make mistakes. (…) Because they need us to explain the rejection. So, to the extent that the institutions in general, and in particular us, we focus on the user, on who is going to receive the positive or the negative, the view will change (…) So to say "no" to someone who has been waiting and maybe thinks that this is going to change the quality of their life, has to be explained in such a way"* *[00:47:46] "So we have to get together from the beginning to say "you are going to do this, you are going to grant with these business rules, with this eligibility process. Because you are going to know what to ask and what not to ask. And the 'yeses' we're going to tell them this way." But we're the ones who are going to say 'yes' to them. Therefore, we have to transform that "yes" into a language of citizenship. To the no's, which are the most complex, we are going to indicate it in this way, in a timely manner, which is also the most important thing in this, the opportunity."*	Sup_A
[00:18:51] "I think that feedback is given in particular problem situations. I mean, if the process comes out clean in terms of there being no incident during the process, there is no feedback. The only feedback that I see there... but it has to do with a monitoring process that we do. It's from the processing time it takes for the systems to do the mass eligibility update processes. It is a process that monitors that and it is permanent, it is done every month." *[00:31:03] "(…) You receive a copy of the report, with a sheet of commitments, where for each of those findings that were raised, it is determined who is responsible for taking the measures to mitigate or solve them. And then they check that you are complying with the deadlines for each of the findings."* *[00:34:17] "And well, you have to determine the responsibilities first. Why was that mistake made? If it was because the data was wrong, and you have no way of validating whether it is correct... in truth, the responsibility does not lie here. It is to take all the measures to correct it."*	Sup_B
[00:13:08] "For example, I get a lot of emails every day for the same type of support. Because I do support and I do the communication with the staff. When they have questions, I help them. I go online to help, for example, when a funeral home comes in and needs to know some information. They call me by phone or via Teams, or they consult me by email. Then he tells me, for example, "we could use a form to create that communication, so that they can enter the data they need into the form". And that's how a record is created." *[00:24:55] "We are looking for ideas. We work together on that. And well, when there is any information, I am the person who has to inform the branches. I am the direct contact for Death Benefits. For example, just yesterday... Since we're going into production next*	Mg_A

Perception of responsibility for explaining or justifying the decision or task	
week with the new addition that we made of the mortuary fee and these improvements that we made to the system, I did a training. We called all the branches across the country, all the regions (…) And what had to do with the customer service system and business rules, obviously it was me. So in this way, we are working with the branches. And feeding back to each other." *[00:27:16] "We... The headquarters is supposed to be in charge of asking us for what they need or for us to review what, by virtue of what comes in, what really relates to us. With the stuff that we are in charge of."* *[00:40:46] "(Edge cases) are clear results of this lack of business rules that were missing there in the system. And that's why the improvements are being made. As I told you, we already start operating next week with these new rules, which should decrease, at least about 80% of the border cases."* *[00:43:58]* (Referring to an erroneous case of overpayment) *"(Another unit) had to communicate with the funeral home and ask for the restitution of these monies that had been underpaid. And that generated the audit alert. And we had to work on this improvement (…)No, I don't think so. I don't feel like it's really my responsibility. But I do feel like my responsibility is to try to make this work better and better every day. That's what I feel. It's not my responsibility, but I'm in charge of making sure that it works better and better every day and that we make fewer and fewer mistakes."* *[00:46:38] "What I'm doing now, I'm supposed to be the one in charge of making this work and trying to make sure that (anomalous cases) don't happen and trying to find a way so that, for example, these pay-for-difference payments don't happen. So, in a way, even though they don't tell you that you are responsible, you are in charge and you have to be in charge. Always trying to make sure that everything operates in the best possible way and to try to prevent these errors from happening."*	
[00:07:12] "We have a designated functional leader in each project. In this case, for the death benefit, for example, our functional leader is the face-to-face channel, who are the ones who manage it. And they are the ones who, at the end of the day, are like the owner of the benefit. And they're the ones who define to us, "Look, for this benefit we need these rules." And obviously, once they raise those requirements, we as IT, we start to see, ready, where can we get this rule? How can we validate? Because for every person that comes in, you have to validate their benefit." *[00:21:01] "Obviously, if we see early warnings that could be impacting or could impact the operation, we also raise them. In other words, we are always in feedback, both of us. So, if you ask me, my role is mainly to support the business with operational continuity, generally at 100 percent."* *[00:21:48] "So, if you normally have problems with third party systems, such as, for example, the civil registry, with which we are going to validate that the person has indeed died. So, if that system does not respond, obviously we have to make the escalations with our counterpart in the respective institution so that they can see the problem and escalate it. Because then they block the income of the applications, and so on."* *[00:25:19] "Obviously, as I was saying, although we are responsible at the technical level for keeping it updated and operational, the business is obviously also responsible for telling me "hey, this regulation came in, now this rule is not like this. Take it out and update it with this one"."* *[00:37:51] "Many of those messages also have to be validated by the legal area, to deliver certain arguments as to why the person could not apply. You also have the communications area, the operations area, the training area within this work table, which*	Mg_B

Perception of responsibility for explaining or justifying the decision or task	
also in the evolution of a project. They interact at different points of the project, both at the beginning and at the end." *[00:39:10] "(…) as I tell you, in agreement with and in review with Business, we see if the algorithm is... for example, is it just adding a new rule to it and what does that rule imply within the defined flow."* *[00:48:16]* (Asked about the practices to maintain business continuity) *"Because it allows us to, as they say, proactively raise a certain alert to the business, and not the business raising it to you."* *[00:54:08] "If there's an error in the system, if the application didn't allow you to pass an assignment for death that you were entitled to, that's still triggered by my business. Because I have no way of knowing that someone came to the branch... The business triggers it for me, we analyze it together. On the functional side she tells me "this should be this rule. And I validate if the algorithm has that rule or if the rule is there and if it's not being followed correctly. And then it's corrected depending on the incidence, where it is. But that's how we generally operate. The leader always has to be hand in hand with the PM, which in this case is me."*	
[00:01:33] "And the updating process is done between the 15th and 18th of each month. In this process, all entities have the seventh working day of each month as a date. External entities such as the AFPs, insurance companies, the IPS itself. All the external entities have until the seventh working day of the month to send the bases to the IPS. They load it into a kind of juicer. All the information is received there. And that feeds our pension database, which is where we draw eligibility. With the latest information available, we resolve the applications. (…) We take out the unresolved applications with the eligibility that came in and we compare it with what is coming in now. And then we analyze against eligibility: if he is alive or not, if before it said he was not affiliated and now he is. You have to change the ... But if before it said he was affiliated and now he is not, we have to see why there is an error." *[00:21:59] "That application is pending until we get a response from the AFP. So what do we do? We remove the applications that are in that condition. We wait for the update. And if it is the same, we send an e-mail to the AFP asking if this person is processing a disability pension with them. (…) Then you have to go to the AFP to do the procedure. That's not with us. If the AFP says that the pension is being processed, we leave the application unresolved. And we wait until the next update, which may be the following month or two or three months later, when we are informed of the pension received and paid."* *[00:23:45]* (Asked about sending requests for data to AFPs) *"We send an email, informing that the person applied, or a list actually, because there are several cases. "Please inform us if these people who applied for the Solidarity Disability Contribution are processing their pensions with you. If they are not applying for a pension with you, the application will be rejected and the people will be sent to each entity to process their disability pension" (…) Me and (Operative). Between the two of us we do everything. (…) Either (name) or myself. And they respond, like I'm telling you, in the same email. They add a column to the lake and they put "Processing pension", "yes" or "no". "Has balance", "yes" or "no"."* *[00:43:47] "The (external) entity is the one that has to send us their PAFE indicator, for example (…) We send personalized emails to the AFP people, so that they send the correct information. And they reply "yes, it will be sent in the other process". But it is the responsibility of each entity to send us the information."*	Mg_C
[00:10:38] "Normally we are noticing, or each one is taking note, of the problems that we are finding in the Eligibility. My task in that case, they tell me: "You know what? This was supposed to be solved in a given way, but it is being solved badly."	Op_A

Perception of responsibility for explaining or justifying the decision or task	
[00:28:44] "For the rejections, it is much simpler. All these cases have to be rejected, even though they were pending for several months, because we were waiting for them to give us some kind of information that was missing, that information arrived and with it we reject them. (…) As long as the residency information has not arrived, they cannot make a decision even if they give you the eligibility code. You still have to meet this condition. Once it arrives, they verify that you meet the residency (requirement). Then we can process it as granting (the benefit)." *[00:40:33] "For example, the Payments department. If something seems strange to them, they all get up and cry out."* *[00:44:07] "(…) we're not satisfied until we find an answer that's either (someone saying) "hey, I made a mistake in my assessment, what Eligibility said was right." Or we find out that the Eligibility has an error and we correct it immediately."*	
[00:16:24] "We've always been making improvements anyway. We have incorporated other eligibility codes, precisely what they have to do with AFPs. Other rejection codes. We are looking at the situations and we are always improving." *[00:19:27] "I would imagine that the databases are monitored. There is one person, which is (name). He's the one that sees the database that receives all this information. That is obviously what allows us to deliver the product. He receives, loads. If there are errors, I imagine that he will communicate, but that already depends on the database."* *[00:39:38] "Personally, my direct management, has always told us that the mistake is everybody's mistake. Therefore, if there is a mistake by one person, we have to face it and solve it as a team. Depending on the size, as a team, as an institution, as a department, and so on. But we have to face it and take all the measures to correct it in the best possible way."*	Op_B
[00:23:37] "We report and in the end it's up to headquarters to make the corrections there."	Op_C
[00:27:36] "There are people who have certain deficiencies in different areas. (…). The code changes. Therefore, we cannot grant, because the code does not allow us to grant. What we do in these cases is always to ask the AFP what the situation is." *[00:30:34] "Uh... well, I don't know whether to say it, but I'm going to say it. The TGR once misreported a case. Because of what I was telling you. Amounts that... we are talking about pensions of grace, alright? They were very high. And what was done then was to detect them. And the TGR was contacted, and the TGR, I don't know if the same day, seems to have analyzed, reviewed and corrected it. But that's what's on my mind at the moment."*	Op_D

Ability to predict possible sanctions or rewards for the decision or task	
Data	**Source**
[00:54:33] "To the extent that the official is clear about what his framework of action is, his field of action, so to speak, he knows where to move. He knows that he cannot run this way. Because if he runs this way, he knows what the consequences could be. So, as long as he moves within his framework, which is well defined and clear, this institution functions as it does."	Sup_A
[00:48:43] "No, no, no, there's no, there's no sanctions. Nothing. No, there are no sanctions or consequences. We always look for, try to improve this or see how, we're going to work, for example, in contingencies. If the system goes down."	Mg_A
[00:55:15] "I feel like the consequences... I don't know, no because we always handle it together. It's not something that only YOU have to be responsible for. Because there are things that, as I say, there are cases that maybe the business didn't detect. And there are other things that maybe we didn't understand well. (…) And when they jump, they adjust, but they adjust in the agreement. Not by blaming each other, but by saying, "Yeah, how should this be handled? Like this, this way. That's it. And it is corrected."	Mg_B
[00:23:10] (Asked if the eligibility process is done manually) "No, impossible to do it manually"	Op_A
[00:41:01] "Look at the last (audit), in the previous ones they didn't find anything, the processes were all fine. It was a matter of course, to make sure that they don't attack us."	Op_B
[00:25:13] "Sanctions? No. No, they're mostly suggestions. As I was telling you about the payments that were being done, and the decision to suspend it. More than anything they were corrections (...) a regulation that said that "you have not suspended the benefit, you have to take responsibility for it"?, no. Everything has to be regulated. (…) In this case, it was an audit that they did on us. And in that audit, the recommendations were made to (Sup_B)."	**Op_C**

Presence of instances of contestation or non-alignment with the ADS	
Data	**Source**
[00:32:38] "There are some who jump on the bandwagon. There are some that find it more difficult, but at this point, many years have passed, it is already part of the process. And there is no conflict there." *[00:34:37] "Today it's the process that exists. It's no longer questioned. It already is. Because there is no manual. There is no alternative. Because at first we were with both of them. Then, when we were with both, because suddenly the system could crash, or something like that, today there is only one. So since there is only one, at this point there is no longer any conflict."*	Sup_A
[00:43:02] "Look, in the current death benefit system, there are a lot of cases that are called "borderline cases". Because of what I was explaining to you with these new rules that were created by the PGU, many cases were left out. So, what we are doing today, until this new system comes out, because as I was saying, (we have) operational continuity... is the entry of these cases that are not taken by the system, but the executive knows that the death allowance benefit does apply to them." *[00:56:05] "So, all of that is highlighted in the audit. And that also helps you to... I mean, I'm talking about this was created in 2018. We're in 2022 and I would tell you that when they audited the system in 2019, they obviously found several flaws. Several things that also at the operational level were not right, and that the respective units had to correct. We also as a technology unit, maybe, then put more alerts and more rules, right? (…) And it turns out that the rule did not apply, for example, to the funeral home, but applied only to the natural person who was going to collect the benefit directly, because it was the person who incurred the funeral expenses. So that, of course, the audit raises it to me: "Why is the system doing this?" I tell him that the business defined this for me. Then he goes to the business and says that this is misapplied. And business says, "Okay, that's it, we'll correct it". And that's another thing... when audits come up, obviously there are things that you can't get to and address because you have other priorities as well, right?"*	Mg_B
[00:28:56] "I mean, the eligibility worked the same way, but we didn't have as much knowledge, so to speak, of the analysis of the eligibility record. I mean, we relied a hundred percent on what they gave us. They would say, "Yeah, here's the eligibility record for the applications. Load it up." And we loaded it, but without further analysis. (…) There was no questioning on our part as analysts. This was evolving and new things were appearing. Well, the Bono por Hijo was incorporated in 2009. Other things started to appear that we began to question and to verify if it was right or wrong. Like taking more autonomy. But before it was like, do this and that's what we did. That's all."	Mg_C
[00:05:24] "What do we check? That we obviously have a series of controls in place. But what we check is that the code that was given effectively corresponds to the pension situation. But everything is correct. That works perfectly. In other words, there are no errors." *[00:22:50] "So the amount of errors is minimal. There are no errors. They do not exist, but they are differences in information, because remember that these are databases that are loaded in one month, others that we are using in another month. Therefore, it can give us a difference there. And you have to analyze."*	Op_B

Presence of instances of contestation or non-alignment with the ADS	
[00:24:57] "I think it simplifies things quite a bit, because since it is so massive, so many applications are being resolved, I can't imagine any other way to work with so many applications. It's impossible to look at it case by case." *[00:26:19] "It makes sense to me at least, it makes sense to me and I wouldn't think of any other way. Maybe for the more computer-knowledgeable people... Yes, but for the moment it's what has worked for us... and a lot of things have happened to us."* *[00:33:40] "I think that when the information arrives... I think that especially the amount, questioning the amounts of a benefit that another institution pays... I think that... I don't know. I don't think that's questionable. Because it is assumed that all the data that is transferred here is regulated by the superintendence and they are formats and it is done every month."*	Op_D

Perception of overall trust in the ADS	
Data	**Source**
[00:38:31] "I think it's very positive, I think it's very positive. I think it's a step forward. And I think that, at this point, the branches have realized that it's a great gain that we've been able to automate the death assignment."	Sup_A
[00:26:53] "First of all, it's a tool that's there. That works...the right to the benefit and the amount that people are entitled to. I feel that it's positively evaluated by everybody. Ultimately, the only negative perceptions we can have about the process have nothing to do with the algorithm." *[00:29:58]* (On the teams' opinion of the ADS) *"Absolutely positive. And the problems that we have have to do with the information that we use to work with."*	Sup_B
[00:14:38] "For example, sometimes there are not only entry problems in the system, but also when you type the RUT of the deceased in the system, the eligibility registry or the Civil Registry shows another name. This is a casuistry, because it does not happen all the time, but it does happen from time to time. That is to say, the system suddenly still delivers perhaps, you could say, some error." *[00:21:04] "We were working... even now we are working on a project to improve this system. The thing is that the system was still missing some business rules. Like the one I gave you as an example. What was happening? When the RUT of the deceased was entered, the system automatically said that this person was receiving an AFP pension. But uh... the system was not, like, smart enough to say 'ah, no, this person is receiving a survivor's pension, but in fact he has no affiliation to the 3500, no benefit with us. Therefore, he is entitled to the same with us (the benefit)'."*	Mg_A
[00:01:33] "These errors do not mean that we have an error, but that the AFP sent us the incorrect data. We call this inconsistency. It is not an error, it is an inconsistency, because the AFP should have informed us that data." *[00:21:00] "Let's see, yes, the algorithm has got it right. If you ask me, is it bad? No, it's good. It gives us the correct information. The problem is when the entities don't send the correct information. And then the application is going to be pending. And we have to ask the AFP to provide the correct information."* *[00:37:56] "(The problems) of the eligibility? It's just that I find that the eligibility system has no errors. The result that it gives you is according to the data that the different entities provide."* *[00:43:04] "(…) if the AFP tells me that the person is not a pensioner, it tells me that the person is an affiliate, but it does not send me the PAFE of a non-pensioner affiliate either, I cannot resolve it. But the eligibility is working well. It is giving me the correct information."*	Mg_C
[00:45:02] "We assume that the Eligibility is okay. It's correct and the process is responding the way it has to respond. When an error occurs, it is because of a change in regulation. Then the Superintendency tells us that we have to change the regulations. (…) Okay, no drama. But we have to make sure that this is right." *[00:50:10] "That's our phrase. "Eligibility is okay. It's always okay." If there's any problem, it was because of the change of regulations or because the data is wrong. In fact, it has happened to us... if you calculate from 2008 until now, they do two audits a year. How many years has it been? And in all those audits they have never found a problem in Eligibility."*	Op_A
[00:05:24] "Look, we have a really good process. It's practically error-free. It's error-free. It works flawlessly."	Op_B

Perception of overall trust in the ADS	
[00:11:20] "(…) as I tell you, the system works very well. There is no problem." *[00:30:53] "We're always asking the IT guys who are the ones who are really brilliant, in that sense. They improve, and they minimize error. And we do it in a more timely manner. We deliver the benefit in a more timely manner to our users. I would say yes, we have a generally good outlook on it. Because, as I tell you, it's all automated."* *[00:33:07] "Personally, I wouldn't talk about errors, because it's data, it's information. And it's all automated. And as I said, it works quite well."*	
[00:21:50] "It's been very easy for the whole process. Because it's all systematized and you're handling a lot of applications. The system is makes it all very easy." *[00:24:34] "I find it user friendly. The information that you see on the system I find it user friendly."*	Op_C
[00:16:11] "It's like experience. I think it's experience. Because at the end of the day, the system... if an entity gives you information, you trust that information. We can't be doubting all the data." *[00:17:45] "(…) I think it's very complex because you have to trust (the data of the ADS). Obviously there are validation processes, but how can you mistrust an amount, a benefit that was reported by other institutions... Because in the end, if there is validation. (…) Within the validations I would say that there could be inconsistencies. That is, within this whole package, the rules behind the eligibility, a person tells me on the one hand that he is a pensioner, and on the other hand that he is a contributing member at a private pension. So, all these things, I think that you single them out and the way to solve them is by consulting through Customer Service about the inconsistency."* *[00:23:31] "I really like it. I mean, it's a super friendly way to summarize so much information about a person. Because there are so many conditions, so many possibilities that a person can have. And in my opinion, they're all clearly defined by the eligibility codes. (…) And everything has a different code. So we, when we look at the code, we already know sometimes without... logically, we need memory aids sometimes, but you can already imagine what information is going to come in the record. In other words, everything has to be coherent, and this simplifies things a lot."* *[00:27:36] "I think that the system does not give errors per se. But what we see is the information that the institutions report. But maybe it's not a problem either, it's just that it calls our attention."*	Op_D

Preference of the ADS over a human alternative	
Data	**Source**
[00:23:21] "It's more practical. Alright?" *[00:25:13] "But we were also going to decompress the demand of the branch, particularly the funeral homes."* *[00:27:49] "I think it has to do with economic resources, whether it's worth doing it or not. We used to grant one by one, so to speak. I would take a file, review the traditional history of that file and grant. The analysts, the people who worked, were assigned daily quotas of files to work with. Therefore, they had granting times, not very long, but there were still delays. In 2008, when the reform was born, it was expected... and it was just like that, that there would be more people applying. Therefore, we had to look for a mechanism that would allow this to be done in a quick and timely manner."* *[00:39:50] "And because they realized that it's faster, that it helps them more, that it creates less administrative workload for them."* *[00:40:18] "It's not just the equipment, it's the institution. We are users of systems that have been automated. And that the institution, obviously moving forward, because we have to become... we are a modern institution, has been installing different applications that are moving towards a higher degree of automation."*	Sup_A
[00:40:26] (Asked if the ADS makes their job easier) *"Oh, of course. I mean, nowadays the user, the employees in this case, and the funeral homes themselves... when the Death Grant system came out, they thanked us a lot, because one thing that you have to do manually... think that, for example, a funeral home like Hogar de Cristo, in one day, they can enter 100 applications. (…) Imagine, all day long, going through paperwork, going through the steps to get them to sign off, "I paid it, I didn't pay it". You didn't have automated control. It was all manual. So, at the most, they had Excel spreadsheets, where they were entering and that was shared with the branches, so that the same funeral home wouldn't do the same thing at another branch, you know? (…) They don't have to go and fish out the bunch of documents and skim through it. They see everything on the screen. They check, they just check things. (…) It's much faster to process an application"*	Mg_B
[00:21:59] "(…) if it weren't for eligibility, we wouldn't be able to do anything." *[00:33:59] "I mean, I insist. We couldn't work without the eligibility system. I mean, that's our input. That's our input in order to be able to assess an application. Without that, we can't do anything. I mean, it's super important for us."*	Mg_C
[00:47:01] "You have to try to worry as little as possible about the eligibility itself, so that you can worry about other issues. Find other kinds of problems with the concessions. Not so much about Eligibility. (…) By not having to worry about whether the eligibility is correct or not, we can devote effort to other kinds of problems. (…) I mean, if there are 100 applications, the time to grant is five days. So, the evaluation falls in that line. Did you go over the five days? Why did you go over the five days? What is the reason why you went over the five days? In the case of our Mass Processing, we are subordinated to the time, more than to the eligibility process itself."	Op_A

Preference of the ADS over a human alternative	
[00:28:48] "The automated system? It's a great working tool. Because when I came, at the beginning, there wasn't so much automation. It was all very manual, so there were a lot of errors. Many, many, many, many. At the beginning it was manual. (…) In the beginning, when the reform was first installed in 2009, for the BPH in 2008. It was manual. There was nothing automated. I would imagine that the files would be generated by IT, here they would be reviewed manually. There were no programs like the ones we have where they tell us "this is here, this is the amount, this is the difference". Today we have everything. So, in that sense, we have been growing and it has been integrated into our needs, as an analyst, which gives us much greater security that what we are doing is right. That we are delivering a benefit in a timely manner and in the right way, which is our ultimate goal."	Op_B
[00:23:31] "I can't imagine any other way of working with so much information."	Op_D

The bureaucratic accountability chain as a source of trust	
Data	**Source**
[00:54:33] "I believe that we have been very concerned and responsible to be able to order all our procedures. We have procedures for absolutely everything. Protocols for everything, because as we have to unify particularly what has to do with the area of channels, what people say throughout Chile and in all the channels of attention, in a fairly similar way... everything is very structured. And that also allows us to carry out controls in a better way. Because if I have how and on what basis to make a check, it is easier for me to control. But if that were not stipulated... besides, in public administration, there is a dogma that says that 'what is not written does not exist'. (…) So I feel that this is a great value of this institution that we call the IPS. That everything has been formalized. We have an audit department that controls us, that makes preventive controls. We also have proactive controls. We also have an internal comptroller department that reviews the largest concession processes, which involve state resources. (…) And that is the best that can happen. I'm not saying that the other services don't have them. I don't know, because I haven't worked in another one. But at least for us... It's something that I always tell our civil servants. The procedures are to take care of the civil servant."	Sup_A
[00:33:12] "If we're talking about the role that I play, I think yes, well. Orderly. I think that... because yes, we work together in an orderly way, but each one with their own subject. And well."	Mg_A
[00:34:31] "I mean, for example, I don't remember how many fields there were. But they were a lot less in the eligibility registry compared to the fields that we have today. (…) when new benefits come out, for example, for the PGU, we get together with (Operative) and (Op_A)'s team. And we talk, with (Sup_B) too. We discuss the rules, all that, and we generate actions for them to implement in the eligibility registry. They modify the algorithm, they make sure that we get what we need, in the end."	Mg_C
[00:39:54] "The truth is that all parts of the process have.... it's not oversight that we have, but a lot of external feedback. For anything that deviates from normality, there's always somebody crying out. We're lucky in that way."	Op_A
[00:37:08] "And we check everything, we do all the tests. We make sure it's well implemented and it goes to production. And that's channeled through (name), who is obviously the boss. We just do the operational work.(…) I personally like it a lot. Because it gives me confidence. Regardless of the fact that they may exist, I don't know. It gives me a lot of confidence because everything that comes from the Super is simply channeled through the headquarters. And one reviews and it gives me confidence in what we are doing. That is very important."	Op_B
[00:29:12] (Asked about how they perceive being constantly supervised) *"Excellent, because now I'm informed if a web request was made from a Chilean IP address or a foreign IP address. So all of that is checked. (…) (I perceive them as) necessary. I think it's necessary and good. All these audits are useful for us to see if we are working well, or doing it wrong."* *[00:37:04] "Yeah. It makes the work process easier for us. For anything, you send a situation email and they notify (Sup_B). (…) I don't see any big problems and it's a very close relationship. Any notification, they are notified. There is no problem there. (…)And we're close. That's why. That's why we're with the internal IT unit and with (Sup_B), we're very close. And with (name) we're next door."*	Op_C
[00:04:01] (Asked to describe the team's feedback processes) *"There have been several changes that imply that we are very up to date with the new challenges that have come to us through the new benefits. But we are always in communication. Well, now, more directly. But before, it was the same through Teams. There has always been communication. And the important thing is not to keep quiet. If you find something, always be talking."*	Op_D

The bureaucratic accountability chain as a source of trust	
[00:13:19] "Well, the boss is always... because we work side by side. I mean, my boss also does things... grants, I mean reports. She's involved and knows how everything works. And she's been there since the pension reform began in 2008. So she's always on the lookout. If there is any case that calls our attention, we send her an email and if we have to raise an alert about something, they do it. Always a good attitude, from all the colleagues in the unit and from the chief's office. And from my boss's boss as well."	

APPENDIX B: Interviews

This section lays out the interviews that were conducted for this thesis' data collection. The associated theme code can be found in the column to the right. For ease of reading, data was color coded according to their associated to indicators.

Furthermore, recurring themes that were not stipulated in the operationalization, such as "*the bureaucratic accountability chain as a source of trust*" (see **5.2.3**) was coded as well. Lastly, to disclose the interpretation process of qualitative data, some data was highlighted as a "predictor"; that is, data were the variable is not overtly mentioned, but arguably alluded to in the context of the interview.

Variable	**Name**	**Color**
Independent variable	Awareness of the bureaucratic accountability chain	
	Perception of the bureaucratic accountability chain	
Dependent variable	Disposition toward algorithm use	
Alternative explanation	The bureaucratic accountability chain as a source of trust	

[REDACTED]