Discovering the Impact of Regulation Changes on Processes: Findings from a Process Science Study in Finance

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Abstract

Regulatory changes such as new environmental, social and government (ESG) requirements can profoundly impact how organizations operate, especially by altering their business processes. Yet, we still know little about the connection between the implementation of regulatory changes in corporate information systems (IS) and their dynamic effects on business processes. This study addresses that gap by investigating how regulatory changes, once embedded in an IS, affect the trade order process of a European financial institution. Conducting a process science study, specifically using both digital trace data and qualitative insights, we identify patterns between regulation implementation and process performance indicators. Our findings show that these indicators shift dynamically after regulatory changes and that such shifts are shaped by contextual factors such as employee experience. These insights underscore the need to move beyond static views of compliance and toward a nuanced understanding of how regulation implementation unfolds over time in technology-mediated work environments.

Keywords: Process Science, Regulation, Change, Business Processes, Digital Trace Data, Dynamics

1. Introduction

External regulations such as ESG regulations are a crucial part of legal requirements that organizations must adhere to. Regulations determine the way and the boundaries in which organizations can carry out their work (Butler et al., 2023). Hence, by design, regulations, and changes thereof, have a direct impact on organizational business processes (Zasada & Fellmann, 2016). For example, they affect organizational business process design and monitoring activities and are typically covered in process

governance initiatives. More importantly, the effects of external regulations and regulatory changes are not static and simple to deal with; rather they are dynamic and require continuous attention (Fast et al., 2022).

However, managing dynamic change, especially in the context of regulation implementation, is inherently difficult. By regulation implementation we mean the integration of external regulatory changes into an organization's operations and IS, ensuring that processes and their activities remain compliant with the boundaries of regulatory requirements. Unlike one-time changes, regulatory dynamics often unfold in a piecemeal, incremental, and sometimes ambiguous manner, making it difficult for organizations to respond in a timely and coherent way (Wurzer & vom Brocke, 2025). Regulatory updates can be frequent, come with unclear interpretations, or evolve as supervisory expectations shift – introducing uncertainty and procedural volatility into business operations (Grisold et al., 2023). Such volatility challenges the ability of organizations to maintain compliance while also achieving process efficiency and effectiveness. In particular, dynamically aligning business processes with evolving regulatory constraints creates tensions between stability and flexibility, compliance and agility, as well as formalization and adaptation (Currie & Seddon, 2017). This problem is especially acute in highly regulated sectors such as finance, where even small delays or misinterpretations in adaptation can carry severe reputational or financial consequences (Currie & Seddon, 2022).

While research, especially in the finance field, highlights the importance of external regulations for organizations and their respective consequences, the connection of regulatory changes to business processes is still relatively unknown. So far, Business Process Management (BPM) research has only considered regulatory changes superficially. For

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instance, notably, Sadiq and Governatori (2015) focused on segregation-of-duty constraints and compliance requirements by modeling controls and enriching processes with semantic annotations. Similarly, Fdhila et al. (2015) explored the intricate relationships among processes, emphasizing the necessity for comprehensive analysis and evaluation of the impacts of process changes, including alterations in process choreography on a scenario-based level. However, such considerations are important, because regulations not only determine the boundaries in which a business process can operate, but they also have to be continuously adhered to when external requirements change.

This raises a central problem: organizations must not only be compliant at a single point in time but also ensure continued compliance over time as regulations evolve. While such a dynamic adaptation of business processes to external regulatory changes is crucial for organizations, little is known about how regulation implementations affect the execution of business processes over time.

In this research, we follow a process science approach (vom Brocke et al., 2024) to understand the dynamics of business processes following regulatory changes by using digital trace data and qualitative insights to understand how specific actions within business processes and patterns of action change over time (Feldman et al., 2016). Our core contribution is empirical and methodological: we demonstrate the value of combining digital trace data with qualitative insights to capture the dynamic effects of regulatory changes on business processes. In particular, we address the following research question: *How does regulation implementation affect the execution of business processes?*

To answer this overarching question, we look at how an organization dynamically adapts its business processes to cope with regulatory changes. We draw on an empirical case of a financial institution where regulations significantly impact operational processes to understand how business processes dynamically change after regulation implementation.

We leverage digital trace data from a trade order process, employing process mining techniques (van der Aalst, 2016) to capture process changes from multiple perspectives (Grisold et al., 2020). Additionally, we incorporate qualitative contextual insights, through interviews, internal documentation and observations, from the organization that allow for the investigation of dynamic process changes following regulation implementations.

We make two key observations. First, we show how business process dynamics captured through key performance indicators such as throughput time,

number of activities, or number of process violations change after regulation implementations, which highlights the importance of considering regulatory changes as contextual factors (Franzoi et al., 2025; Grisold et al., 2024). Second, we identify patterns in regulatory changes by categorizing the types of changes, their purposes, and the resulting impact on processes. Our research points to a variety of implications for BPM research. Particularly, we delineate what it means for BPM to look at regulation implementation as dynamic change. This reorientation highlights that BPM systems and practices must be designed not only for compliance assurance but also for adaptability over time. Building on this, we discuss potential avenues for future research as well as implications for practice.

2. Research background

In the contemporary corporate landscape, strict adherence to regulations has become an imperative undertaking for all businesses (Becker et al., 2016). In its historical perspective, regulation is seen as a bi-directional process involving a regulator and a regulated entity (Gunningham & Sinclair, 2017). This conventional understanding means that one party (the regulator) establishes legal norms that the other party (the regulated entity) is required to adhere to.

Compliance, in its broader context, refers to an enterprise's capacity to conform to the extensive array of regulatory requirements imposed on its operational activities (Davydova & Makarov, 2021). The necessity for compliant reporting exerts pressure on organizations to improve their business processes dynamically in alignment with these regulations (Hashmi et al., 2016). Despite established deadlines, many organizations find it continuously challenging to implement their compliance endeavors in a timely manner. As a result, compliance with regulatory norms constitutes a significant objective for organizations and plays a vital role in aligning with strategic BPM initiatives (Rosemann & vom Brocke, 2010).

BPM as a systematic approach that organizations adopt to design, model, execute, monitor, and optimize their business processes, aims to improve organizational performance by managing processes with strategic goals (vom Brocke et al., 2014). Therefore, BPM is especially critical in regulated environments because it enables businesses to maintain process consistency, transparency, and agility – all essential for meeting compliance requirements. Integrating BPM practices facilitates the continuous improvement of processes, which is vital for adapting to changing regulatory landscapes.

It is especially crucial for business processes to operate within the defined boundaries of regulatory standards, often referred to as norms in a legal context (Currie & Seddon, 2022). These norms govern the behavior of business processes by imposing restrictions on how activities should be conducted and penalties for violating prescribed practices (Hashmi et al., 2016). Consequently, organizations bear the responsibility of ensuring compliance with a multitude of regulations. Managing the dynamics of the rapidly evolving regulatory landscape is a task that demands continuous organizational attention (Rosemann & vom Brocke, 2010). Among the drivers of these dynamics are fast-paced business rule changes (Wurzer & vom Brocke, 2025), based on constant new regulation, deregulation, and re-regulation (Currie et al., 2018). By business rule changes, we refer to updates deployed in an IS to reflect evolving compliance requirements, where regulatory mandates are embedded into a rule-based IS.

In this context, BPM serves as a critical enabler for regulatory compliance because it structures the way processes are governed and controlled. By leveraging BPM tools and methodologies, organizations can embed compliance requirements directly into process models, ensuring that regulatory constraints are adhered to during process execution. This structured approach not only mitigates compliance risks but also promotes transparency and accountability, which are key to internal and external audits.

Keeping pace with those drivers requires an IS that can be dynamically adapted. Given the extensive array of business activities that an organization provides, the automation of compliance maintenance via business rule adoption becomes imperative. Consequently, methodologies have been developed in the past to automate aspects of compliance management, including compliance verification. These techniques facilitate the pinpointing of compliance issues within process models (Awad et al., 2009).

To effectively monitor and understand these dynamic processes, researchers increasingly utilize digital trace data, which provide detailed, process-driven insights into organizational activities and their socio-technical context (Hartl et al., 2023; Vaast, 2025). Digital trace data consist of records generated through user interactions with digital technologies in personal and organizational contexts (Berente et al., 2019; Howison et al., 2011). These data comprise discrete events (e.g. event logs including certain properties) that specify when and how particular activities take place (Pentland et al., 2021). By leveraging such data, organizations and researchers

can gain a clearer picture of process dynamics, supporting more informed compliance management and process adaptation (Franzoi et al., 2025).

In the nexus of changing external factors (e.g., changing or emerging regulations) and process transformations, ensuring compliance becomes not only a regulatory obligation but also a strategic imperative for maintaining operational integrity and fostering process adaptability (Becker et al., 2016). The capacity to dynamically adjust processes in response to shifting external requirements is essential, requiring proactive measures to anticipate and address unforeseen challenges. Implementing robust and proactive approaches to process change enables organizations to not only ensure regulatory compliance but also provide organizational resilience in foreseeing and responding to external stimuli (Baiyere et al., 2020; Röglinger et al., 2022; Sadiq & Governatori, 2015; Wurzer & Plattfaut, 2024). This proactive adaptation underscores the criticality of integrating adaptive setups within dynamic process changes to effectively address evolving regulations and their impact on business processes.

3. Research method

3.1. Research setting

This study draws on a case from a financial institution located in Europe to investigate how regulatory changes shape process execution over time. Specifically, we examine process adaptations in response to evolving compliance requirements within the organization's trade order process.

The case organization staffs approximately 5,500 employees worldwide and offers a wide range of services, focusing on private and institutional banking. The financial institution manages assets of wealthy families and companies based on traditional values since several decades. Its systematic investment processes, sound data analyses and portfolio theories make it stand out from its competitors. Additionally, the institution has a strong focus on sustainability and philanthropy, which influence its investment strategies. Despite its traditional values, it provides digital services and tools for its customers and especially for its relationship managers to facilitate their client relations. Within its trade order process, client advisors enter trade orders in an internal tool, execute trades, and provide an investment proposal to their client.

The trade order process consists of six process segments, starting with the first contact between the customer and the client advisor and ending with the fulfilled investment proposal. Consequently, the

reference process model is divided into six segments: Segment (1) "Define Situation," acts as the starting point for any trade order case. Here, the client advisor gathers essential client and advisory information. Segment (2), "Construct Portfolio," is where the trade is entered by the client advisor. Simultaneously, the tool performs compliance checks via business rules in the background to ensure investor protection. Segment (3), "Client Documents," focuses on verifying product documentation. The tool again follows business rules to determine which documents are mandatory, recommended, or optional to provide to the client. The client advisor then can manually select the necessary product documentation for the client's information and investor protection. Segment (4), "Review and Send Documents," takes the output from Segment (3) and assembles an investment proposal. The client advisor reviews this proposal and then sends it to the client. Segment (5), "Place Trade Order," involves the generation and execution of trade orders, and, if necessary, a compliance review. Segment (6), "Document Outcome," serves the purpose of archiving all documentation related to the order for audit and regulatory compliance. These six process segments work together to ensure a structured and compliant process for handling trade orders.

Adopting a process science research design (vom Brocke et al., 2024), we combined computational and qualitative research methods. In total, we collected almost 17,000 process executions (i.e., cases), executed by 539 different client advisors over a period of six months, starting in June 2023 until November 2023. Throughout the same period, we collected data on five regulatory changes, included in five maintenance windows (MWs), that were implemented through the IS associated with the process (i.e., trade order system).

We conducted further investigation into three selected regulatory changes based on their significant potential impact on the process, categorized under function-based and content-based regulation types: (1) Pre-Trade Documentation for Foreign Exchange Trades: Introduced during the second MW, pre-trade documentation requirements for foreign exchange (FX) trades were implemented, under content-based prudential regulation. While this change may not affect activity counts directly, it alters the sequence of actions by necessitating pre-trade documentation for FX transactions. (2) Additional Sustainability Reporting and ESG Regulation: During the second MW, supplementary sustainability reporting fields were automatically integrated into Segment 3, requiring no manual intervention from client advisors. This function-based environmental regulation streamlines reporting processes and ensures

compliance with ESG frameworks. (3) New Product Documents for Clients within a Specific Jurisdiction: Implemented during the fifth MW, the issuance of new product documents specifically for a group of clients reflects compliance measures under content-based conduct regulations (e.g. GDPR).

As a response to external regulatory changes, the development of the trade order system through deployments is based on change requests submitted by the business and compliance departments. Typically, such change requests are submitted to the IT staff with a lead time to ensure proper testing of the changes in the IT system. To implement these adjustments, the financial institution defined monthly MWs that contain the deployments of the changes on the productive system environments.

3.2. Data collection and analysis

To study the described research setting, we rely on two main sources of data for our data collection. First, we draw on digital trace data from the productive environment of the internal trade order system of the financial institution. More specifically, the digital trace data takes the form of an event log that includes the following properties: case ID, process activity, timestamp, country (C), town (T), new user, and user. By user, we understand the client advisor. An excerpt of the event log is shown in Table 1.

Table 1. Excerpt of the event log data

Case ID	Process Activity	Time-stamp	C	T	New User	User
1	loading of page	06.11.2023 08:15	C2	B	false	RM93
1	create an advisory case	06.11.2023 08:15	C2	B	false	RM93
1	switch from segment 2 to segment 3	06.11.2023 08:16	C2	B	false	RM93
…	…	…	…	…	…	…
56	loading of page	19.01.2024 16:04:39	C1	G	true	RM271
…	…	…	…	…	…	…

Due to the unique case ID associated with the process activities and the respective timestamps, event logs are well-suited to study processual phenomena in organizations over time (Andersen & Hukal, 2023; Franzoi et al., 2023; van der Aalst, 2016). The collected data can be summarized as follows: one case refers to one trade order comprising various process steps (i.e., activities) that cover the trade order

documentation and execution conducted by a client advisor. Country and town specify where the client advisor is operating from. Furthermore, new users who are employed for less than 30 days are marked in the data as well. Before analyzing the data, it needed preprocessing, anonymizing, and cleaning, which included the correct formatting of timestamps, the standardized naming of process steps, as well as the removal of redundant process steps (e.g., API calls in the background). Second, aside from digital trace data, we relied on three sources of qualitative data that allowed us to create a deeper understanding of the case, provide contextual information, and make sense of the analyses (see Table 2). First, we leveraged the documentation of the implemented regulatory changes through deployments in the respective MWs, including their solution designs and implementation content, which facilitated our understanding of the regulatory details and their technical implementation on the IS. Second, we conducted five informal interviews with one business analyst, two process owners, and two power users, who have advanced knowledge and skills in using the trade order system. Through this conversational approach, we obtained detailed information about the planned deployments, the implementation process, and insights from the operational perspective. Third, we build on observations from weekly alignment meetings, made by one co-author, who worked at the financial institution during the time of the study, which provided us with relevant contextual information from within the organization.

From a data analysis perspective, we employed a variety of process mining techniques to analyze the digital trace data from the trade order process. Initially, process discovery algorithms were used to create the process model and calculate different process performance KPIs such as throughput time or average number of process activities per case (van der Aalst, 2016). Furthermore, based on these insights, conformance-checking algorithms were used to compare the actual process model with the desired process model to subsequently record process violations (Sadiq & Governatori, 2015). For this study, we relied on standard discovery and conformance checking techniques implemented in the trade order tool, which provide sufficient accuracy for analyzing overall process dynamics. A detailed benchmarking of algorithmic precision and fitness was beyond the scope of this research, as our focus lies on capturing regulatory change patterns rather than algorithmic optimization. We calculated all metrics on a daily basis for six months. Afterward, we formed brackets (i.e., distinct temporal stages) in the data for the respective time periods of the MWs. In general,

bracketing is a suitable method to analyze processual patterns over time (Hartl et al., 2023; Langley, 1999). This approach allowed us to track process dynamics over time and investigate the effects of deployments and regulatory changes on the business process. Accordingly, we examined and analyzed in greater detail the development of key figures associated with the described brackets. The gathered insights from the computational analysis were enriched with contextual information from qualitative data. The qualitative inputs aim at enhancing the contextual understanding of the key figures and associated brackets, and, thereby, enriching our analytical depth and fostering a more holistic understanding of the case.

Table 2. Overview of data sources

Data Source	Purpose	Amount	Description
Digital Trace Data	Data analysis	$\cong$ 17,000 cases >138,000 process activities	Preprocessed digital trace data exported from the trade order tool covering three different countries.
Documentation of Changes and MWs	Facilitation	5 changes 5 MWs	i.e., change request specifications, MW reports and ticketing system
Informal Interviews	Validation of findings	5 informal interviews	Informal interviews with business analysts, process owners, and power users.
Observations	Validation of findings	weekly meetings	Insights of one co-author from internal discussions and alignments.

4. Results

Based on our observations throughout the case, our findings emphasize the role of external regulatory changes and their subsequent implementation via organizational IS on the dynamics of business processes. In this context, we make several important observations. First, we delineate the connection between regulatory changes and subsequent changes in how business processes are carried out, showcasing that regulatory changes dynamically affect business processes. Second, we highlight that business process change can unfold in different ways following regulation implementation, emphasizing the role of

temporality and dynamics of regulatory changes. Third, we find that the context surrounding the business process is crucial to assessing the effect of regulatory changes. Following, we outline these observations in more detail and illustrate them with digital trace data-based analyses from our case.

After analyzing the trade order process, we observed patterns between regulatory changes and business processes. These patterns become particularly evident after the second and the fifth MW (marked as vertical lines in Figure 1 and Figure 2). In the second MW, regulatory changes were implemented in relation to new ESG guidelines for financial institutions. Specifically, interface changes on the IS (i.e., two additional tick boxes checking for sustainable investments) were implemented on an existing screen. While this change does not increase the workload of client advisors, our analysis showed that it changed the way they carried out the process.

We observe a drastic increase in the average process steps count, for at least one country, after the second MW (see country 1, Figure 2), although no additional process steps were added. This pattern suggests the occurrence of loops or repeated executions of existing process steps. To better understand these dynamics, we drew on qualitative insights from informal interviews. Interviewees identified a key factor behind the increased repetitions: a lack of structured training for client advisors. Supporting this, a power user noted that "*the challenges of continuously training all users due to time constraints on the frontline, as well as the broader issue of information flow hindrances and users' lack of receptivity to changes, underscore the difficulties in addressing training needs and improving process efficiency.*" These insights suggest that insufficient training contributed to uncertainty or errors, which in turn led to the observed process loops and repetitions.

Lacking dedicated training, client advisors may find themselves navigating a subtly altered user interface or process logic without adequate preparation. This can lead to uncertainty and inefficiencies in adapting to regulatory-induced system changes. As one power user noted in an interview, the absence of mandatory training left many advisors unaware of the practical implications of recent updates. A structured and compulsory training program, the interviewee suggested, could have proactively prepared client advisors by clarifying the anticipated changes and their operational impact, thereby supporting a smoother transition within the productive environment. Moreover, we observed an increased amount of user interactions with support services after the respective MW, which indicates a

heightened demand for assistance and underscores the significance of proactively addressing the informational gaps through comprehensive training initiatives. This observation was supported by a power user, who also works in support, and noted during an interview that the number of inquiries rose noticeably following the deployment, particularly from client advisors struggling to understand new system behaviors.
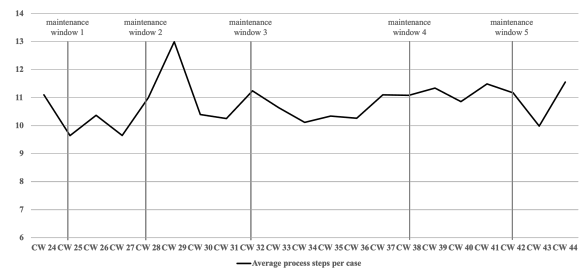

Figure 1. Process development - average process steps per case.

A similar observation can be made with the number of distinct violations. The violations also increased by nearly 14 percent from 171 to 194 immediately after the second MW, indicating that the deviations from the reference process model increased comparably. Which reflects an enormous increase, given that an average of 700 cases are processed each week. As both the mean number of process steps per case and the process violations increase directly after the second MW, we see that the business process is affected by the regulatory changes. We found that another reason for the steep increase in process steps per case was that users were not adequately informed about the regulation implementation beforehand, resulting in the need for further clarifications throughout the process to comply with regulatory requirements. This can also lead to confusion or uncertainty among users, which manifests itself in the repeated execution of a process step or attempted workarounds (Currie & Seddon, 2022). Further, insufficient user awareness and training on regulatory changes contribute to an increase in violations, leading to deviations from the process model. The process owner reported that "*power users, who are in charge of training the users [...] sometimes fail to pass on information effectively, exacerbating the issue of inadequate training and contributing to inefficiencies in the process.*"

Additionally, we found that processes dynamically change over time after regulation implementation. In our case, we observed two specific forms of change: sudden spikes (see e.g., Figure 1, second MW), where process indicators increase abruptly after regulatory changes, and latent effects

(see e.g., Figure 1, fifth MW), where the business process changes with a time delay.

Lastly, we found that there are different contextual factors influencing the dynamics of process changes (Franzoi et al., 2025; vom Brocke et al., 2016). When looking at the development of the business process for the three countries in isolation, we noticed that the effects of regulatory changes unfolded differently for the three locations included in our analysis. For instance, we have recognized that the effects of the regulatory adjustments in the second MW had a stronger impact in country 1 (see Figure 2) than in the other countries. A similar trajectory can be observed after the fifth MW for country 2. "*There was a tightening in the [...] regulation*" as a business analyst involved in the project reported, which resulted in the fact that "*many products that used to be sellable to certain customers can no longer be marketed*". Such differences can be attributed to the specificity of regulatory changes and their country-specific implementation (e.g., client domicile).
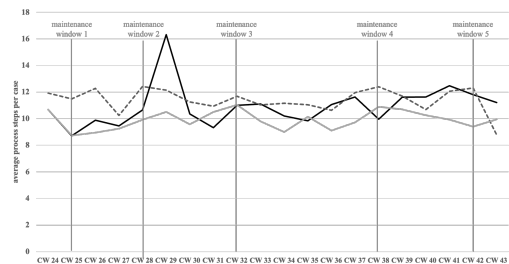

Figure 2. Average process steps per case per country.

To investigate the effects of regulatory changes on business processes, we combined digital trace data with additional qualitative and documentary sources. Using digital trace data for our analysis enabled us to (1) showcase the connection between regulation changes and process changes, (2) highlight the temporal dynamics involved, and (3) accentuate the role of contextual factors such as location. In addition, we leveraged documentation from the respective maintenance windows, which provided a detailed understanding of the regulatory requirements and their technical realization in the information system. We also conducted interviews with key stakeholders who offered operational insights into the planning, deployment, and practical use of the trade order system. Finally, observations enriched our understanding of the organizational context in which the changes were embedded. Overall, these complementary sources allowed us to better understand the implementation of regulatory changes in organizational IS and their dynamic effects on business processes.

As illustrated in Table 3 and supported by our investigation of three selected regulatory changes, the nature and purpose of regulation implementation significantly influences how processes adapt. For example, the introduction of pre-trade documentation for FX transactions, classified as content-based, prudential regulation, required a change in process sequence without directly impacting user activity.

Table 3. Patterns between regulatory changes and the trade process

Type of change	Purpose	Observed pattern
Pattern 1: content-based	no impact for the user, solely regulatory adaption	no impact: the regulation does not affect the process
Pattern 2: content-based	no observable impact for the user, automatic generation of additional documents	streamlining; the process becomes leaner; there are fewer loops and reworks
Pattern 3: function-based	additional fields (tick boxes) for the user	increasing reworks; certain process activities are executed several times (in succession)

Similarly, the implementation of new product documentation for specific jurisdictions, reflecting content-based conduct regulation, had no observable impact on the trade process. In contrast, the automated addition of sustainability reporting fields, a function-based environmental regulation, aligning with Patter 3 by leading to increased rework, as users were required to repeatedly complete additional fields before proceeding. These examples align with the patterns we observed: content-based changes often result in minimal process impact, while function-based changes can either streamline workflows or increase rework, depending on whether they automate tasks or add steps for users. This highlights the need to consider not just whether regulation affects processes, but how different types of regulatory changes shape process behavior and outcomes.

In summary, our findings demonstrate that regulatory changes, once implemented through organizational IS, have dynamic, multifaceted effects on business processes. We identified that such changes can lead to both immediate and delayed process adaptations, shaped by contextual factors such as location and user readiness. These adaptations manifest in process performance indicators, including increased repetition of steps and violation rates. By

triangulating digital trace data with qualitative insights and documentation, we reveal not only that regulatory changes affect business processes, but also how different types of regulatory interventions (e.g., content-based vs. function-based) produce distinct patterns of change. Overall, our findings highlight the importance of understanding the interplay between regulation, system design, user behavior, and process dynamics, offering a perspective on how external mandates materialize within operational realities.

5. Discussion and Implications

With this study, we contribute to BPM research in three ways. First, our findings showcase patterns between changes in external regulations and changes in the way business processes are carried out, which highlights the importance of regulation implementation for BPM (see Table 3). Even seemingly simple processes (e.g., short duration, one actor), such as the trade order process we scrutinized in this study, are affected by regulatory changes and their implementation in the organization's information system. Hence, rather than solely implementing regulatory changes to adhere to external requirements, organizations might need to foreground regulatory changes and their (potential) consequences for business processes to mitigate the negative effects imposed by mandatory regulatory changes (Fdhila et al., 2015). For example, organizations could proactively include upcoming regulatory changes in their managerial decision-making practices, discuss their consequences for the respective business processes, and monitor them over time to align business process changes with external regulatory changes. In this regard, novel technological opportunities offered by large language models can support the automatic identification of misalignments and incoherencies between business processes and regulatory requirements (Schulte et al., 2025).

Second, our research contributes to the growing literature on digital trace data by demonstrating its potential to understand the effects of regulatory changes on business processes. Prior studies have already indicated the promising opportunities of digital trace data for IS research in general (e.g., Berente et al., 2019; Miranda et al., 2022) and for analyzing processes specifically (Andersen & Hukal, 2023; Franzoi et al., 2023; vom Brocke et al., 2024). In this study, we leverage digital trace data to look at process dynamics on a fine-granular level (e.g., number of process activities over time) to understand better the consequences of regulatory changes and their implementation in the organization's information system. This can be particularly useful as it allows for the observation of certain dynamics that might be unobservable through other approaches (e.g., ethnography or interviews) or even unrecognizable by actors directly involved in the process (Pentland et al., 2021).

Third, we also see potential in combining the analysis of digital trace data with qualitative insights to contextualize the computational findings. This dual perspective, integrating quantitative digital trace data with qualitative context, is crucial for capturing the complexities of business process change following regulation implementation. Our study highlights the importance of taking a dynamic perspective to understand and manage business process change after regulation implementation. Recent arguments in BPM and IS literature stress that process management initiatives should account for the dynamics of the digital age (e.g., Baiyere et al., 2020; Grisold et al., 2023; Kerpedzhiev et al., 2021). Hence, especially when processes are carried out through or mediated by digital technologies, it is vital to look at the implementation of regulatory changes and their concomitant effects on business processes over time to incorporate such dynamics.

7. Limitations and Future Research Opportunities

Our study also comes with several limitations, which provide opportunities for future research. From a methodological perspective, we relied mainly on digital trace data analyses as well as auxiliary qualitative insights from employees of the case organization and change documentation. Although this enabled a detailed understanding of process dynamics, future studies could deepen these insights into the specific mechanisms involved in the processual dynamics after regulation implementations. This would also facilitate the alleviation of the inherent limitations associated with digital trace data, such as its limited contextual information (Grisold et al., 2020). Future research should also investigate learning effects and user adaption over time, exploring whether some users adapt more quickly to regulatory changes than others and the factors that drive such differences.

The presented findings contribute to research by demonstrating the value of combining digital trace data with qualitative perspectives to uncover patterns of regulatory impact on business processes. Future research can build on this foundation to explore more nuanced mechanisms underlying process adaptation and regulation implementation across diverse organizational contexts.

All in all, identifying and analyzing the patterns of regulatory changes and business process dynamics by relying on digital trace data from organizational IS seems promising to learn more about the effect of external regulation on organizations and their business process performance.

6. Conclusion

This process science study provides an examination of how regulatory changes are implemented and operationalized within a critical business process of a financial institution, emphasizing the dynamic interplay between external regulatory drivers and internal process adaptations. By leveraging a rich combination of digital trace data, deployment documentation, stakeholder interviews, and direct organizational observations, we uncovered not only the patterns linking regulation and process changes but also the contextual factors that influence these adaptations. In doing so, this study is among the first to empirically demonstrate the potential of process science research for uncovering how and why processes evolve in real-world organizational settings. Our findings highlight the essential role of automated compliance mechanisms embedded in IS and the challenges faced by client advisors in navigating evolving system environments. Ultimately, this research contributes to the broader understanding of regulatory compliance as a strategic and operational imperative within BPM.

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