# Compliance Checking in Action for INGKA Group Inventory Management

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**Abstract**
Inventory management is crucial to companies' competitiveness, especially in large-scale scenarios with many distributed departments. In this context, business intelligence solutions support companies through interactive dashboards, giving a quantitative view of their operational status. Process mining, particularly compliance checking, enhances the data analysis by aligning the resulting insights with actual process executions. This paper reports on the experience of applying compliance checking to inventory management in the INGKA Group stores. We addressed this real-world problem methodically by taking inspiration from the Process Mining Project Methodology to encourage iterative analysis and close collaboration between analysts and stakeholders. The company has systematically adopted our analysis. It provided process-oriented insights that helped make informed decisions and drove the implementation of process enhancements. The experience raised awareness of adopting compliance checking in practice and has been an opportunity to move the research in process mining alongside the business.

**Keywords**
Inventory management, Compliance checking, Decision support, Insights to action

## 1. Introduction

Inventory management plays a crucial role in logistics and warehouse operations [1], offering significant potential to enhance efficiency and customer satisfaction. It is essential for maintaining clear visibility of goods moving through warehouses and retail outlets [2]. This is particularly challenging in large-scale scenarios, considering companies with many warehouses and stores spread across different locations [3].

In this regard, business intelligence solutions support companies in producing interactive dashboards, giving a quantitative view of the operational status in inventory management [4]. However, these solutions provide analytics without a process-oriented perspective, as process mining and, in particular, *compliance checking* do [5, 6]. Getting valuable process-oriented insights via compliance checking allows companies to make informed decisions and implement actions for process enhancement [7].

In this paper, we present an experience dealing with compliance checking applied in a real large-scale inventory management process coming from INGKA Group (www.ingka.com), a leading multinational home furnishing retailer controlling *379* stores worldwide. The experience lasted six months and focused on answering four business challenges in the Stock Check (SC) process. SC is performed daily in the INGKA Group stores and produces, on average, *450,000* inventory-related events per day. The experience was inspired by the *Process Mining Project Methodology* ($PM^2$) [8] for structuring the phases of the working method since the methodology is designed to support process mining projects.

As an outcome of the experience, the company advanced its operations applying follow-up actions guided by the analysis results, so much so that the company systematically adopted our solution into their systems to continuously check the compliance of the SC process. In addition, the experience allowed us to deepen awareness of applying compliance checking into practice through the lessons learned in each phase.

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The rest of the paper is organized as follows. Section 2 describes the process under analysis and the problem addressed in this work. In Section 3, the research and methodological background is presented. Section 4 reports on the experience carried out with the company. Key findings are illustrated in Section 5, while the work's relevance is discussed in Section 6. Finally, Section 7 summarizes concluding remarks.

## 2. Problem Statement

This section defines the problem addressed by the study, outlining the SC process and the specific compliance challenges encountered, set against the broader context of increasing regulatory demands and operational complexity in industrial environments.

**Stock Check process.** The process under analysis is the SC, a process adopted in all INGKA Group stores. SC is devoted to ensuring stock accuracy, thus enabling the company to know how many articles of each kind are present in a store. Articles may be located in different places in a store, and they are counted periodically. As stores are organized differently, they implement the SC differently. Some of them implement (full or partial) automation in their warehouse. In such cases, stock accuracy is positively affected, especially in comparison to stores that work only manually, which are instead more likely to be error-prone. For all the stores, it is common to spend a significant amount of person hours, which involves a cost in the store budget. Two types of SC exist: Type 1 and Type 2. Type 1 is initiated on purpose when an inconsistency in article count is spotted. Type 2 is initiated daily on hundreds of articles; it starts in the evening when the list of articles to check is prepared and terminates before the store opens. Various automatic and manual triggers add articles to the list for a SC. The involved employee receives the list of articles to be counted and the related locations that hold the articles. Usually, locations are of two kinds: the sales location, which refers to the showroom accessible by the customer, and the buffer location, which refers to the store's warehouse. During the process, the employee checks if the count of a specific article at a particular location equals the quantity registered in the system. Otherwise, the quantity is updated with the observed value. In particular cases, the article quantity is assumed as correct without an actual counting performed by the employee; these are referred to as *auto count* activity. The information systems that support process execution register each manual and automated activity. These data can be retrieved to construct the process's event log.

**Compliance checking in action.** Compliance checking approaches check the adherence of processes to laws, regulations, and standards and measure process effectiveness [9]. They differ by strategy used, such as *a priori*, *run-time*, and *post-mortem*. We focused on the last one, which serves as an after-execution analysis method to detect possible violations on past process execution (it is also known as auditing [10]). We conducted it *internally*, i.e., with the process owner; while it is *external* when made by an independent party [11]. The analysis of process executions is a crucial activity in several application domains, and compliance checking techniques represent a powerful approach to addressing the problem. The main objective, from the company's point of view, was to answer highly specific business challenges on the SC. To obtain valuable results, we acquired the SC process data from the company's data warehouse and preprocessed it to get the event logs. We organized dedicated workshops with the company's stakeholders to define rules by moving from the informal description of the business challenges to structured compliance rules that could be checked against the event logs. To check SC process compliance, we analyzed the event logs with ad-hoc scripts due to the lack of standardized approaches and tools that support compliance checking in practice [9] and the need of the company for fast and incremental analysis.

## 3. Research/Methodological Background

This section presents the research and methodological background at the basis of this work.

**Related literature.** Compliance checking is largely studied in the literature [10, 11, 12] since it permits obtaining precise insights and performing the right actions. Concerning its application in real

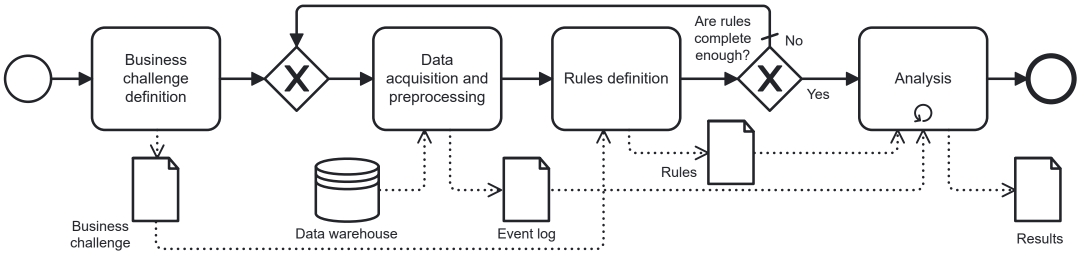


**Figure 1:** Phases of the working method.

scenarios, Becker et al. [13] propose a generic approach consisting of a model query language and a search algorithm implemented in a modeling tool for business process compliance checking. They also provide an evaluation via an applicability check in the financial sector. Longo et al. [14] outline a methodology to improve clinical risk monitoring and workflow digitalization, emphasizing advanced analytics to enhance patient safety and optimize healthcare processes. Differently, Jans et al. [12] demonstrate the relevance of process mining techniques concerning conventional auditing procedures. Finally, Dijkman et al. [15], suggest incorporating unexpected exceptions into the process, making them expected exceptions, so that they can be recognized and handled, allowing for continuous monitoring.

**Methodology.** The working method covered the phases depicted in Figure 1. Its structure is inspired by the PM$^2$ [8], designed to support process mining projects by encouraging iterative analysis and close work between analysts and business people, both pillars of our experience. The first phase was *Business challenges definition* to list the objectives of the analysis. Then, we performed *Data acquisition and preprocessing* to refine the event data and to assess their reliability, followed by *Rule definition* to map the business challenges into rules to be checked. These two phases were repeated until we agreed with the process owner and stakeholders on the completeness of the rules. Finally, we performed *Analysis* on the event logs, which consisted of checking the process execution against the specified compliance rules and providing the most meaningful visualization to be presented to process owners and stakeholders. Each phase of the working method involved weekly meetings to discuss the latest findings. Moreover, on-purpose meetings were planned to solve urgent issues.

## 4. Compliance Checking for the INGKA Group

In this section, we describe the experience and its phases outlined with the methodology, discussing the approach used and the decisions taken in developing the solution.

**Business challenge definition.** The business challenges formed the foundation of the experience, defining the problem to be solved throughout the subsequent phases. They have been discussed among the participants and defined clearly to ensure a common understanding of the aspects to be investigated. All the challenges reflected aspects of interest in the SC process. The four challenges are reported below.

The first business challenge (BC-1) aimed at *measure the effectiveness of automated tasks.* The company wanted to discover if automated activities were repeated manually and how often this happened. Moreover, they wanted to discover if the results of the automated activity were consistent with the results of the manual task. The second challenge (BC-2) had the objective to *check process termination time concerning the different SC triggers.* The company asked what the most common trigger was for late process termination. Challenge number three (BC-3) aimed at *measure the planning efficiency of the SC.* In this case, the company asked how often articles removed from a SC were finally counted within two days. To conclude, the fourth business challenge (BC-4) had the objective to *measure the effort employed in the process before canceling an article from a SC.* The company wanted to know the typical process behaviors leading to the cancellation of an article from the SC.

**Data acquisition and preprocessing.** This phase was essential to obtain the right event logs to address the business challenges. Indeed, defining the data to be used in the analysis was fundamental for

| Field name | Description | Example value | Concept |
|---|---|---|---|
| *RecType* | the group the activity belongs to, it can be (CNT) count, check (CHK), location (LOC) or article (ART) | CNT | other |
| *bu_code* | the unique identifier of a business unit | 123 | other |
| *inv_date* | the inventory date in the format "YYYYMMDD" | 20030819 | other |
| *sc_id* | the unique identifier of a SC | 456 | case |
| *art* | the identifier of an article | 789 | case |
| *event_dttm* | the time stamp of the event | 19-08-2003 08:15:00 | timestamp |
| *EventName* | the activity name | CHECK_CREATED | activity |
| *Location* | is the unique identifier of the physical location where the article is | BUFF:27 | other |
| *qty_before* | the article quantity before the count activity | 0.0 | other |
| *qty_after* | the article quantity after the count activity | 4.0 | other |

**Table 1**
Structure of the acquired data.

understanding what could be analyzed. Preprocessing was equally important in ensuring a consistent dataset regarding field definitions, date formats, and noise filtering.

The data was acquired by accessing the INGKA Group data warehouse, where the information systems dump event data. We did not encounter particular issues regarding data availability since the warehouse offers a sufficiently wide spectrum of data regarding the SC process to reconstruct it and address the business challenges. We extracted the dataset structured as described in Table 1. We constructed the event log structure by identifying the main concepts, i.e., timestamp, activity name, and case identifier. More in detail, the field *event_dttm* corresponds to the timestamp of the event, the field *EventName* to the activity name, and the union of fields *sc_id* and *art* to the case identifier, while the other fields are generic attributes associated with the event. Regarding the amount of data used in the next phases, we extracted a sample dataset to comprehend the data structure and spot anomalies, e.g., missing events and wrong data formats. Following the process owner's suggestion, we detected a representative set of stores and a time window sufficiently large to catch any possible SC process implementation. More in detail, we performed the extraction for *32* stores that differ for stock accuracy and level of automation; for a proper period (we cannot disclose), resulting in *3,174,689* events. Another essential step was to check the quality of the acquired data to assess the presence of issues to be solved with preprocessing [5]. We performed the inspection of the data using process mining tools such as Disco (fluxicon.com/disco) and PMTK (processintelligence.solutions/pmtk), observing the discovered Directly-Follows Graph (DFG) and the variants of the process. In particular, the discovered DFGs allowed the sharing of pictures of the actual process with the company.

The main weaknesses we found regarded (i) the format of timestamps, (ii) event redundancy, and (iii) event swaps. The event data exhibited heterogeneous **timestamp formats** due to the diversity of information systems and global store locations. To standardize the data, timestamps were converted to the format "YYYY-MM-DD hh:mm:ss.ssssss," preserving the original timezone based on the store's country, identified via the *business unit code.* Regarding **event redundancy**, multiple events with identical field values were observed, stemming from an information system that recorded certain events multiple times. These duplicates, offering no additional information and potentially distorting process variant interpretation, were removed. Regarding **event swaps**, several unexpected activity orderings were identified in the DFG. It was determined that these anomalies resulted from events being recorded with identical timestamps. With the process owner's agreement, a millisecond was added to the subsequent activity's timestamp to resolve the issue, enhancing the alignment of event logs with the actual process while maintaining data reliability. The DFGs discovered after the preprocessing were the focus of many discussions with the company. The process owner and the stakeholders got closer to the context of process mining by experiencing the data in a process-oriented manner, so they can discuss and define rules to be checked. Summing up, we obtained *342,806* cases from the data acquisition and preprocessing, with a mean duration of *9.5* hours. A total of *39* distinct activities building *24,294* execution variants.

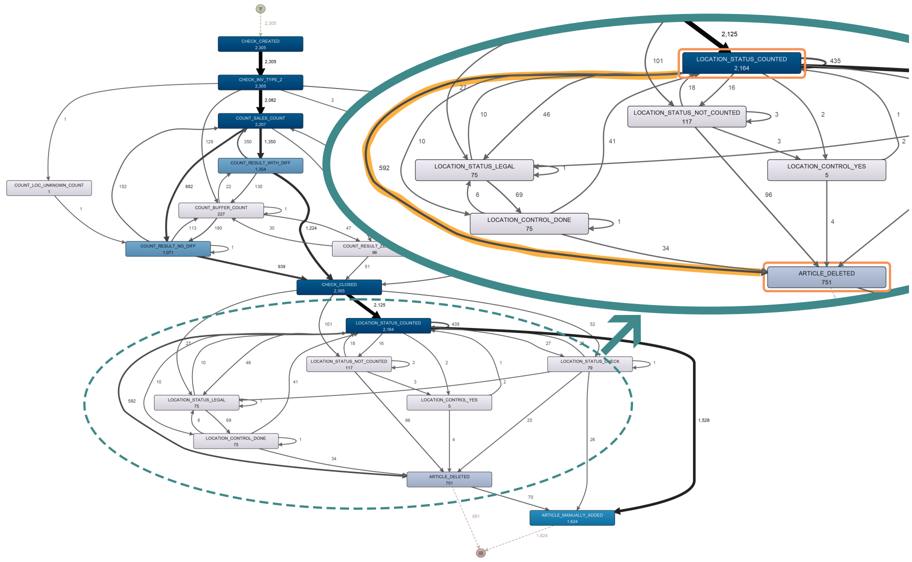


**Figure 2:** Rule extraction example from a SC process' DFG.

**Rules definition.** The increased awareness of the SC process derived from the DFGs prompted a discussion on transitioning from the specified business challenges to formulating compliance rules to be checked through event log analysis. Figure 2 shows an excerpt of a DFG extracted from a month of data of one store where the company detected an undesired behavior. During the discussion, process owners generally defined and highlighted the rules over the model as non-compliant paths. Rules to be checked were finalized after several iterations of *Data acquisition and preprocessing* and *Rules definition* activities until the set of rules was deemed complete enough to spot and quantify non-compliant behaviors. These phases were essential to pass from an informal description of what the company wanted to check to structured compliance rules, linking the business needs to the analysis solution.

Concerning the first business challenge (**BC-1**), we check whether, in the same trace, an automated count activity was *eventually followed by* a manual count activity. In this case, an additional check determines if the two activities had the same value in the field *qty_after* to spot a possible discrepancy. Regarding the second challenge (**BC-2**), we check whether the SC process terminates before the store opening hour, and we extract the distribution of SC triggers and types (type 1 or 2). Then, for the third business challenge (**BC-3**), we check whether the article is deleted from a SC. The challenge is mapped into four rules representing different SC behaviors. The first rule regards compliant cases where the deleted article was re-included in another SC within two days without being deleted again. In contrast, the following behaviors are classified as non-compliant. The second rule regards articles re-included after two days without being deleted again. The third rule regards articles deleted more than once before being re-included. The last rule regards articles never being re-included in a SC. In the last business challenge (**BC-4**), we check the cases with articles deleted from the SC. In particular, we measured the manual counting activities performed before the deletion. We also focus on spot process executions, observing the counting results, which were more likely to lead to an article deletion.

**Analysis.** Once we had the compliance rules that needed to be checked, we realized that a traditional filtering activity would not be suitable for achieving a complete result due to rules complexity. Therefore, we decided to move to a tailored solution implementing ad-hoc scripts. This decision was also motivated by the lack of a powerful enough tool for compliance to address our business challenges. Moreover, the development of ad-hoc scripts allowed us to have more control over the execution of the analysis and helped to speed up the process. Thus, the defined compliance rules were translated into ad-hoc scripts to perform the specific analysis for each business challenge. The general operation of the solution is described as follows: each script takes as input the event logs of the SC and iterates through every event included in all the cases. When the condition for a rule is met, the script checks the constraints expressed by the related rule and builds the output, registering the eventual non-compliant executions

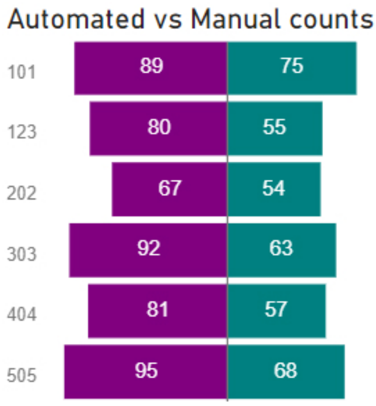


**Figure 3:** First BC-1 results.

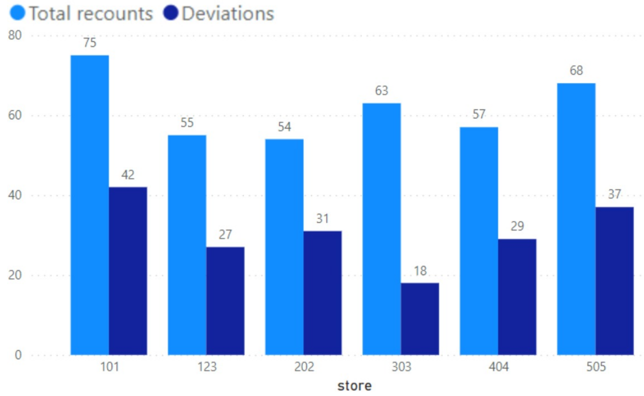


**Figure 4:** Second BC-1 results.


**Figure 5:** BC-2 results.

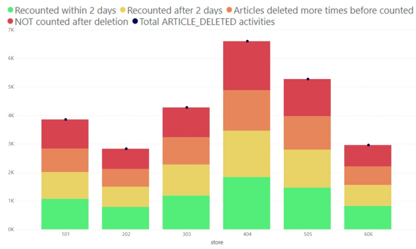


**Figure 6:** BC-3 results.

or expected behaviors.

During the meetings, in the most collaborative context, we tried to extract meaningful insights from the results or to understand how to refine the analysis that has been repeated until the results provide a complete answer to the business challenges. Alongside this, as the visual representation of process mining results has been discussed as a critical point of knowledge and insight transfer to stakeholders [16], we carefully explored how to visualize them [17, 18]. In our case, we decided to use simple visualizations such as stacked bar column graphs or tornado diagrams to easily quantify the deviations observed in the analysis or to provide an immediate overview of the motivations behind the non-compliant process executions. Following, we describe the ad-hoc compliance checking solutions, alongside the results obtained and the visualizations provided[1].

The purpose of **BC-1** was to measure the effectiveness of automated tasks. Our compliance checking solution revealed that automated activities were repeated manually at very different frequencies from store to store. Figure 3 shows the amount of automated count on the left side and how many times it is repeated manually on the right. We also observed in the data that most of these recounts are ordered by the system. A significant percentage of manual recounts after automated counts show a discrepancy in the count result. Figure 4 illustrates the amounts of recounts, i.e., the brighter bars on the left of each cluster, and how many of them present a different quantity of the stock level, i.e., the darker bars. The percentage of recounts with different stock levels is considered to be so high as to raise attention to the general reliability of automated counting. For what concerns **BC-2**, the objective was to check the process termination time concerning the different SC triggers. In general, type 1 SCs were used less frequently than type 2 SCs. As for the completion at a precise time, the first SC of the day, whether of type 1 or 2, did not finish at a regular time. Figure 5 shows the percentage of late and on-time first SC of the day. Some stores invest in respecting the time constraints, while others do it only partially. **BC-3** aimed to measure the SC's planning efficiency. In the end, four behaviors were identified to provide a complete answer to the question. In particular, all the stores partially adhere to the rule

[1]Due to the non-disclosure agreement between the University of Camerino and IKEA IT Aktiebolag, some information is omitted or replaced by approximate values, in particular, the graphs in the visualizations in the following paragraphs are populated with illustrative data, and references to store identifiers have been masked.

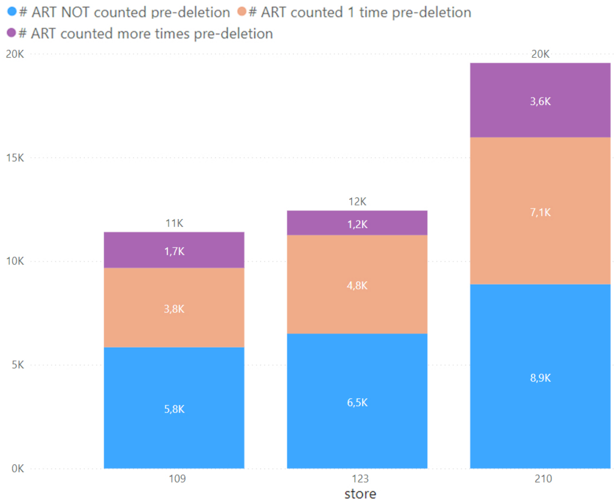


**Figure 7:** First BC-4 results.

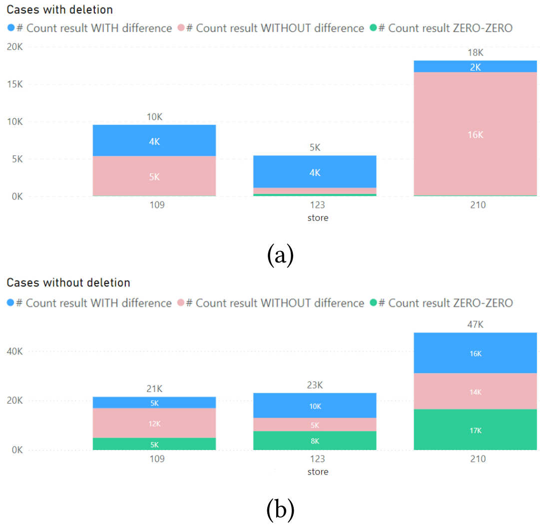


**Figure 8:** Second BC-4 results.

of re-including articles deleted within two days without being deleted again, Figure 6 first segment of the stacked bar from the bottom. In the most frequent situations, those articles were: recounted after two days without being deleted again, the second segment; deleted several times and recounted (independently from the day passed), the third segment; or not recounted at all, the uppermost segment. The analysis highlighted a general trend of "bad" SC planning, easily recognizable by the height of the bottom segment, which never reaches the majority of the stacked bar in each store. The last, **BC-4**, aimed to measure the effort employed in the process before deleting an article from a SC. The analysis identified three different behaviors unevenly distributed from store to store, Figure 7. In particular, a substantial share of articles was not counted before the deletion, i.e., the first segment of the stacked bar from the bottom. A relevant share of articles was counted at most once in each location where the article should be found, the second segment. Finally, in a small portion, the article was counted multiple times in at least one location where it should be found, the uppermost segment. In addition, a different behavior on counting results differentiated the cases with deletion, Figure 8a, from the others without deletion, Figure 8b. The distributions show a significant increment between counting results with deviations on cases with deletion with respect to cases without. There is no common trend among the stores, but it can be easily deduced which stores behave better in terms of wasted effort. For those who are not properly on the good side, it can be inspected if the reason for such a high amount of wasted time comes from suspicious counting results.

## 5. Key Findings

This section presents the key findings of the study, including the enhancement actions implemented by the company to improve its process and the lessons learned regarding the methodology of conducting process mining projects, providing valuable insights for both practitioners and researchers.

**Enhancement actions.** According to $PM^2$ [8], the final stage of a project is *process enhancement*. At this stage, the data analysts usually do not take part in the discussion, since their duties are fulfilled with the final presentation of the results; in some cases, however, their presence can be useful to provide further insights into the results and support for the stakeholders' reflections.

In our experience, the decision-making process for enhancement changes was entirely carried out by the company. It was supported by the results obtained in the *Analysis* phase that had been comprehensively presented beforehand. In particular, the main results that stood out from the analysis and drove the decision-making process were the following. Several insights about all business challenges of the SC process, in addition to those included in the visualizations, e.g., in BC-2, type 1 SCs contained mainly manually added articles. In contrast, type 2 SCs contained a more homogeneous distribution of the automated daily inventory triggers. A relevant share of automatically counted buffer stock levels was inaccurate; from BC-1, we saw that the automated count activities are not highly reliable, thus, the SC quality could be affected by this finding. A relevant share of the SCs were not finished before the due time; BC-2 revealed that this business policy was not respected in the majority of the stores, which means overlapping tasks for coworkers and an outdated stock level at the time of store opening. A huge number of non-compliant article checks per year; BC-3 and BC-4 revealed that many SCs are not carried out following planning rules or recommended working practices.

These findings triggered a series of enhancement actions that the company decided to implement. In detail, the company defined *six new follow-ups* regarding the conditions that led to encountering a non-compliant execution, e.g., implausible counting results that are the cause for the article deletion from a SC, or more attention on registering trigger reasons of articles included in the SC. Another action involved *synchronizing the software configuration settings of stores in different countries* that use the same system to support SC execution. This alignment allows stores that perform well to serve as examples for others. Then, the company defined *new ways of work*, *work recommendations*, and *standard operating procedure*, e.g., when to use SCs of type 1 or recommendations on default values on system parameters. Moreover, there were implemented *two updates on management software*, mainly regarding new KPIs of specific process executions. Finally, *three additional areas of business requirements* for future software solutions have been detected.

All of these enhancement actions have culminated in the integration of the SC compliance checking analysis into the company's business intelligence systems. Consequently, our solution has been systematically adopted and made available to the company, including all stores and warehouses for daily use and reference, coming to record an average of *1000* accesses per week.

**Lessons learned.** The experience brought various reflections on the methodology used and its phases. For each phase, we put forward recommendations that could help in conducting similar projects.

The *Business challenge definition* was the main precondition for driving the analysis and obtaining results useful for deriving concrete actions to improve the process. This phase must provide specific and addressable challenges to data analysts. Clarifying the scope of the analysis and fostering strong coordination between the business and analysis teams would ensure that the entire experience thrives and becomes highly effective. In our experience, we arranged purposeful meetings in which the teams reasoned together. In such a way, a continuous team interaction has been established to support each other at any time, also through a direct communication channel, even restricted to a few people. The strict collaboration and synchronization enabled the setting of feasible and relevant objectives.

For what concerns *Data acquisition and preprocessing*, the precondition is to acquire the right data according to the scope of the analysis. A dataset that is too small (with a short time window or few stores) may exclude significant data crucial for the analysis and undermine the reliability of the results. An overly wide dataset slows down the rest of the analysis, especially if we rely on non-scalable algorithms. Additionally, a larger volume of data does not necessarily translate into more valuable insights. Nonetheless, a balance in the analyzed data may not be sufficient to ensure a representative dataset. Here, domain knowledge can help analysts choose which data (or stores) to analyze.

Concerning the *Rules definition*, we have experienced how DFGs offer an immediate and intuitive understanding of the process to stakeholders. This type of model provides an as-is representation of the process executions where people can reason and take notes [19]. Frequency and performance annotations on DFGs can help easily identify outlier relationships or time-consuming executions, which can then be included in further analysis or inspire new business challenges to check for compliance.

Finally, the *Rules analysis* was particularly effective since the INGKA Group had exploited for the first time insights in a process-oriented manner. These insights enhanced the process changes, allowing informed decision-making that builds the difference between traditional business intelligence solutions and compliance checking analysis. Moreover, presenting the results was also useful in introducing process mining-specific concepts to non-practitioners. We aimed to balance a visualization that is easy to understand while still accurately representing the insights behind compliance checking results.

## 6. Significance and Relevance

This section reflects on the case study's significance through the stakeholders' feedback and project retrospective, highlighting its impact on industry practices and academic discourse on compliance checking.

**Stakeholders' feedback.** After the enhancements actions, we submitted a questionnaire to all the company's stakeholders to obtain feedback and a deeper awareness of what had been done (available at tinyurl.com/363kmwup). In the following, we report some excerpts from the questionnaires' responses, aiming to discuss the relevance of the experience. Process mining enhanced decision-making by providing clear visualizations that uncovered new insights into processes once thought to be well-known by experts. Although experienced, their understanding of the SC process was limited and subjective. Process mining allowed the company to grasp the full process and focus on specific cases, described as *"the data-driven complement to years of practical experience"*. When comparing process mining to business intelligence, challenges emerged regarding the target audience, as process mining insights were primarily accessible to those with strong process expertise. It was concluded that *"process mining and data intelligence complement each other"*. Although the company had implemented numerous performance measures over recent years, most failed to address the qualitative questions of *"how"* and *"why"*. Crucially, guidance on necessary changes for performance improvement was lacking. It was concluded that *"Process mining delivers new kinds of insights that enable great optimization opportunities"*.

**Project retrospective.** The final retrospective has been carried out by the core of the working group involved in the project. The questions answered during this activity referred to the situations that members of the team experienced and focused on what *slowed down*/*powered up* the project, what the team *was worried about*, or *wished have*, and lastly *how to improve* the previous concerns. The primary cause of the slowdown was attributed to the unprecedented scale of the problem, which was particularly challenging for the university's members, whose experience is rooted in academic environments with limited exposure to real-world, large-scale scenarios. Technically, the large amount of data and the substantial effort required for data extraction and preprocessing significantly hindered the execution process. What boosted the project was the team's strong collaborative spirit, which fostered high levels of individual commitment. Additionally, structured coordination and a rigorous meeting schedule promoted continuous interaction, contributing positively to the project's development. Worries varied depending on individual roles; however, there was a common sense of responsibility to deliver results that met the company's expectations. Additionally, concerns emerged about whether scientific and business goals could be effectively aligned to achieve the desired outcomes. The wish list contained various items, including additional time and personnel, greater involvement of stakeholders, opportunities to employ advanced techniques, and improved skills in the communication of insights. The discussion had a notably positive impact, allowing participants to reflect on the work completed, identify strengths to build upon, and recognize weaknesses to address moving forward. A key proposal that emerged from the retrospective was the establishment of a process mining unit within the company to generate and explore new challenges. This initiative aims to promote innovative thinking and identify opportunities at the intersection of academic research and business interests.

## 7. Conclusion

This paper reports on an experience of compliance checking on the INGKA Group's inventory management. The analysis was conducted on *32* stores out of the *425* on an overall amount of *3,174,689* events belonging to the SC process. The experience aimed to check the adherence of the SC process to compliance rules derived from business challenges. The experience results are new process-oriented insights provided via ad-hoc compliance checking solutions, and the opportunity to deepen the awareness of applying compliance checking into practice. The process-oriented insights were the result of a detailed analysis carried out following the $PM^2$, in which the close collaboration between the analysis and business team was the cornerstone that allowed the project to succeed. The experience brought innovative technologies to the company that could become a competitive advantage for positioning in the market [20]. Still, even if the practical experience is not replicable, due to the confidentiality of the employed data, nor generalizable due to the specific business challenges of the company; it has been an opportunity to move research alongside the business, bringing them together and harnessing the motivation from both perspectives to add value to the research community.

## Declaration on Generative AI

During the preparation of this work, the authors used DeepL, and Grammarly in order to: Grammar and spelling check, Paraphrase and reword. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the publication's content.

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