Università degli Studi di Padova

Department of Information Engineering

Master's degree in
Computer Engineering

Leveraging Data Warehousing and Business Intelligence for Improved Budgeting and Forecasting in a Publishing Company

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Abstract

This thesis investigates the digital transformation of a leading publishing company, referred to as A.B.C Spa for confidentiality, as it transitions to advanced data warehousing and business intelligence systems for enhanced budgeting and forecasting. Faced with the challenges of a rapidly evolving digital landscape in the publishing sector, A.B.C Spa, with the guidance of PwC Italy, initiates a strategic shift. The core of this transformation lies in moving from traditional static models—primarily used for economic and asset planning—to a dynamic, data-driven approach, thereby improving decision-making efficiency through real-time analytics.

The research specifically focuses on the adaptation and customization of SAP technologies, including SAP Analytics Cloud, SAP S/4 HANA, and SAP Datasphere, to replace the company's existing Excel-based and legacy systems. This strategic overhaul addresses critical issues such as limited collaboration capabilities, scalability challenges, and inefficiencies inherent in the company's previous forecasting processes.

The study's significance is rooted in the broader narrative of how digital transformation impacts business efficiency, emphasizing the importance of Enterprise Performance Management (EPM) in a volatile market environment. It investigates the shortcomings of the current system, evaluates the advantages of the proposed data-centric strategy, and examines the challenges and solutions involved in the implementation phase.

Overall, this thesis presents a comprehensive case study of A.B.C Spa's journey, providing valuable insights and a practical blueprint for organizations aspiring to leverage data-driven methodologies in an increasingly digital

business landscape. It demonstrates how strategic use of SAP solutions can transform traditional budgeting and forecasting processes, offering a path towards more informed, agile, and efficient decision-making.

Contents

1 Introduction

1.1 Background

In the swiftly transforming digital landscape of today's business sphere, the handling and efficient management of extensive and multifaceted data have emerged as critical challenges. Industries deeply rooted in tradition, like publishing, stand at a pivotal juncture where digital evolution necessitates profound changes to operational approaches. Within this context, forecasting and budgeting have become pivotal functions, guiding strategic pathways, steering resources adeptly, and ensuring sustained innovation and growth.

It is against this dynamic backdrop that A.B.C Spa, a stalwart in publishing, embarked on a transformative journey, envisioning a harmonized, agile, and data-driven operational landscape. Guided by PwC Italy's expertise, this endeavor marked the beginning of a meticulous process, characterized by an ambitious vision to fully harness the latent potential of data, fostering a framework that is not just responsive but vibrant, offering real-time insights and actionable strategies.

Central to this vision were two core objectives:

1. Revitalizing Budgeting and Forecasting: Shifting from static models to dynamic frameworks driven by cutting-edge data tools, envisioning processes with heightened accuracy and strategic resource alignment.

2. Empowering Decision-Making: Envisaging decision-making guided by real-time data visualization and detailed reporting, providing immediate insights and nuanced understanding of market dynamics.

The project aimed to revolutionize data handling and decision-making processes by integrating SAP solutions. At the forefront was the SAP Analytics Cloud, which transformed complex data into intuitive dashboards and reports, thereby enabling seamless interpretation and smarter decision-making. Complementing this core component were S/4 HANA and BW/4 HANA, which contributed significantly by providing robust data warehousing capabilities. These systems were essential for maintaining data integrity and ensuring scalability. Another key element was SAP DataSphere, playing a pivotal role in orchestrating seamless data flows and governance, thereby establishing a consistent and reliable data ecosystem.

The project's journey was meticulously planned and executed through several critical stages, each playing a vital role in the transformative process. The first stage was a comprehensive infrastructure assessment, which involved an in-depth evaluation of the existing data infrastructure. This stage was crucial for identifying gaps and inefficiencies and laid the foundation for the transformation. The next phase focused on the design and implementation of tailored solutions, developed in response to the initial assessment. These solutions aimed to streamline processes and enhance overall efficiency. An ongoing stage of continuous monitoring with iterative feedback loops was also implemented. This stage was essential for ensuring the project's alignment with business objectives and for making necessary adjustments to meet the envisioned goals.

In addition to these stages, the project also included an extensive exploration of A.B.C Spa's operational fabric across various business units such as Retail, Enti Centrali, Trade, Education, and Media. This exploration

was critical in understanding the unique challenges and opportunities within these sectors. It provided a detailed analysis of the transformation process within these key areas of A.B.C Spa's business landscape.

The project unfolded in phased stages, each characterized by distinct milestones and objectives:

- Initial Diagnosis and Gap Identification: Early stages involved thoroughly diagnosing existing systems, meticulously identifying gaps, and outlining strategic pathways to address them.

- Strategic Planning and Blueprint Development: Following diagnosis, strategic planning laid down a detailed blueprint outlining step-by-step transformation processes.

- Solution Development and Integration: Subsequent phases involved developing tailored solutions, integrating state-of-the-art tools and technologies to enable seamless transformation.

- User Training and Feedback Incorporation: Post-integration, extensive user training initiatives were complemented by feedback incorporation, ensuring solutions were not just advanced but user-friendly and intuitive.

- Deployment and Continuous Improvement: Final stages encompassed deploying developed solutions, characterized by ongoing enhancements and optimizations, aiming for alignment with organizational objectives.

As we navigate the ensuing chapters' detailed narrative, we unravel a journey characterized by visionary strategies, innovative solutions, and the

relentless pursuit of excellence. It is a deep dive into a universally relevant transformative journey, offering enterprises navigating intricate digital transformation pathways a valuable blueprint.

In conclusion, this thesis testifies to the transformative power of data engineering in contemporary business environments, providing not just a chronicle of a transformation journey, but a beacon guiding enterprises towards a data-driven future. It serves as an illuminating guidebook for organizations aspiring to harness data's power in an increasingly digital era, steering towards informed decisions, streamlined operations, and vibrant, data-driven corporate landscapes. It explores the intersection of tradition and innovation, offering a narrative of data-driven strategies and decision-making, presenting a vision of a sustainable, vibrant, and innovative future.

1.2 Previous Situation and Current Limitations

The economic planning process in individual Business Units currently involves data processing through Excel or various legacy systems like Data Concentrator, B-Monitor, and MOS, where operational plans are meticulously crafted. For Cost of Labor planning, a different system is used: the Zucchetti Open Budget system, which projects data from diverse sources, including Payroll. Central to this framework is the SAP BPC system, acting as the culmination point of economic planning. Here, forecast data undergoes standardization and integration into the SAP BPC data structure, enabling comprehensive Financial Planning by consolidating anticipated Economic, Asset, and Financial values.

Significantly, SAP BPC also collates all economic and asset real data

from SAP S/4 HANA. This integration is crucial for the preparation of consolidated financial statements at A.B.C Spa. Despite these systems, several shortcomings have been identified. Primarily, the reliance on Excel for Business Units' forecasting processes (encompassing Plan, Budget, and Forecast) hinders effective collaboration among stakeholders.

The dependence on Excel and legacy systems complicates the management of an integrated approach, requiring manual handling of information outside the systems, tailored for each Business Unit. This setup also presents obstacles in conducting efficient simulations and what-if analyses for alternative scenario evaluations. The lack of automated dashboarding and data visualization tools, coupled with limitations in technological and application scalability due to the absence of a dedicated Planning system and the prevalent use of Excel, are additional significant concerns.

1.3 Proposed Solution

The necessity of implementing a new Planning and Control system emerges from the limitations identified in our current approach. This new system is essential for integrating departmental processes and systems, thereby capturing the full benefits of a harmonized accounting management approach. The anticipated opportunities with this new system are multifaceted. It will offer a standardized solution to harmonize and rationalize our existing operational methods. Moreover, it is tailored to accommodate the unique needs of each Business Unit in the planning process, thereby enhancing operational efficiency.

The system will also play a pivotal role in supporting and automating

ABC S.P.A's forecasting processes, fostering a collaborative environment between Business and Management Control units. Importantly, it will streamline the preparation of reports for Top Management, business lines, and Management Control.

Our proposed solution is anchored in the SAP Analytics Cloud (SAC) platform, known for its seamless integration with data warehouses. This integration is vital for connecting the planning system with ABC's on-premise systems, which include a range of SAP modules like SAP S/4 HANA, SAP BW/4 HANA, and SAP BPC, along with the Zucchetti System. Additionally, the SAP system will efficiently manage the loading of Excel and text file data.

The envisioned architecture of this solution is strategically designed to simplify existing processes while ensuring scalability, both in terms of application and technology. The integration of the SAC-based planning tool with our current systems, facilitated through cloud delivery, will empower Business Units to operate autonomously. Simultaneously, it will enable a collaborative framework, offering a unified view of integrated financial and operational planning. A key aspect of this initiative is the automation of processes through the software, which stands as a critical enabler for our strategic goals.

1.4 Significance of the Study

The digital transformation threatens organizational profitability, and globalization's volatility and uncertainty are increasing. EPM is now seen as a solution, perfectly integrating management systems. EPM is based on con-

tinuously pursuing value addition by synchronizing improvement methods to create value for customers, delivering economic value for shareholders and owners.

EPM's scope is extensive, necessitating enterprise-wide implementation. It helps managers sense and respond more quickly and effectively to unexpected changes. External forces like globalization and the internet produce uncertainty and volatility. The pace of change makes long-term, multi-year planning inadequate. Strategies can never be static but must adapt continuously based on external forces and new opportunities.

EPM integrates operational and financial information into a single decision-support and planning framework including strategy maps, balanced scorecards, budgeting, forecasting, and consolidation. It encompasses the processes, information, and systems managers use to define business strategies, plans, and monitor performance to achieve sustainable success.

Machine learning's advent, where computers self-learn from large data sets, will displace many human jobs by 2025. However, history suggests this is a temporary shock. As workers adapt their skills and entrepreneurs create new technology-based opportunities, job growth will resume. Human ingenuity is expected to drive new industries and jobs, much like the Industrial Revolution.

This thesis will demonstrate the transformative power of data engineering in modern business, providing a chronicle of a data-driven transformation journey and a guide steering enterprises towards data-driven futures. It will be an illuminating handbook for organizations seeking to harness data's power in an increasingly digital era, steering towards informed decisions,

streamlined operations, and vibrant, data-rich corporate landscapes. The study will explore the intersection of tradition and innovation, offering a narrative of data-driven strategies and informed decision-making, presenting a vision of a sustainable, vibrant, and innovative future.

1.5 Research Questions

The study will address the following questions:

1. What are the limitations with the existing budgeting and forecasting systems and processes?
2. How can improved data management help overcome these limitations?
3. What specific technologies and solutions should be adopted?
4. What are the expected benefits and impact of implementing these solutions?
5. What challenges may arise during implementation and how can they be mitigated?
6. How can the solutions be enhanced over time to maximize value?

1.6 Methodology

In this thesis, a qualitative case study methodology will be adopted to conduct a comprehensive examination of the processes, systems, and documents related to budgeting and forecasting. This examination aims to pinpoint existing limitations. Key to this analysis will be interviews with crucial stake-

holders such as business units, IT departments, and management teams. These interviews are intended to collect insights about the perceived limitations and expectations for future solutions.

The study will also involve a detailed evaluation of potential solutions and vendors, focusing on selecting the most suitable platforms. This selection process will be guided by a thorough cost-benefit analysis and a clear understanding of organizational requirements. An essential component of the thesis will be the formulation of a strategy for implementation and adoption. This strategy will draw upon the best practices of organizational change management, with a specific emphasis on Business Intelligence (BI) implementations.

Additionally, the thesis will assess the anticipated benefits and impacts of the proposed solutions, including ROI projections, benchmarking, and their alignment with the organization's strategic objectives. Concluding the study, a roadmap for post-implementation optimization will be developed. This roadmap will be dedicated to enhancing value over time, advocating for continuous improvements and adjustments to align with evolving organizational and technological contexts.

1.7 Summary

This chapter provided an overview of the background, existing challenges, and vision for transforming budgeting and forecasting via data warehousing and business intelligence solutions. It outlined the research questions, methodology, significance, and limitations. The next chapter will review literature on relevant topics. Subsequent chapters will present findings from

organizational analysis, proposed solutions, implementation roadmap, and expected impact.

The thesis aims to develop a comprehensive qualitative and quantitative analysis of how enhanced data management and analytics capabilities can enable more agile, data-driven planning and decision-making. While focused on a specific company, the lessons can inform other organizations seeking to optimize budgeting and forecasting through data warehousing, business intelligence, and enterprise performance management.

2 Project Management

This chapter makes clear to the reader what the current status of the project is, describing the organization of the involved companies, the needs of customers, and which objective must be reached.

2.1 Descriptions of Companies

The involved companies are two of the biggest businesses of their branch and are related by a consultancy agreement. Cause of company policy, the name of customer is replaced with a fictional one.

2.1.1 PricewaterhouseCoopers Spa

PricewaterhouseCoopers Spa is an international professional services brand of firms operating as partnerships under the PwC brand. The PwC firms are in 157 countries with 328.000 people and offer several services for a variety of industries including financial services, healthcare, technology, and energy, among others. Among all the professional services provided around the world, the main ones are the following:

PricewaterhouseCoopers, abbreviated as PwC, stands as a global titan in the provision of professional services, functioning through a network of firms harmoniously operating in partnerships under the unified banner of the PwC brand. Originating from the merger of two historical accounting firms, Coopers & Lybrand and Price Waterhouse in 1998, it has continuously expanded its reach to boast a presence in 157 countries, supported by a formidable force of 328,000 professionals working in diverse industries such as

financial services, healthcare, and technology, amongst others. In Italy, PwC S.p.A. delineates its services into distinctive Line Of Service (LOS) categories, each dedicated to addressing various business demands meticulously:

1. **Assurance:** Going beyond the conventional audit service, it seeks to uphold the veracity and correctness of financial reports, working hand in hand with different supervisory entities to safeguard the integrity of the economic system.

2. **Consulting:** This LOS harbors the ambition of fostering corporate growth by aiding in managerial, organizational, and technological development, thereby creating substantial value for all stakeholders in the market. It harbors subdivisions like Technology Consulting and Management Consulting which work towards the optimization and innovation of corporate organizations through a variety of strategies.

3. **Deals:** Designed to assist businesses both large and small in choosing the right partners and managing exceptional transactions, this service line promotes competitiveness in an ever-evolving economic landscape.

4. **Tax & Legal (TLS):** Dedicated to devising legal and tax strategies to protect business operations and ensure proper taxation, safeguarding the created value and promoting fair taxation.

5. **Internal Firm Service (IFS):** Operational with internal network services such as HR services, it supports other lines of services efficiently.

As part of its rich service portfolio, PwC's consulting LOS introduced a matrix-based new service line to offer the right expertise and additional

value to its clients. This division operates across various sectors, identified as 'Verticals' and 'Horizontals' which further classifies into areas such as Consumer & Industrial Product (CIP), Telecommunication, Media & Technology (TMT), and Financial Services & Banking Insurance (FS), amongst others. At the core of PwC's operation lies a firm commitment to client satisfaction, leveraging modern digital technologies to guide transformations in both operational and financial aspects of client businesses, aiming for heightened efficiency, effectiveness, and agility in financial management. Your journey through this thesis will offer a closer examination of the Consulting LOS, particularly focusing on its dedication to optimizing and fostering innovation within corporate organizations, guided by the experienced team at PwC Italy. The insights shared are a result of an enriching internship experience within the LOS Consulting, offering a firsthand perspective into PwC's commitment to adding value to their clients' endeavors.

2.1.2 Publishing Group

The client, herein referred to as "ABC S.p.A." to maintain confidentiality, is a dominant force in the publishing sector, showcasing extensive operations in trade and educational publishing. This influential entity also enjoys a substantial footprint in the digital and social media space with a robust portfolio encompassing 15 magazine brands and 16 digital properties, extending from product creation to marketing and distribution. In 2021, ABC S.p.A. witnessed a revenue influx of 807.3 million euros, reflecting an 8.5% growth from the previous year, asserting its pivotal role in the sector through a subsidiary dedicated to fostering growth and resilience in the book publishing realm.

The organization operates through well-defined sectors:

- **Trade Area:** This division takes charge of narrative and essay publishing, housing prominent brands (names undisclosed due to confidentiality).
- **Educational Area:** Comprising two controlled firms spearheading initiatives across a diverse spectrum from pedagogical to university publications.
- **Art Publishing:** Entrusted with the management of museum concessions and orchestrating international cultural events.

Technological Infrastructure and Data Management Since 2019, ABC S.p.A has been utilizing the SAP S/4 HANA and BW/4 HANA systems to transform its core business operations. This transformation has led to the creation of a standardized process environment, enhancing efficiency across various domains, including administration, managerial control, and purchasing. The implementation of the SAP infrastructure has been crucial in tackling the challenges of technological obsolescence and the complexities associated with custom solutions.

As ABC S.p.A looks to the future, it continues to build on the strong foundation established by the SAP suite. The company is particularly focused on strategic interventions in the Business Unit Copyright Management Application Processes within the book domain, a historically significant area for the company. The goal is to move beyond the limitations of the current Copyright Management System and establish a new system that excels in several critical aspects.

The new system prioritizes performance and efficiency, ensuring top-notch operational effectiveness. It also emphasizes flexibility and scalability, adapting seamlessly to evolving technological demands. A key aspect of this system is its commitment to data integrity, ensuring the security of personal, transactional, and accounting data. Furthermore, the system is designed to optimize the use of SAP S/4 HANA, facilitating a seamless end-to-end process. This approach helps to address potential misalignments caused by interfacing various systems and enhances budgeting and forecasting capabilities through advanced data integration and analytics.

By focusing on data warehousing and business intelligence, ABC S.p.A aims to revolutionize its approach to budgeting and forecasting. This strategic direction is expected to lead to a new era of data-driven decision-making, fostering growth and innovation within the company.

2.2 Project Framework

Before implementing the new strategy, ABC S.p.A. already had a robust foundation in SAP systems for managing their resources and monitoring performance. Their existing infrastructure included:

- **Main Budgeting Tool - Excel**: A primary tool for budgeting, involving data extraction from various sources, including legacy systems and SAP platforms, for processing and consolidation.
- **Cost and Revenue Management - Data Concentrator (dati)**: Key in managing costs and revenues, especially for Media, this tool played a crucial role in standardizing data flows for accounting and

reporting.

- **Operational Systems - B-Monitor and MOS**: These systems were used across various Business Units for managing the production cycle of editorial products, with data extraction facilitated via Excel.

- **Personnel Cost Planning - Zucchetti Open Budget**: Utilized for planning and actualizing personnel costs.

- **Data Forecasting and Consolidation - SAP BPC**: This system managed the consolidation of forecast and actual data across various Business Units and was a cornerstone for financial planning.

- **Back-office Processes - SAP S/4 HANA**: This platform was crucial for actualization processes and supported all back-office processes for the group's companies.

- **Managerial Reporting - SAP BW/4 HANA**: Used for various reporting needs, this system allowed direct access to data on S/4 HANA.

ABC S.p.A., in a collaborative effort with PwC, embarked on an initiative to enhance and streamline their financial management system by adopting modern SAP technologies. This significant transformation entailed integrating SAP Data Warehouse Cloud and SAP Analytics Cloud into their existing framework, yielding a multitude of benefits. The integration fostered consistent and unified data handling across various segments like management closing, planning, and reporting, significantly improving data integration and accuracy.

This enhancement was accompanied by an increase in the detail and granularity of data reporting, and more frequent, timely data uploads from the ERP system. Simplification of the system's architecture was another key achievement, boosting the overall efficiency of the system. The integration also greatly enhanced the user experience, thanks to the introduction of digital boardrooms and self-reporting features in SAP Analytics Cloud, which made navigating data more intuitive.

Moreover, the process was streamlined with the support of various Business Process Flows and workflows, thereby enhancing transparency in tracking progress. This overhaul effectively addressed and resolved the inefficiencies of previous systems by leveraging the real-time capabilities of BW/4HANA. Ultimately, this strategic move by ABC S.p.A. not only enabled more sophisticated predictive analytics but also set a solid foundation for the future implementation of SAP S/4HANA, marking a substantial leap forward in their journey towards improved financial management and operational efficiency.

2.2.1 Master Data Analysis

ABC S.p.A. has decided to undertake an evolutionary path in the Planning field, with the aim of evolving the processes and reviewing them from a critical perspective, making them leaner, more efficient and, where possible, harmonizing them while preserving the specificities that characterize each Business Unit . The possibility of achieving this objective necessarily passes through the adoption of a best-in-class technological solution, allowing the Planning and Control function to maximize the effort on value-added analysis and business insights activities; Below I have reported the main highlights on

the Best Practices that guide the adoption of an advanced Budget System:

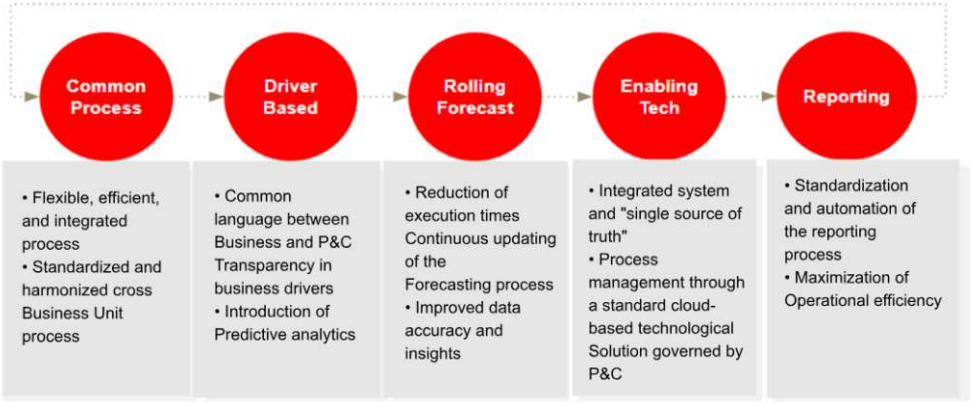


Figure 1: Project objectives

The Master Design phase was characterized by two primary objectives: the intricate design of the Data Model and the meticulous development of the TO BE processes, accompanied by a detailed definition of functional requirements. This phase was marked by a series of productive meetings with ABC S.p.A., where we collectively pinpointed several areas within processes and models that required enhancement. These identified improvements are projected to yield benefits in diverse, critical categories.

A notable expected outcome is the reduction in process times coupled with an improvement in data quality. This is anticipated as a result of increased operational efficiency, which not only accelerates process execution times but also significantly enhances the accuracy and reliability of the data involved. Another key area of focus is systems integration. Here, the objective is to foster operational efficiency through a streamlined integration of various systems. This integration is crucial as it simplifies the retrieval of

information, thereby supporting and strengthening the overall process structure.

In addition to these, we are placing a strong emphasis on the automation of manual activities. This shift from manual or offline methods to automated processes is designed to further operational efficiency. By replacing time-consuming manual tasks with automated solutions, we aim to streamline workflows and reduce the potential for errors. Lastly, the simplification and standardization of processes stand as a pivotal goal. This aspect targets operational efficiency by eliminating unnecessary complexities and standardizing procedures, thereby making processes more straightforward and efficient.

Overall, each of these targeted improvements has been carefully selected and strategically planned to significantly enhance the efficiency and effectiveness of the processes within ABC S.p.A., aligning with the overarching goals of the Master Design phase.

Areas for improvement identified	Process time reduction/data quality improvement	Systems integration	Automations of manual tasks	Simplification of the process
Automation of the final balance sheet (data and KPIs) to support forecasting processes.	✓		✓	

Management of the dual view by nature and destination and related automation of the feeding of the Group tool for economic/asset/financial consolidation.	✓	✓	✓	✓
Aggregation and simplification, where possible, of the nature of planning according to a criterion of significance of the data.				✓
Standardization of the cross Business Unit process (e.g., budget Opex) and interactions by integrating them within the budget platform.	✓			✓

Integration of the P&C process with the planning process on the Business side (e.g., editorial plan for Trade and Educational, periodic budgets, etc.) and ongoing evaluations in terms of simplification of some process integrations (e.g., assumptions on labor costs in forecasting processes waiting for the final data).	✓	✓	✓	
Harmonization and refinement of the information detail and granularity of the data managed within homogeneous perimeters (e.g., coherence between publishing houses, coherence between Education and the De Agostini world, etc.).				✓

Simplification of calculation logics (e.g., reversal of Central Authorities) and automation of calculation logics managed offline (e.g., top-down reproportioning).	✓		✓	✓
Coordinated management of intercompany and intra business unit flows.	✓		✓	✓
Standardization and automation of the reporting process.	✓		✓	✓

2.2.2 Overview of the Data Model

ABC S.p.A. contains within it a multitude of different businesses grouped by business unit. During the first analysis meetings, the methods of working and managing the information flows of the finance planning and control process were therefore investigated for each Business Unit, with the aim of defining the data model specific to each one. By Data Model we mean the set of analysis dimensions necessary for reporting financial statements and planning and, more generally, the data present in the system for each Business Unit. From the meetings held it emerged that the planning and control needs and

the detailed analysis of each Business Unit is different and presents different elements for each BU, although it is still possible to identify a minimum common factor of interest size in all ABC S.p.A. realities. It is therefore possible to think that the data will flow into a single view, into a single data model with dimensions necessary for all processes. In the figure below a unique representation of this reality and its peculiarities.

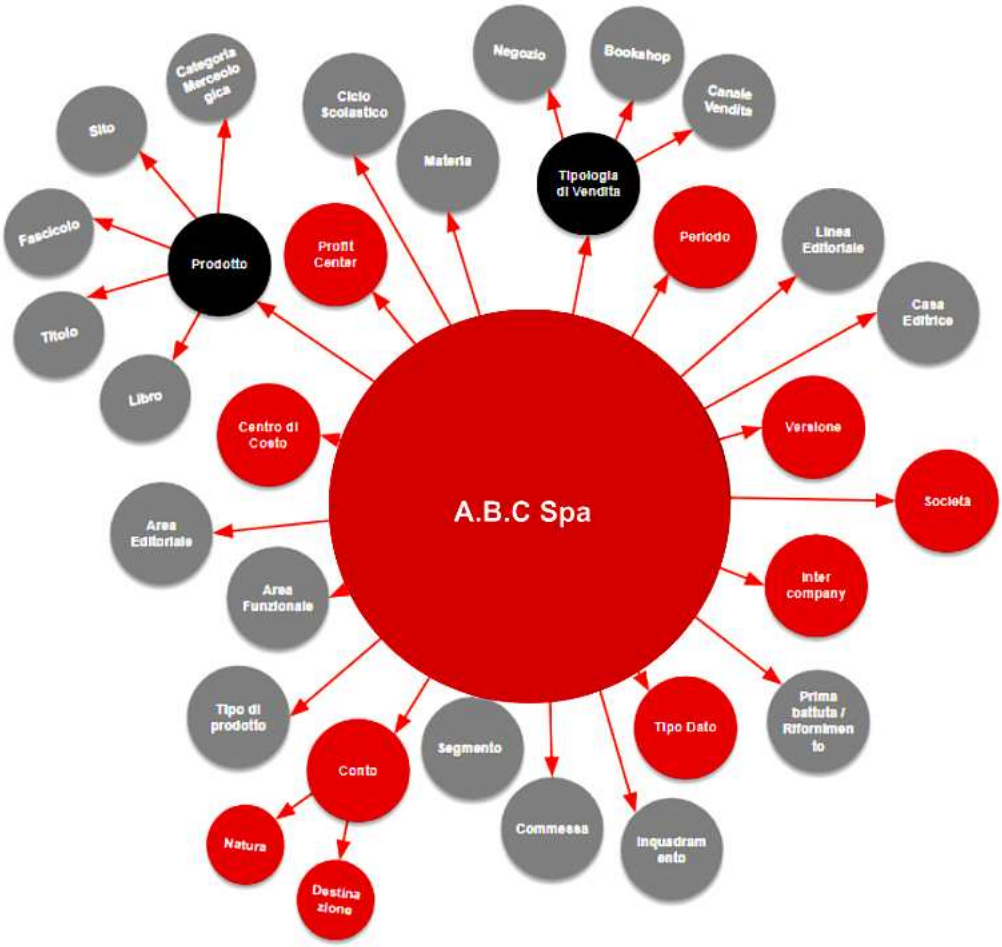


Figure 2: Data Model Design

We have found that all the dimensional details can be obtained from the current transactional system (SAP S4), to which it is necessary to make the appropriate aggregations / transcodings to bring the dimensions back to the target data model. Starting from the data model defined in the High Level Design phase, this was refined and finalized in the present Set Up and Agile Design site, in terms of analysis dimensions and granularity. A special note should be made regarding the design and meaning of the "Account" dimension: In order to implement the automatic feeding of the Group system for asset planning (SAP BPC), the chart of accounts used in planning will be single for the management of the dual view by nature and destination; In order to simplify and rationalize the planning activity, where possible, the types of planning will be aggregated according to a criterion of significance of the data and therefore reduced in number.

The guiding principle in the construction of the detailed model was to ensure consistency between the planned view and the final balance view available on S/4 - SAP BI. This principle will also be the basis of the model configuration, an activity that will be the subject of the subsequent Construct design phase. The table below describes the conceptual dimensions common to all businesses.

Dimension	Description	Desired planning granularity
Version	Represents the different planning version of the data (e.g. Budget, Forecast)	Single element (actual, budget, forecast)

Period	Represents the month in which the effects are recorded	Month
Society	Represents the companies of the ABC S.p.A. group	Single element
Intercompany	Represents the trading partners of the ABC S.p.A. group (partner companies)	Single element
Data type	Represents the origin / type of data (source data, adjustment, calculation)	Single element
Profit Center	Represents the profit center to which the data is asserted	Single profit center
Cost center	Cost center of the ABC S.p.A. group. Used for all HR costs, shared services	Single cost center
Management account (or planning)	Represents the chart of accounts used for planning. During the analysis, the need to reduce the number of management accounts subject to planning was identified	Single management account

In this project, we will concentrate our analysis on two pivotal business units: Retail Central Entities and HR. These units have been selected due to the substantial similarity in their operational processes. The investigation will include an exploration of additional dimensions that are specific to each of these business units. This focus will enable a more nuanced understanding of the shared and unique aspects of their operational frameworks within the

broader organizational context.

2.2.3 Retail Model

The Retail Business Unit encompasses the business of selling books to the end consumer; sales can occur through four main channels: Franchising, Owned Stores, Online, and Book Clubs.

Dimension	**Description**	**Desired Planning Granularity**	**Reference to the S4 Model**
Channel	Franchising, Owned Stores, Online, and Book Club	Single Channel	Profit Center
Store/Other Types of Sales	Represents: individual direct stores, individual franchised stores, Online, Club (Mail/internet orders – Book of the month – Recruitment)	Single type of sale and cost center associated with TV	Type of sale / cost center
Merchandise Category	Represents the different merchandise categories	Generic product	Product
Functional Area	Represents a management key for reading revenues and costs	Single functional area	Functional Area

2.2.4 Enti Centrali Model

The Central Entities Business Unit controls and supervises the costs of services that are provided or sustained centrally by A.B.C SPA and then allocated to the businesses via intercompany recharges. The main reference

dimension for this BU is the cost center and its nature. To further detail the costs associated with the cost center, there is an intention to leverage the additional detail provided by job orders, which will allow for the automation and facilitation of constructing specific reports and specific planning, such as in the IT area.

Dimension	**Description**	**Desired Planning Granularity**	**Reference to the S4 Model**
Project or Job Order	Used to group costs of a homogeneous category	Specific and/or total depending on the needs	Internal Order

2.2.5 HR Model

The area of personnel costs, as in many realities, has a significant level of attention within ABC S.p.A. The planning process is carried out with a dedicated tool for each individual, and the summary of this work is then shared. The information mentioned below represents only the additional details presented, not the detail of the initial per capita planning, and supplements a report for cost center and cost macro-category.

Dimension	**Description**	**Desired Planning Granularity**	**Reference to the S4 Model**
Framework	Information that distinguishes between managers / executives and employees	Single element	Not applicable

The current planning moments in ABC S.p.A are 4: Industrial Plan, Budget, Forecast 1 (typically 4+8) and Forecast 2 (typically 8+4). The process is mainly driven by the Planning and Control group and involves all company functions in a collaborative manner. The designed processes represent the logical flow of activities and the actors involved in each process step. At this stage of the project, some initial considerations have already been made on the expected coverage level of the solution with respect to the process steps represented. This component will be finalized in the detailed design of the solution in the Construct phase.

The target process identified can be summarized as in the figure below:

P&C of the Business Unit collects input from various actors within the Business Unit, possibly adjusting or completing it. To this set of data, the data processed by the same P&C BU and the central costs coming from HR and P&C Central Costs are added. The combination of this information gives rise to the PL of the BU. The validated PL is then transferred to the Group's economic / equity and financial consolidation system (SAP BPC), applying the appropriate transcodifications to obtain the view by nature.

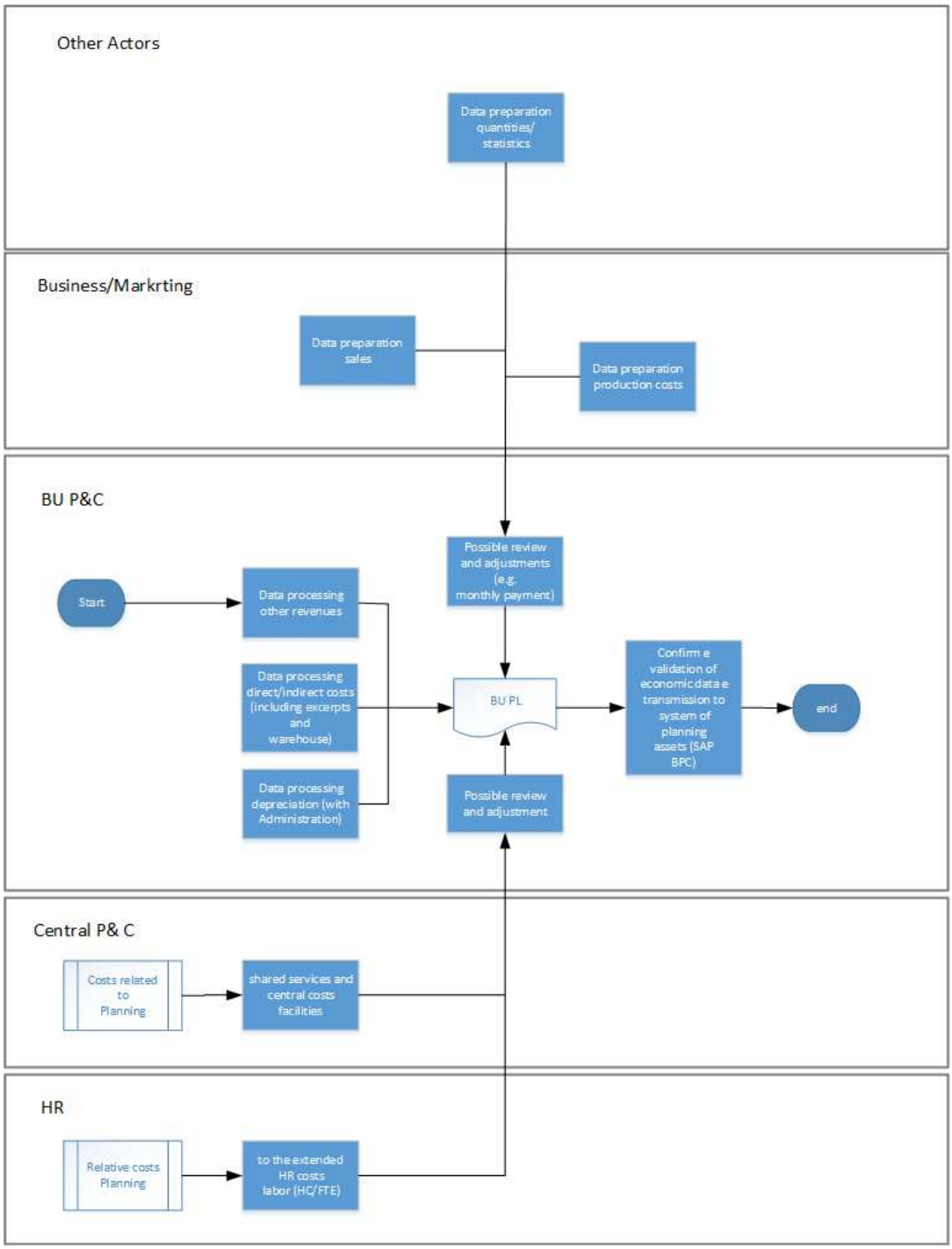


Figure 3: Processes

3 Project Technologies

In this chapter, we introduce the key technologies underpinning ABC S.p.A.'s project. We begin with an overview of the ERP and EPM systems, focusing on their integration and role within SAP's framework. Key components include:

- **SAP S/4 HANA:** Central to business operations and back-office processes.
- **SAP BW/4 HANA and SAP BPC:** Integral for data consolidation and financial planning.
- **SAP Data Warehouse Cloud and SAP Analytics Cloud:** Newly adopted for enhanced data analysis and reporting.

Finally, we touch on the server architecture of ABC S.p.A., illustrating the implementation and integration of these technologies in their specific environment.

3.1 SAP Modules

3.1.1 SAP BPC Classic 10.1

SAP Business Planning and Consolidation (BPC) Classic 10.1 is a key instrument in the enterprise performance management domain, offering a seamless amalgamation of planning and consolidation capabilities. This tool stands as a comprehensive solution for businesses to adeptly manage the complexities of financial planning, budgeting, and forecasting.

At the forefront of its capabilities is the Unified Planning and Consolidation feature. In today's data-driven world, SAP BPC Classic 10.1 efficiently merges these functionalities, thus diminishing operational complexities and providing businesses with a unified view of their financial data. This integration aids in rapid decision-making and heightens operational efficiency.

Another significant strength of SAP BPC Classic 10.1 is its adeptness in Data Integration and Modeling. It can integrate and transform data from various sources, including legacy systems, external databases, and other ERP systems. This flexibility enables businesses to create customized data models, enhancing their financial planning processes.

The tool also recognizes the collaborative nature of financial planning through its Flexible Workflow and Collaboration feature. It supports real-time collaboration, allowing businesses to set and modify business rules, monitor changes, and achieve consensus among stakeholders.

SAP BPC Classic 10.1 excels in Powerful Reporting and Analysis as well. It offers a range of dynamic tools for users to create ad-hoc reports, intuitive dashboards, and conduct scenario analysis. This level of analytical depth allows businesses to delve deeper into their financial data, extracting actionable insights and identifying hidden opportunities.

Understanding the importance of regulatory compliance in today's business environment, SAP BPC Classic 10.1 includes robust Audit and Compliance Features. These features ensure exhaustive audit trails and clear data lineage visualization, reinforcing data integrity and ensuring regulatory compliance.

Lastly, its Excel Integration combines sophistication with simplicity. This

integration allows users to work within the familiar environment of Microsoft Excel, significantly reducing the learning curve and enabling businesses to quickly adapt to the tool.

In sectors like publishing, where the intricacies of financial planning are manifold, SAP BPC Classic 10.1 is particularly beneficial. It provides publishing companies with a comprehensive view of their financial situation, aiding them in refining budgetary strategies and gaining insights into future financial trends.

3.1.2 SAP Analytics Cloud (SAC)

SAP Analytics Cloud (SAC) is a comprehensive cloud platform that seamlessly integrates business intelligence (BI), planning, and predictive analytics, making it a crucial component of SAP's extensive suite of analytics tools. It empowers businesses to make data-driven decisions by offering a range of end-to-end analytics capabilities within a unified environment. SAC's robust Business Intelligence tools enable users to create engaging visualizations, dashboards, and reports through an intuitive drag-and-drop interface, facilitating data exploration, pattern discovery, and insight derivation without needing extensive technical knowledge.

In addition, SAC excels in integrated planning by combining planning and analysis. The platform's collaborative enterprise planning tools allow teams to align on budgets, forecasts, and scenarios, thereby enhancing real-time plan creation and adjustment and streamlining decision-making processes. Predictive analytics in SAC, powered by advanced machine learning algorithms, empower users to forecast trends, identify potential opportunities or

threats, and make proactive decisions based on predictive insights.

Moreover, SAP Analytics Cloud boasts extensive data connectivity, linking to a diverse array of data sources, including both SAP and non-SAP systems, on-premise databases, cloud storage, and third-party applications, ensuring seamless data integration. Augmented Analytics features like Smart Insights and Smart Discovery leverage artificial intelligence to automatically highlight key data points and trends, aiding users in understanding the underlying reasons behind their data.

SAC also promotes effective team collaboration by enabling the sharing of insights, dashboards, and reports, supplemented by integrated discussion boards and comments to enhance communication and ensure team alignment. Additionally, the platform prioritizes data security through granular role-based access controls, safeguarding sensitive data's confidentiality and integrity.

A standout feature of SAC is its Digital Boardroom, which offers an interactive, real-time business review experience. This feature allows executives and decision-makers to delve into data, simulate scenarios, and make strategic decisions using an immersive tool. For a publishing company, leveraging SAC can be transformative, aiding in understanding sales trends of various publications, forecasting demand, managing budgets, and navigating the competitive landscape with the combined power of BI, planning, and predictive analytics.

3.1.3 SAP BW/4HANA

SAP BW/4HANA is an advanced data warehousing solution developed by SAP, specifically designed to run on the SAP HANA platform. With SAP BW/4HANA, all the data in the entire company can be prepared for a consistent view across all departments. One of its key characteristics is the ability to leverage in-memory processing, which enables real-time data access, analysis, and reporting. With SAP BW/4HANA, organizations benefit from a simplified data model, reducing complexity and enhancing performance. Modelling phase is realizable through SAP BPC 11.1 or Eclipse IDE. This solution seamlessly integrates with various data sources, ensuring reliable data integration through extraction, transformation, and loading processes. Another notable characteristic is its support for advanced analytics, including predictive analytics, machine learning, and statistical functions, empowering organizations to uncover valuable insights and make accurate predictions. SAP BW/4HANA also enables real-time reporting and visualization, allowing users to monitor key metrics and gain instant insights into business performance. It offers flexibility in deployment, supporting on-premises, cloud, and hybrid scenarios. Additionally, SAP BW/4HANA integrates seamlessly with both SAP and non-SAP applications, providing a unified view of business operations and facilitating data-driven decision-making.

3.1.4 SAP HANA

SAP HANA, developed by SAP, is a high-performance, in-memory database and application development platform, primarily designed to process large volumes of data in real-time. This revolutionary technology has altered

the business landscape by enabling instantaneous insights and expedited decision-making processes. At the heart of SAP HANA lies its in-memory computing capability, which stores data in RAM instead of traditional disk drives. This approach significantly accelerates data processing, facilitating real-time analytics and transactional applications.

Moreover, SAP HANA integrates advanced analytics by combining transactional and analytical data processing. This unique feature allows businesses to analyze live data and derive insights without hampering their operational systems. It supports a range of analytical processes, including predictive analytics, spatial data processing, text analytics, and stream processing. In addition to these capabilities, SAP HANA excels in data integration, enabling organizations to gather data from diverse sources, be it structured or unstructured, and from both on-premises systems and the cloud. This aspect ensures a comprehensive view of business information.

Another key feature of SAP HANA is its multi-model database functionality. It extends beyond being a mere relational database to support various data types, including graph, document store, and time-series data. This versatility allows businesses to manage different types of data seamlessly. Data virtualization is another significant aspect of HANA, allowing real-time data access without the need for replication. This feature not only ensures up-to-date data but also reduces storage costs.

SAP HANA is not just limited to database capabilities; it also serves as a robust application development platform. Developers have the flexibility to build and deploy applications that harness the power of HANA, using various languages and tools provided by SAP. Furthermore, understanding

the necessity of high availability and disaster recovery for mission-critical applications, SAP HANA incorporates features like automatic failover, data replication, and backup capabilities.

Security is a paramount concern for SAP HANA, which is why it includes a multi-layered security framework. This framework encompasses authentication, encryption, role-based access control, and audit logging to ensure data protection and compliance with regulations. For a publishing company that relies on data warehousing and business intelligence, SAP HANA can serve as an integral backbone. It effectively manages vast amounts of data, ranging from sales figures and inventory levels to reader demographics and feedback. This enables the company to gain real-time insights, optimize operations, and forecast future trends with unmatched accuracy.

3.1.5 SAP DataSphere

SAP DataSphere emerges as a premier data management solution, meticulously crafted to tackle the complexities of today's data-rich environments. At its core, DataSphere is more than a mere tool; it's an expansive ecosystem designed to empower businesses with unparalleled efficiency and insight in navigating the data world. This is achieved through its comprehensive data integration capability, which goes beyond simple data consolidation.

DataSphere skillfully integrates data from varied sources, creating a unified view that breaks down data silos and delivers comprehensive, representative insights. Its dynamic data processing and flows feature excel in real-time data handling, transforming raw data into actionable intelligence, ensuring businesses are constantly equipped to act.

Furthermore, DataSphere ensures fortified security and compliance with robust mechanisms like advanced authentication and encryption, upholding data integrity and aligning with global regulations. Its seamless integration and versatility allow it to merge effortlessly with other SAP products and external platforms, establishing it as a central component in any technological architecture. The cutting-edge analytical tools, including machine learning integrations, turn data into meaningful business insights.

Designed with adaptability and growth in mind, DataSphere is capable of customizing to specific business processes and scaling up in response to increasing data demands. It also fosters a collaborative ecosystem, promoting teamwork and consistency in data management with features like shared workspaces and task chains. In the grand spectrum of data solutions, SAP DataSphere stands out, transforming data into a strategic asset that lights the path for innovation, operational excellence, and sustained growth, not just managing it.

4 Project Construct

The Construct chapter is dedicated to providing a detailed description of the process, user requirements, and functional requirements for the Planning Transformation Project. This project centers around the Planning processes, specifically Budget and Forecast, within ABC S.p.A.

The main objective of this phase is the detailed design of the planning solution using SAP Data Warehouse Cloud and SAP Analytics Cloud. The design is based on the requirements gathered during the Master Design phase of the To Be Processes and the translation of these requirements into the technical system interfaces. This crucial phase lays the groundwork for the subsequent implementation phase, targeting the deployment of the designed solution for the Central Entities, Retail, and Trade Business Units.

ABC's planning process is structured around four key stages: Industrial Plan, Budget, Forecast 1 (typically 4+8), and Forecast 2 (typically 8+4).

In the ensuing sections, I delve into the specific processes for each Business Unit, detailing the required steps, ownership, and specifics related to the implementation in SAP Analytics Cloud. The focus will be on the Central Entities BU, Retail BU, HR BU, and Trade BU. The processes for the Media and Digital BU are under consideration and will be addressed subsequently.

Through this phase, the project aims to create a robust, user-centric planning framework that leverages modern technology to streamline and enhance the planning capabilities within ABC S.p.A.

4.1 Application Infrastructure

From an application point of view, this project fits into a context characterized by an already rather complex and articulated architectural structure, represented in the Figure 4 : In particular, the application tools covered by

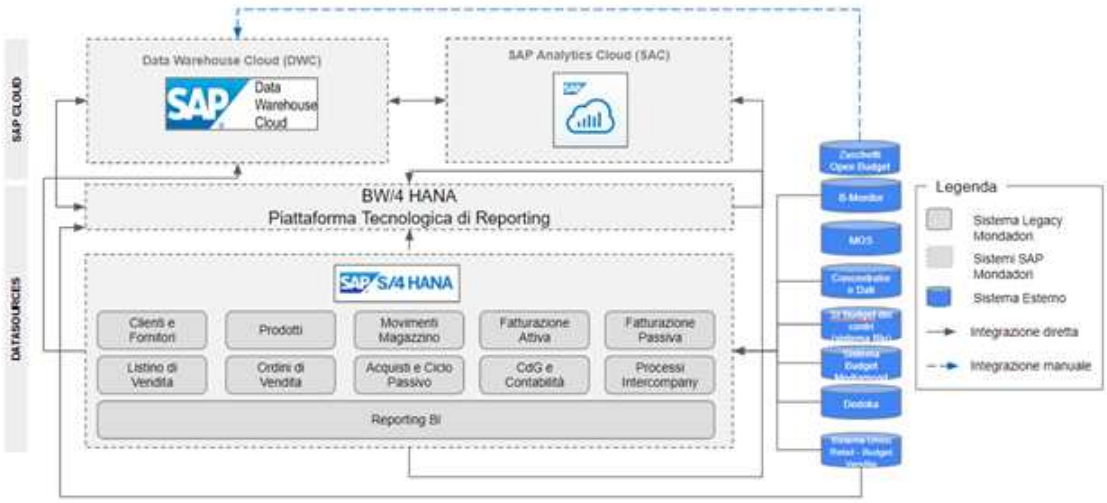


Figure 4: Application Landscape

the new Planning Transformation process such as Data Warehouse Cloud and SAP Analytics Cloud will be integrated into the current application landscape as represented below:

4.2 Version Set-Up

The Version Set-Up task represents the initial step in launching the planning process and scenario we have developed. It's a centrally managed step because it involves configuring and preparing the system to enable the actual planning for each Business Unit.

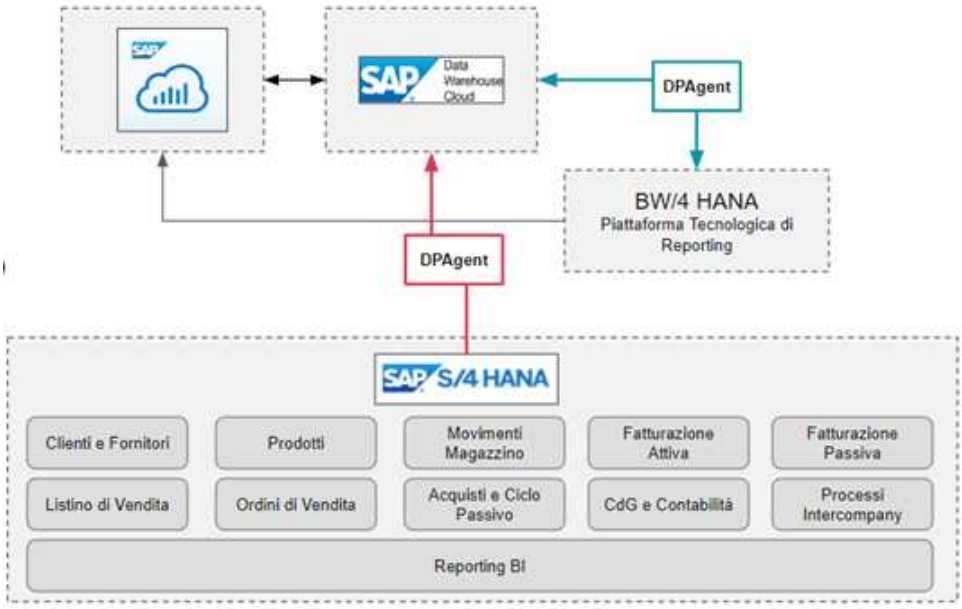


Figure 5: Application tools covered by the new Planning Transformation

Through an Analytics Application, users will be able to perform the following tasks:

Create a new planning version (if needed, in case a new version not yet present in the system is to be used) Update the properties of the version (particularly relevant properties such as Last Month Actual and Reference Version) Import Actual data: it will be possible to update or copy the actual data into the planning version through a single action (useful for forecasting)

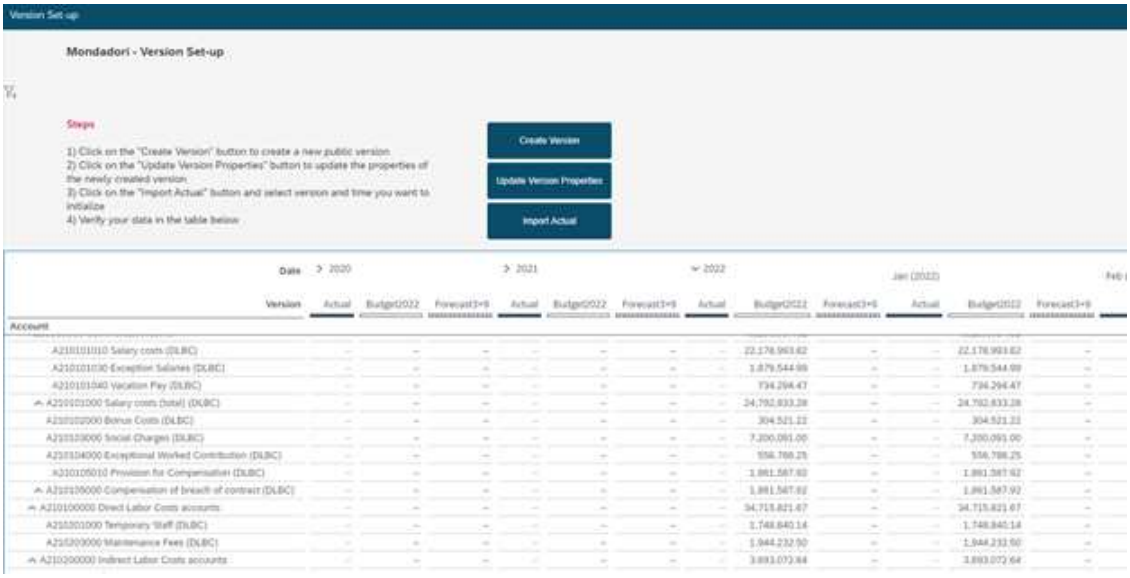


Figure 6: Version Set-Up

4.3 Overview of the Data Model

ABC S.p.A encompasses a multitude of different businesses grouped by business units (Business Units), which manage both common and unique informational details of the individual Business Units analyzed.

During the Master Design meetings, we examined these different views and identified a unified data model that includes common dimensions and those specific to the individual Business Units.

In the subsequent Construct phase, we refined and finalized the data model in terms of analysis dimensions and granularity - respecting the uniqueness of the analyzed businesses and the informative details available and usable in SAP S/4HANA.

To implement the automatic feeding of the Group's estate planning sys-

tem (SAP BPC), the chart of accounts used in planning will be unique to manage the dual view by nature and destination; To streamline the planning activity, where possible, the planning natures will be aggregated according to a criterion of data significance and thus reduced in number.

The guiding principle in constructing the detailed model was to ensure consistency between the planned view and the actual view available on S/4 - SAP BI. This principle will also underpin the configuration of the model, an activity that is the subject of the subsequent Construct project phase.

4.3.1 Central Entities Business Unit

The Central Entities Business Unit (BU) monitors and supervises the costs of services that are provided or incurred centrally by ABC SpA Publisher and then allocated to the businesses through intracompany chargebacks.

The primary reference dimension for this BU is the cost center and nature. To further detail the costs per cost center, the additional detail of the jobs will be leveraged, which will automate and facilitate the construction of reporting and specific planning, such as in the IT area.

Below are the dimensions that make up the data model of the ABC SpA BU within the application, taken from the Master Design phase:

Dimension	**Description**	**Desired Planning Granularity**	**Reference to the S4 Model**

Version	Represents the different planning version of the data (e.g., Budget, Forecast)	Single item (actual, budget, forecast)	Version
Period	Represents the month in which the effects are recorded	Month	Period
Company	Represents the companies of the ABC SpA group	Single item	Company
Intercompany	Represents the trading partners of the ABC SpA group (partner companies)	Single item	Intercompany
Data Type	Represents the origin/type of data (source data, adjustment, calculation)	Single item	Source
Profit Center	Represents the profit center to which the data is asserted	Single profit center	Profit Center
Cost Center	Cost center of the ABC SpA group. Used for all HR costs, shared services	Single cost center	Cost Center
Account (Management or planning account)	Represents the chart of accounts used for planning. There was a requirement to reduce the number of management accounts subject to planning	Single management account	N/A

Co.Ge Account	Represents the accounting chart of accounts. For planning and export to BPC, each planning account will be associated with a specific Co.ge account	Single accounting account	Co.Ge Account
Functional Area	Represents the nature of planning. These will be aggregated according to a criterion of data significance and therefore reduced in number	Single functional area	Functional Area
Project	Used to group costs of a homogeneous category	Specific and/or total depending on the needs	Internal Order
Driver	Used to define the drivers on which to perform allocations	Single Driver	N/A

The Masterdata of dimensions relevant to the BU Central Entities will be maintained automatically where possible, in other cases it will be selected manually. Below I report the details related to dimensions or properties to be maintained to respond to requirements of the planning process of the Central Entities:

Management/Planning Account Should there be a need to exclude some CE (Central Entity) items from the calculation of recharges (such as

depreciation), it will be possible to manage such exclusion with a property of the Account dimension. In this way, the CE items for which such a property will be populated will not be considered in the calculation of Recharges.

Cost Center Through the Allocation Priority property, it is possible to define for each cost center the priority to be followed in the calculation of allocations.

Figure 7: BU Central Entities – Cost Center

4.3.2 BU Retail

The Business Unit Retail encompasses the business of selling books to the end consumer; sales can occur through four main channels: Franchising, Owned Stores, Online, and Book Clubs. Below are the dimensions that make up the data model of the BU Retail within the application, taken from the Master Design phase:

Dimension	**Description**	**Desired Planning Granularity**	**Reference to the S4 Model**

Version	Represents the different version of planning data (e.g., Budget, Forecast)	Single item (actual, budget, forecast)	Version
Period	Represents the month in which effects are recorded	Month	Period
Company	Represents the companies of the ABC SpA group	Single item	Company
Intercompany	Represents the trading partners of the ABC SpA group (partner company)	Single item	Intercompany
Data Type	Represents the origin/type of data (source data, adjustment, calculation)	Single item	Source
Profit Center	Represents the profit center to which the data is asserted	Single profit center	Profit Center
Cost Center	Cost center of the ABC SpA group. Used for all HR costs, shared services	Single cost center	Cost Center
Account (Management or Planning Account)	Represents the chart of accounts used for planning. There is a need to reduce the number of management accounts subject to planning.	Single management account	N/A

Conto Co.Ge (Accounting Account)	Represents the accounting chart of accounts. For planning and export to BPC, each planning account will be associated with a specific Conto Co.Ge.	Single accounting account	Conto Co.Ge
Functional Area	Represents the nature of planning. These will be aggregated according to a criterion of data significance and thus reduced in number.	Single functional area	Functional Area
Channel	Franchising, Owned stores, Online, and Book clubs.	Single channel	Profit Center
Store/Other Types of Sales	Represents: • Individual direct stores • Individual franchising stores • Online • Club (Mail/internet orders – Book of the month – Recruitment)	Single type of sale and cost center associated with the sales type	Type of sale / cost center
Product	Represents the different product categories	Generic product	Product

Partner Segment	Represents the partner segment associated with the trading partner of the ABC SpA group (partner company)	Partner segment	Partner Segment
Catalog	Each club consists of several catalogs, the parents will be identified by the name of the clubs and the children as catalogs to allow hierarchical tracing.	Catalog	N/A

The Masterdata of the dimensions relevant to the BU Retail for Direct/Web, Franchising, and Club will be maintained automatically where possible; in other cases, it will be selected manually. Below are details regarding dimensions or properties to be maintained to respond to requirements of the planning process for central entities:

Product The product dimension in SAC will be the union of the Class and Summary 1 attributes (extracted from the product dimension in SAP S4). The union of these attributes allows for creating the correct hierarchical structure within the Product dimension necessary for the visualization of data for retail reporting purposes.

Type of Sale For Direct/Web and Franchising, the Type of Sale dimension represents the Store and therefore the various points of sale. The elements that will create the Masterdata of the Type of Sale in SAC correspond to

Prodotto: Classe	Prodotto: Riepilogo 1	Prodotto (SAC)
11	C00GIA	11_C00GIA
11	C00SFI	11_C00SFI
32	C00AGC	32_C00AGC

Prodotto

Member ID	Description	Flat View	Gerarchia del Prod...
PX_R00MSN	PRODOTTO EXTRA SETTORE_MATERIALE SUPPORTO NEGOZIO	TOT_PRODOTTI	TOT_ALTRO
PX_R00VAR	PRODOTTO EXTRA SETTORE_VARIE	TOT_PRODOTTI	TOT_ALTRO
PE_#	BOOK_Senza attribuz.	TOT_PRODOTTI	TOT_BOOK
PE_R00LIB	BOOK - LIBRI ITALIANI	TOT_PRODOTTI	TOT_BOOK
PE_R00LIS	BOOK - LIBRI STRANIERI	TOT_PRODOTTI	TOT_BOOK
PE_R00SCO	BOOK - SCOLASTICA	TOT_PRODOTTI	TOT_BOOK
PE_R00SPA	BOOK - SPARTITI	TOT_PRODOTTI	TOT_BOOK

Figure 8: BU Retail – Product

the elements present in the TV5 attribute (Type of Sale level 5) of the Type of Sale in SAP. The Type of Sale dimension will present different attributes:

- Perimeter, which allows identifying stores that were open for the entire previous year and continues to be open during the current year (L4L), stores that will be or have been opened during the current year (OP_CY), stores that will be or have been closed during the current year (CLO_CY), stores closed during the previous year (CLO_PY), and stores opened during the previous year (OPE_PY). This property will be populated automatically from the hierarchy present in SAP S4. It is updated annually for Directs, while for Franchising, it is updated monthly.

- Remodeling, which allows identifying through a flag (Y) whether that point of sale is subject to remodeling in the planning year. This is useful for planning purposes, as a store undergoing remodeling but which by the rule described above would be part of the L4L perimeter is planned with different logic compared to the other L4L but continues to remain in that cluster for reporting purposes.
- Opening date, actual or planned opening date
- Closing date, actual or planned closing date
- Reference Store, which allows indicating for new openings the twin store to use as a basis for initialization

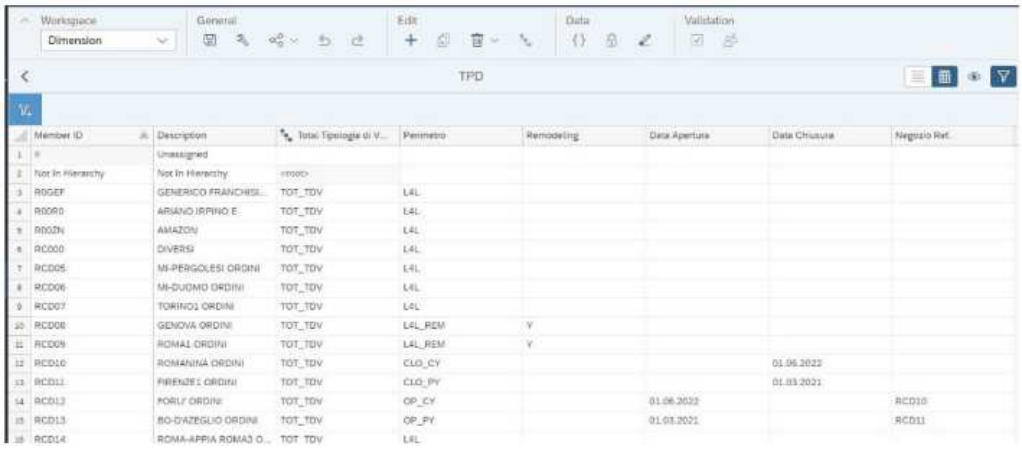


Figure 9: BU Retail – Type of Sale

For Clubs, the Type of Sale dimension represents the Purchase Channel. The elements that will compose the Masterdata of the Type of Sale in SAC correspond to the elements present in the TV5 dimension (attribute of the

Type of Sale) in SAP. The Types of Sale relevant for Clubs are identified through a specific node within the hierarchy.

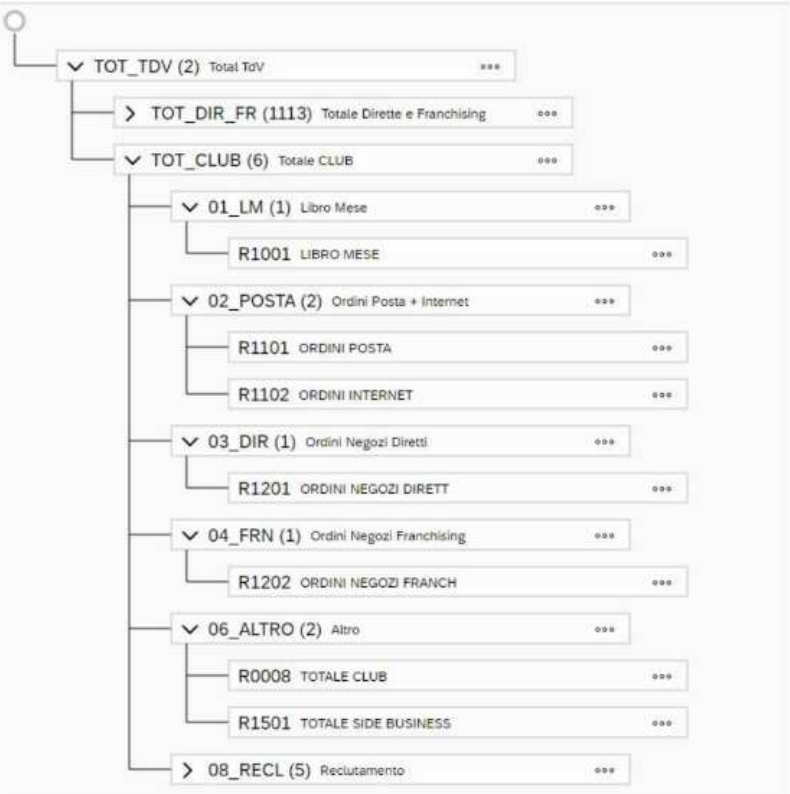


Figure 10: BU Retail – Type of Sale.2

Management / Planning Account For other Profit and Loss items such as Off-store Communication and Corporate, IT Business, Sponsored Revenue, etc., management is planned through rules defined with the goal of identifying how the different account items are planned and/or calculated both for Directs and Franchising. To identify whether a specific account follows one rule or another, the following attributes will be leveraged:

- Directs/Web Planning Type: Generic Store (input for CE items identified in master data by this attribute will occur on the generic store for Directs/Web), Percentage Driver (CE items will be calculated as the product of the percentage entered into the system and the calculation driver whose specifications are managed with the "Directs/Web Calculation Driver" attribute reported below), and Store Value (input for CE items identified in master data by this attribute will occur on the individual store).

- Directs/web Calculation Driver: This attribute is used to identify the calculation base for CE items identified as "Percentage Driver" in the "Type of planning Directs/Web" attribute. Such items are calculated as the product of the percentage entered and the calculation base identified by this property. Possible calculation bases are COGS, Turnover, Class Turnover, Net Product Revenue on a specific PDV or on the generic.

- Franchising Planning Type: Generic Store (input for CE items identified in master data by this attribute will occur on the generic store for Franchising), Percentage Driver (CE items will be calculated as the product of the percentage entered into the system and the calculation driver whose specifications are managed with the "Franchising Calculation Driver" attribute reported below), Store Value (input for CE items identified in master data by this attribute will occur on the individual store).

- Franchising Calculation Driver: This attribute is used to identify the

calculation base for CE items identified as "Percentage Driver" in the "Type of planning Franchising" attribute. Such items are calculated as the product of the percentage entered and the calculation base identified by this property. Possible calculation bases are Class Turnover and PVP.

- Club Planning Type: Input Value (input for CE items will occur on the generic product, with detail of Sale Type and Catalog), Percentage Driver (CE items will be calculated as the product of the percentage entered into the system and the calculation driver whose specifications are managed with the "Club Calculation Driver" attribute reported below).

- Club Calculation Driver: This attribute is used to identify the calculation base for CE items identified as "Percentage Driver" in the "Type of planning Club" attribute. Such items are calculated as the product of the percentage entered and the calculation base identified by this property. Possible calculation bases are Gross Turnover and Net Turnover.

Catalog - Club Retail Only The Catalog dimension is designed to allow the management of the informative detail characteristic of marketing plans in the planning of Revenues. Each Club is made up of multiple catalogs and therefore will be identified as a hierarchical aggregation of the same. This will allow users to plan at the total club level (Euro5, Euro4, Publishers and Literary Circle) or at the individual catalog level if necessary.

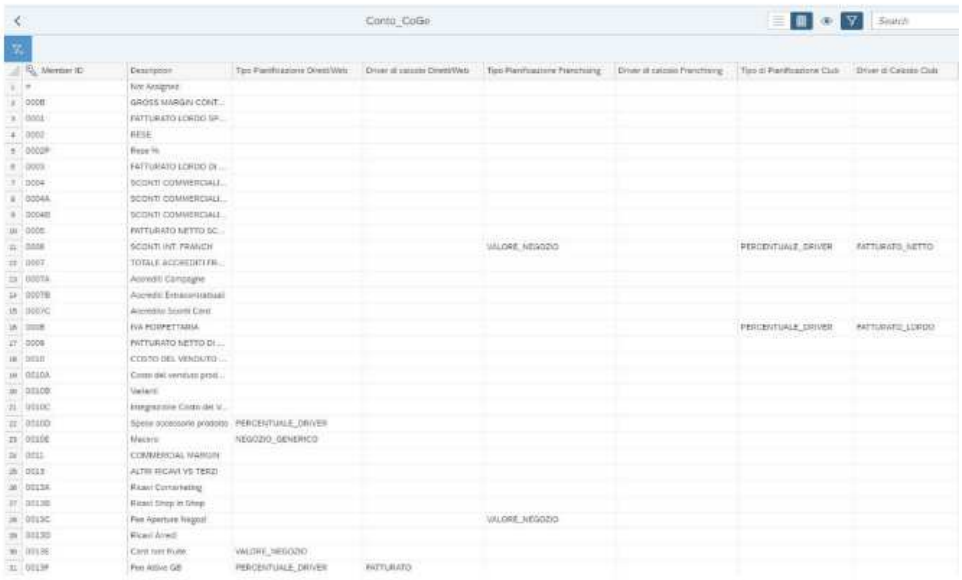


Figure 11: BU Retail – Management / Planning Account

Distribution Channel The channel dimension represents the type of distribution followed by the various merchandise categories. It is divided between Group Publishers and third parties. This dimension is essential to obtain the desired data granularity and the expected reporting detail. It will be maintained separately from the type of sale despite being present in SAP and also derived from a product attribute (Distributed Flag). In this case, it will always be possible to explode the detail or rather plan at the total (where perhaps it is not significant to differentiate between the various distribution channels).

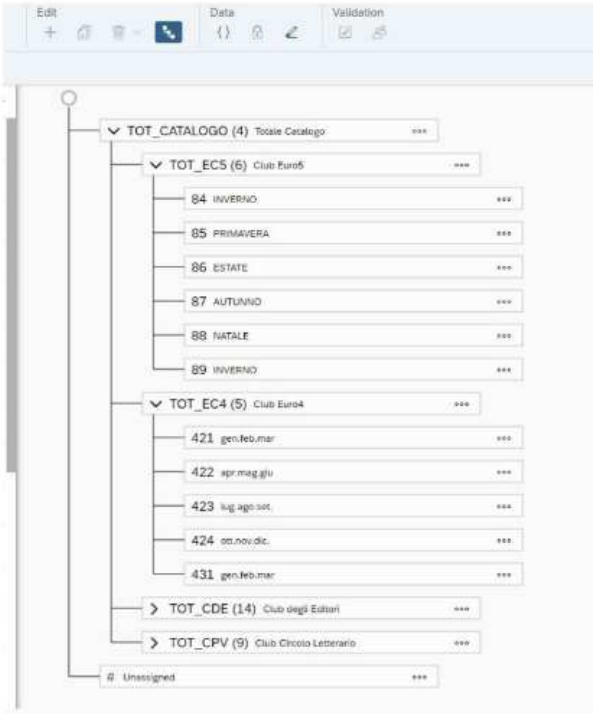


Figure 12: BU Retail – Catalog

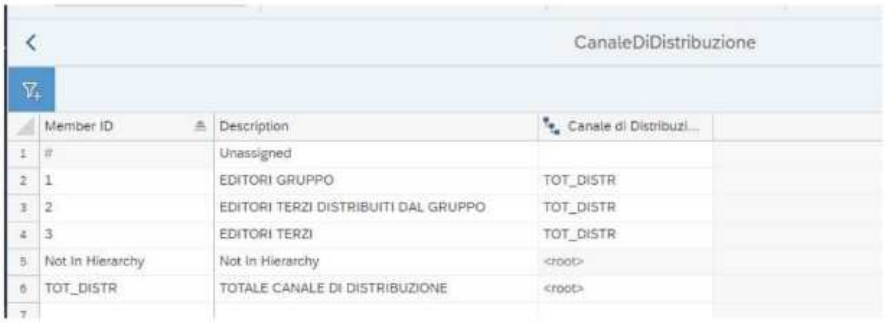


Figure 13: BU Retail Distribution Channel

4.3.3 BU HR

The planning of labor costs, given its relevance and the need for confidentiality, will be managed through a separate model, with security limited only to

the HR control team. Below are the dimensions that make up the HR data model within the application, taken from the Master Design phase:

Dimension	**Description**	**Desired Planning Granularity**	**Reference to the S4 Model**
Version	Represents the different planning versions of the data (e.g., Budget, Forecast)	Single item (actual, budget, forecast)	Version
Period	Represents the month in which effects are recorded	Month	Period
Company	Represents the companies of the ABC S.p.A group	Single item	Company
Intercompany	Represents the trading partners of the ABC S.p.A group (partner companies)	Single item	Intercompany
Data Type	Represents the origin/type of the data (source data, adjustment, calculation)	Single item	Source
Profit Center	Represents the profit center to which the data is asserted	Single profit center	Profit Center
Cost Center	Cost center of the ABC S.p.A group. Used for all HR costs, shared services	Single cost center	Cost Center

Account	Represents the chart of accounts used for planning. In the analysis phase, the need to reduce the number of management accounts subject to planning was identified	Single management account	N/A
Co.Ge Account	Represents the accounting chart of accounts. For planning purposes and export to BPC, each planning account will be associated with a specific Co.Ge account	Single accounting account	Co.Ge Account
OpenBudget Account	Represents the chart of accounts used in the HR planning system OpenBudget	Single item	Not applicable
Functional Area	Represents the planning natures. For planning purposes, these will be aggregated according to a criterion of data significance and thus reduced in number	Single functional area	Functional Area
Classification	Information that distinguishes between managers/executives and employees	Single item	Not applicable

The Masterdata of the relevant dimensions for the BU Retail for Direct/Web, Franchising, and Club will be maintained automatically where

possible; in other cases, it will be carried out manually.

Management of the Account Dimension Below I report an illustrative table on the management of the Account dimension in the HR BU:

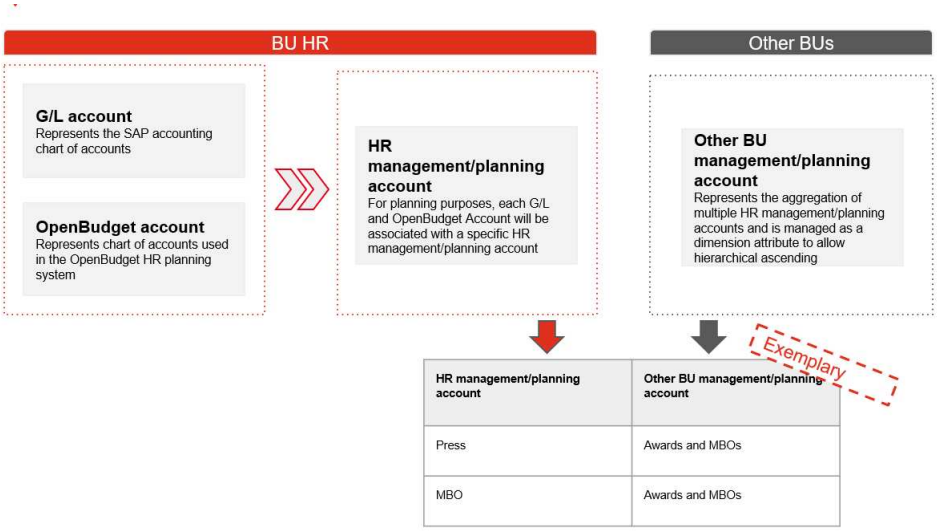


Figure 14: Management of the Account Dimension BU HR

HR Planning Focus Represented below, a summary of the information flows between BUs regarding the planning of labor costs. The various uploads, highlighted and numbered, correspond to the table below, which details the characterizing aspects. Flows 4 and 6 represent the exchange of information between the various models, and therefore primarily the propagation of labor cost elements from the HR model to the models of the other BUs and subsequently the return of information from the BUs for those items that are planned directly (interns, capitalization of labor costs...) which, in addition to the data present in the HR model, contribute to the preparation

of the reporting of the Total Labor Cost for the ABC SpA group.

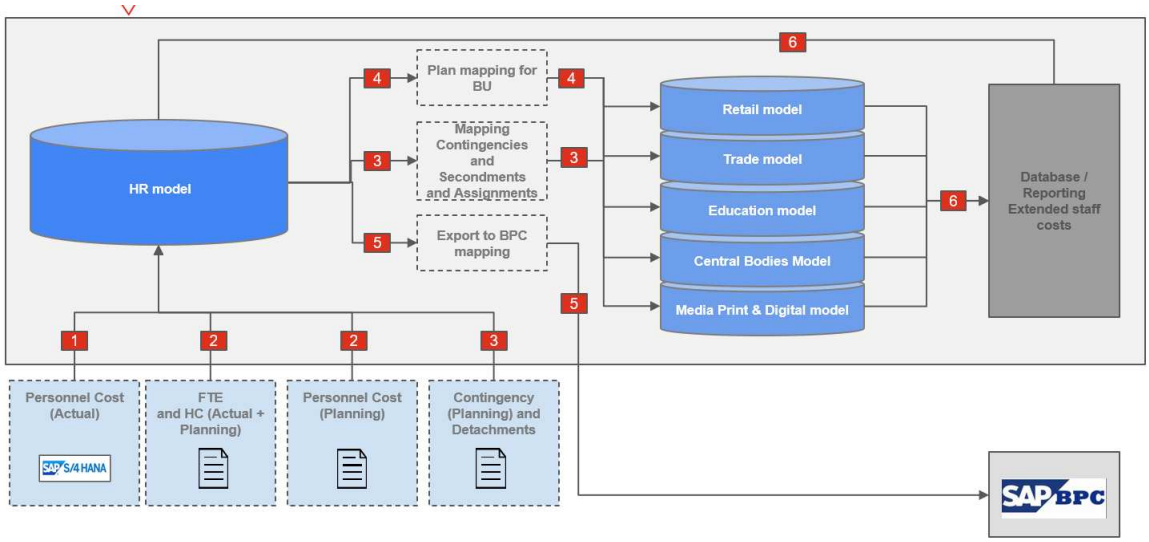


Figure 15: HR Planning Focus

Type of Loading	**Mapping Details**	**Mapping Required**	**Reference to the S4 Model**
Cost of Personnel (Actual)	Automatic	Yes	Company, HR Account, Management/Planning Account, General Accounting Account (Co.Ge), Functional Area, Cost Center, Intercompany, Profit Center, Data Type

Headcount and FTE (Actual)	Manual	Yes	Company, HR Account, Management/Planning Account, General Accounting Account (Co.Ge), Functional Area, Cost Center, Profit Center, Intercompany, Data Type
Headcount and FTE (Planning)	Manual	Yes	Company, HR Account, Management/Planning Account, General Accounting Account (Co.Ge), Functional Area, Cost Center, Profit Center, Intercompany, Data Type
Cost of Personnel (Planning)	Automatic	Yes	Company, HR Account, Management/Planning Account, General Accounting Account (Co.Ge), Functional Area, Cost Center, Profit Center, Intercompany, Data Type
Contingency (Planning)	Manual	Yes	Company, HR Account, Intercompany, Data Type
Export to BPC (Planning)	Automatic	Yes	Company, HR Account, Management/Planning Account, General Accounting Account (Co.Ge), Functional Area, Cost Center, Intercompany, Profit Center, Data Type

4.3.4 Security

In SAC, it is possible to manage user privileges through the definition of Roles, which aim to limit the activities that users can carry out in systems and to which dimensions they can access. Users who share the same authorization privileges can be grouped into Teams. By assigning Roles directly to a Team, all restrictions will be automatically applied to each individual member of the Team. Four different types of Roles are defined, as shown in the table below.

ID	**Roles**	**Descriptions**
1	Administrator	User administrator with full privileges and acts as a system administrator.
2	Group User	Central user who can access various scheduling processes with read and write privileges.
3	Specialist	This user can access only reserved parts of the scheduling process with limited privileges.
4	Viewer	This user has read-only authorization privileges.

In the context of the ABC S.p.A project, we will create a separate model to manage the planning for each BU, and therefore, user accounts will be

profiled according to the model they will have access to. Users from different BUs will thus have authorization to access data from their specific model.

Currently, apart from the model, no other types of restrictions on the displayed data have been considered. However, it is possible to manage data access restrictions in SAC, by defining for each model what the protected dimensions are. For each element of such dimensions, the Teams and/or Users who have access can be defined, and in what mode (Read-Only or Write).

Access to data in SAC is managed differently between models.

5 Implementation - Case study

Building upon our prior discussions, this chapter specifically focuses on the detailed implementation of A.B.C Spa's strategic transformation. Here, we will closely examine the adoption of data warehousing and business intelligence tools that are pivotal in reshaping the company's approach to budgeting and forecasting in the digital age. OR In this chapter, we turn our attention exclusively to the implementation within the Business Unit (BU) Enti Centrali of A.B.C Spa. We will explore in depth how data warehousing and business intelligence tools are being employed specifically in this segment, transforming the company's budgeting and forecasting practices in the context of the digital evolution.

5.1 Central Entities Business Unit

The main areas of improvement we have identified as a solution to support the planning process in Central Entities are as follows:

Introduction of a proxy for recharges to be applied to the Business Units (BU) in progress while the data collection process is still ongoing (calculation performed only in the budget process). Simplification of the types of drivers used for the allocation to the BUs and automation of the calculation and sending of the recharge in the BUs' P&L. Aggregation of planning natures on significant elements and automation in the preparation of the working database to support the process. Introduction of the "Project" dimension for the segmentation of IT costs. Version Set-Up: The query "Free Analysis - Controlling - ZQ_ZCP_CO05_000" accessible in SAP allows, by selecting

Company 100 – ABC S.p.A, access to the ACTUAL (ACT01) data relevant to the Central Entities process, which will be imported into SAP Analytics Cloud through initialization calculation.

An extract of the dimensions identified as relevant for the process:

Time	Società	Società del partner	Profit center	Conto Co.Ge.	Centro di costo	Consuntivo
2020.01	100	110	O0101	60209035	#	350
2020.01	100	150	O0101	62103002	#	64,03
2020.01	100	370	O0101	60209014	#	18577
2020.01	100	370	O0101	60209015	#	59241
2020.01	100	370	O0101	70406004	1008350	14256,66
2020.01	100	450	O0101	60209014	#	58584
2020.01	100	450	P0101	70302008	1008170	-3333,33

Figure 16: Relevant identified Dimensions

To comprehensively elucidate the project's processes and implementation, we'll commence by analyzing the report or story of the Central Entities Business Unit. For each page of the report, we will delve into the details of the procedures, workflows, data flows, and connections to other systems and software to provide a thorough understanding.

5.1.1 Central Entities Initialization

At the first page of the story (Figure 17), the first step highlighted is the importation of Actual Data into SAC. This step is crucial because integrating data systems is a key goal of the project, and it has been successfully achieved. The integrated data system operates as follows: "Actual" data, residing in SAP HANA, is transferred to SAP Datasphere. Here, the data is processed - cleaned, projected, and mapped - before being sent to SAC. The views employed within SAP Datasphere for exporting and altering the data are

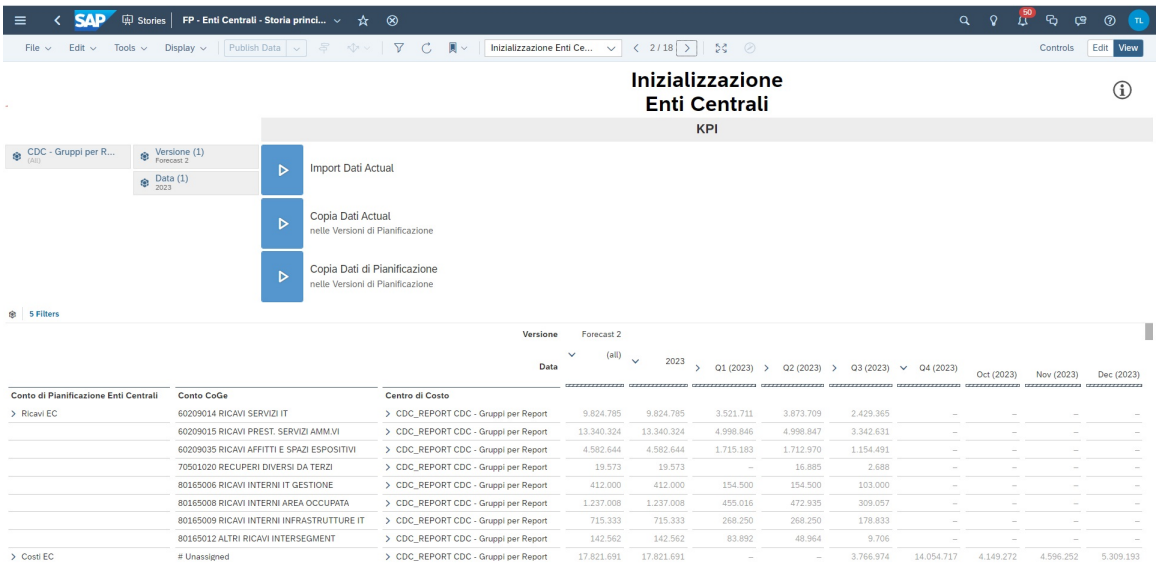


Figure 17: Central Entities Story - Initizlize Page

clearly depicted in the accompanying Figure 18 .

After transferring data to SAC, we employ a Data Action to replicate and update the data across various versions. This action not only modifies the data's version but also advances its date from the current year to the forthcoming planning year. The process begins by clearing any existing data in the other versions. The data is then temporarily held in an intermediary storage area. In subsequent steps, this data is meticulously moved to the 'Input' section, which serves as the final destination for data storage in the Database. To maintain data integrity and cleanliness, the temporary data storage is subsequently cleared.

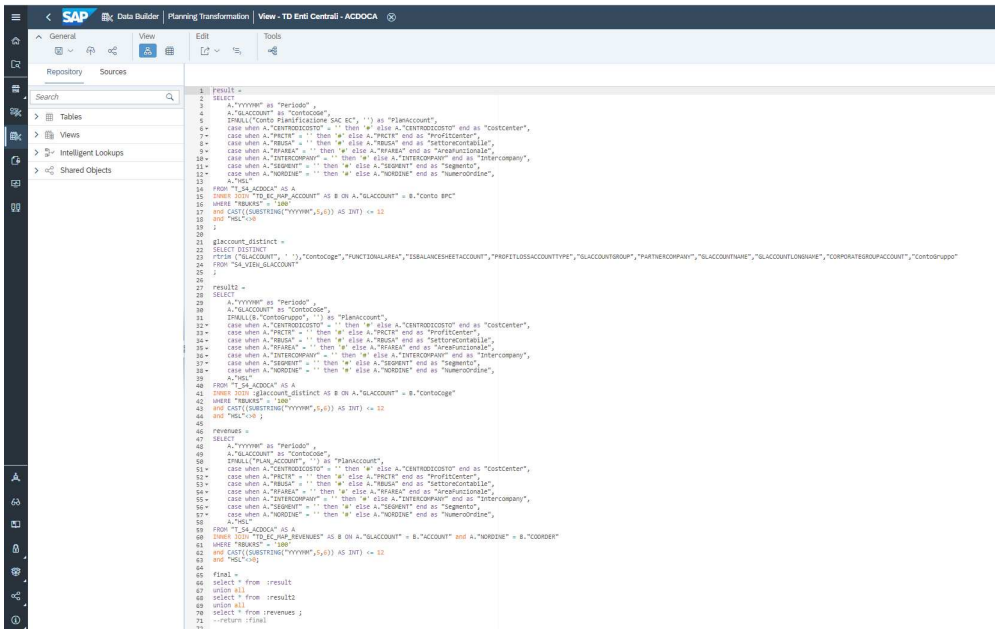


Figure 18: Actual Data processing in SAP Datasphere

5.1.2 Central Entities Planning

This story allows users to modify data related to the Central Entities Profit Center, initially set up for planning versions by Cost Center and Project. Users have the option to adjust the annual total data for the desired planning version. The page enables users to compare data from versions previously selected in the Dashboard and to view corresponding variances (all variances compare data from the AC Version with others).

5.1.3 Setup for Allocating Recharges to Occupied Areas

This functionality enables users to designate, for each Corporation, the specific Cost Center and Functional Area to which recharges associated with

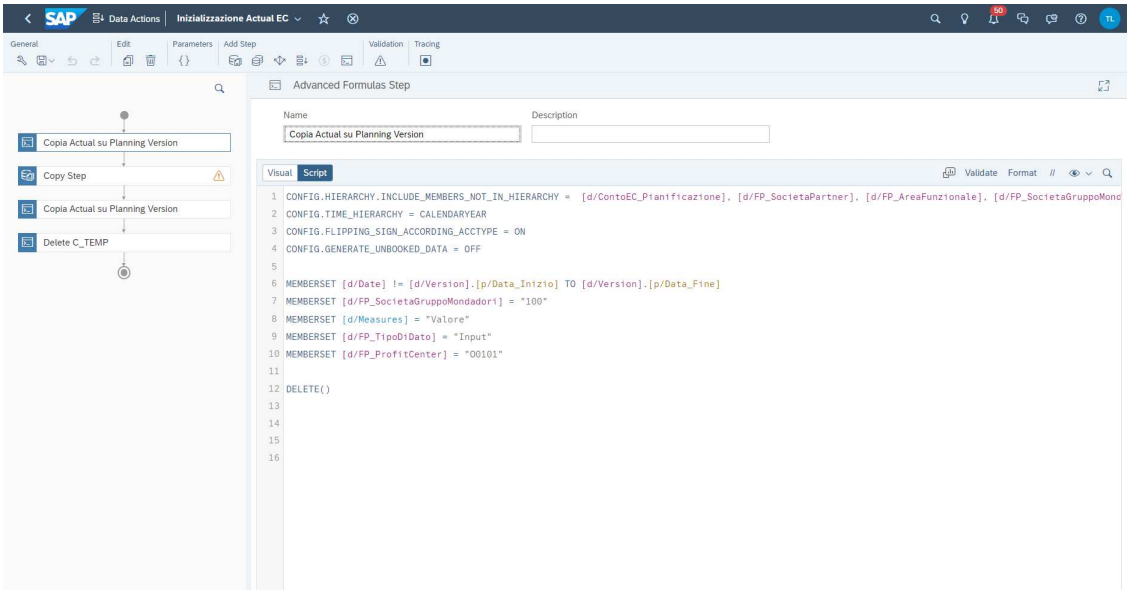


Figure 19: Data distribution to other Versions - Delete Previous Data

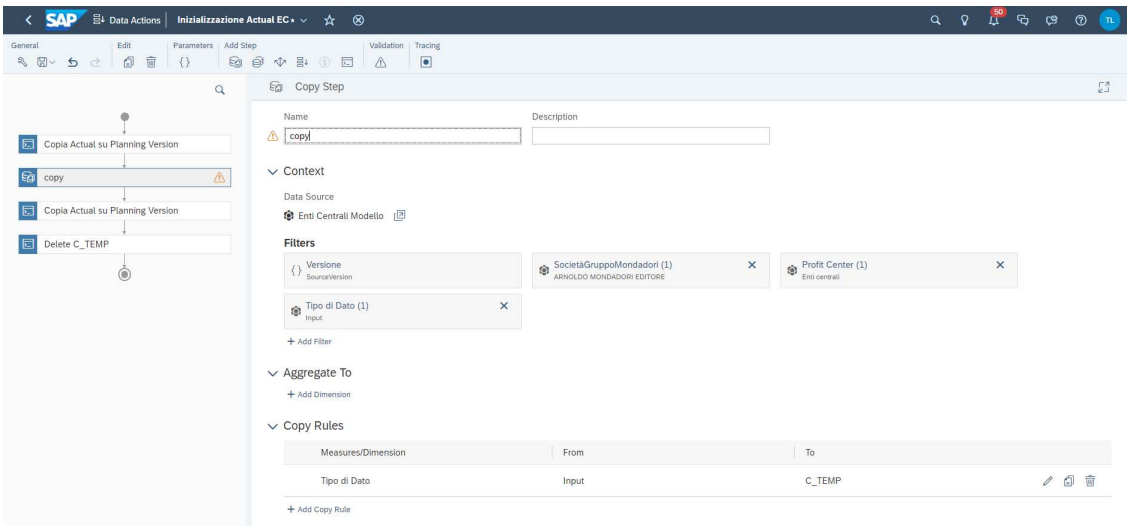


Figure 20: Data distribution to other Versions - Copy Step

Occupied Areas should be mapped. The corresponding Profit Center will

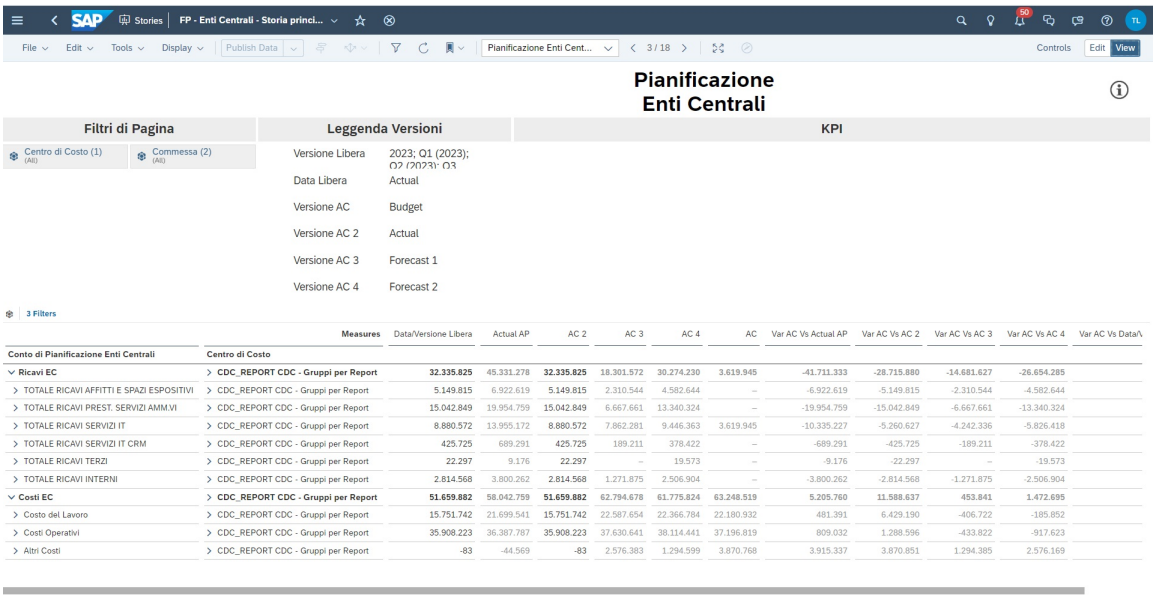


Figure 21: Central Entities Planning

be inferred from the designated Cost Center. Additionally, users can assess the mapping's accuracy for the previous year by utilizing the 'Year/Version for Comparison' column, ensuring historical consistency and correctness in allocation.

"Add Combination" button, a popup will appear asking you to select the Target Version, Functional Area, Cost Center, Company, and Period. This process enables the entry of mapping data (via a "1") into the system.

5.1.4 Manual Driver Configuration

This functionality enables users to either upload or automatically populate different drivers that are then used in recalculating charges for each specific combination of Company and Cost Center. Users have the option to choose

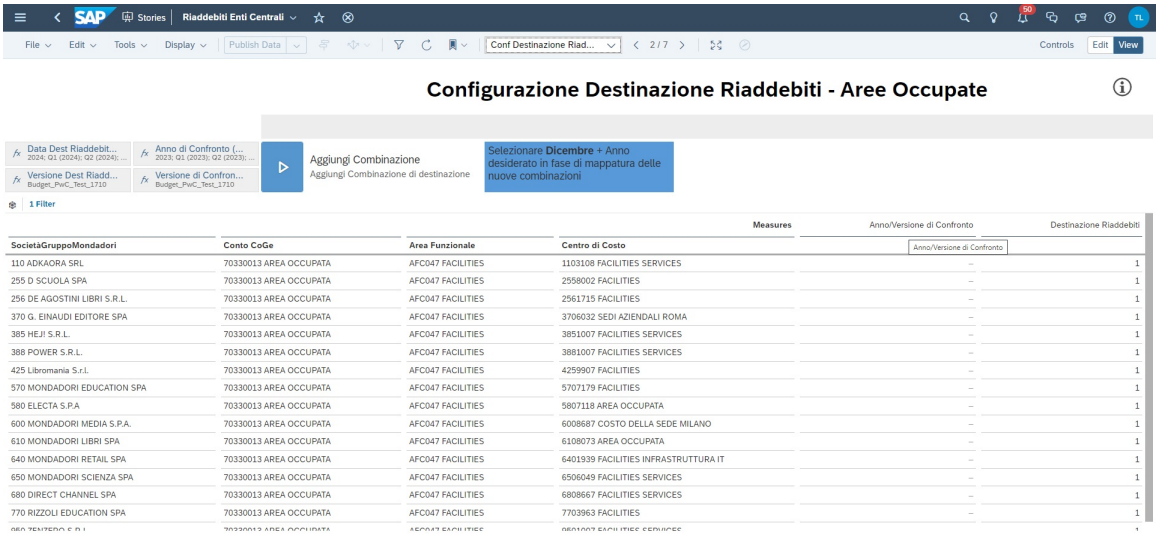


Figure 22: etup for Allocating Recharges to Occupied Areas

which driver to utilize for loading or inputting values, using a page filter for guidance. These drivers can be either manual (such as office space in square meters, number of clients managed, workload efforts, etc.) or automatically pre-filled. The automatic pre-filling occurs by running a computation for all pre-existing system data, including headcount, full-time equivalents, projected revenues, revenues from external sources, direct expenses, and labor costs.

5.1.5 Driver Selection Process

This story enables users to specify which driver will be applied to a particular Cost Center for the purpose of recalculating charges. A pop-up will appear, allowing users to choose from the available Cost Centers and Drivers in the system. Selecting these options will lead to the actual mapping in the system,

which can be verified through the report provided below.

Users will have the opportunity to indicate in the "Mapping" column which driver they want to apply to a specific Cost Center for recalculating charges. The corresponding numbers to be indicated for each driver are clearly displayed in illustrative mirrors at the top of the page.

The priority order for recalculating charges is managed through the properties of the Cost Center dimension in the relevant MasterData. This structured approach ensures a streamlined and efficient process for managing and applying drivers to Cost Centers.

5.1.6 Recharge Calculation Feature

This integrated feature streamlines the recharge calculation process, starting with users uploading revenue data via an Excel file into the SAP Datasphere (Figure 23). The data is then processed and transferred to SAC (Figure 24).

During the recharge calculation, costs are allocated to the individual Business Units' Cost Elements (CE), and revenues are recorded in the Central Entities' CE, with the total value evenly distributed across 12 months. For the holding company, users input varying percentages based on cost centers, leading to the cost calculation stage. Here, data from revenue accounts is replicated to cost accounts under specific conditions, with account details adjusted to accurately reflect costs.

Users can review and manually adjust these calculations in the report, including the option to overwrite values. Flexibility is further enhanced by the ability to exclude certain CE items, like depreciation, by managing a

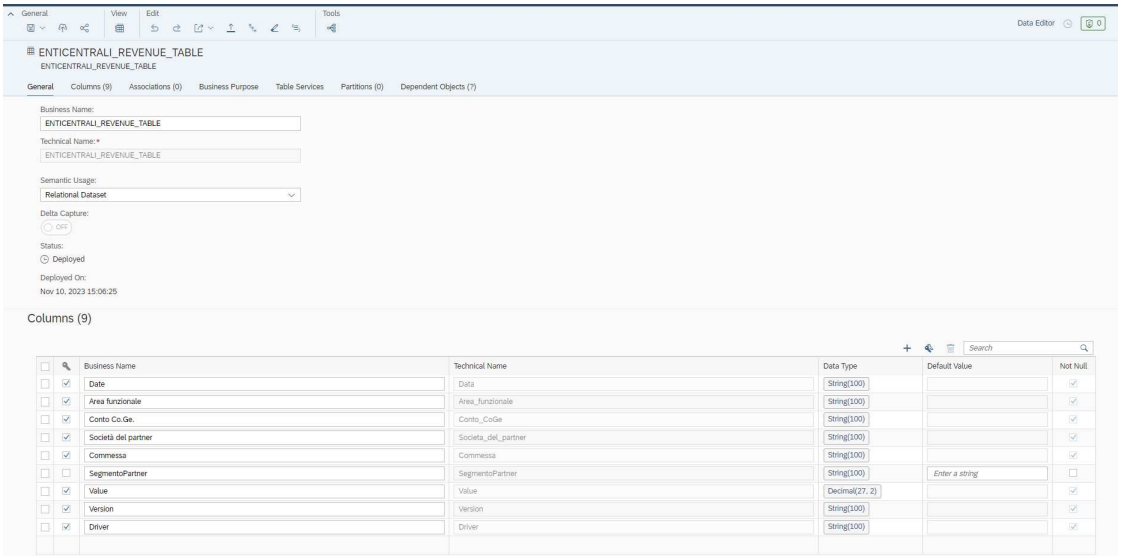


Figure 23: Revenues table in Datasphere used for uploading the revenues via Excel file

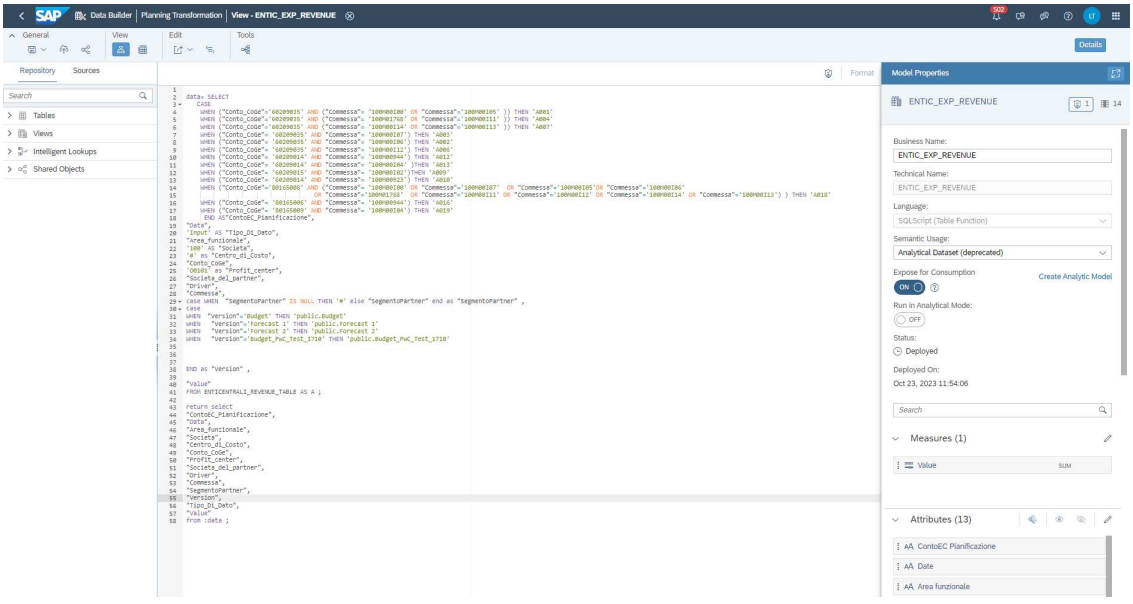
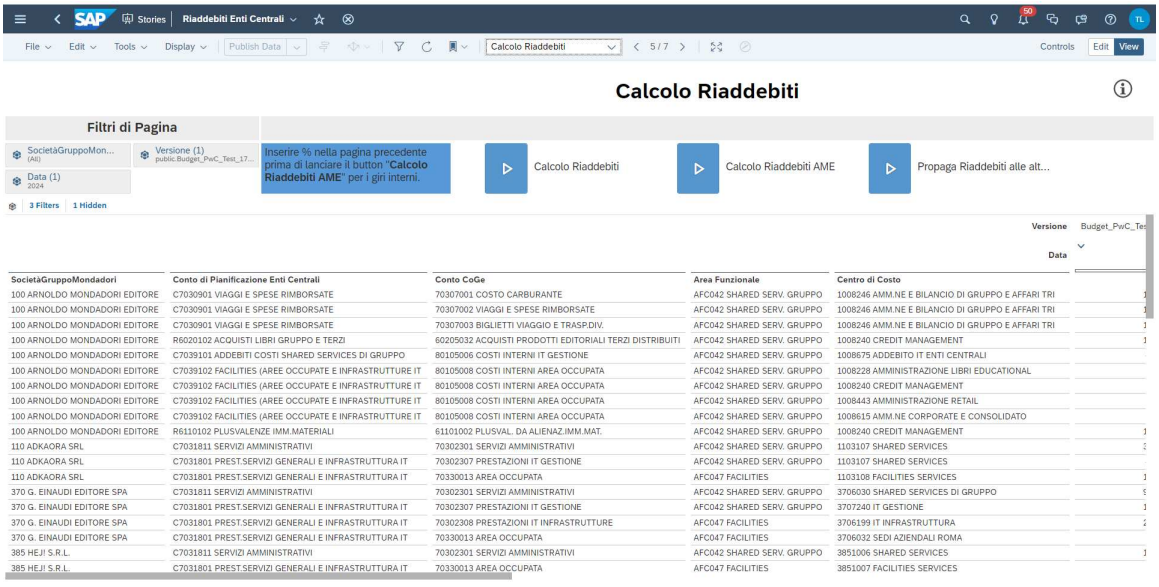


Figure 24: Processing Uploaded Revenue data and returning the Data to SAC

property in the Account dimension. The final step in this comprehensive process involves spreading the calculated costs to other Business Units. This is executed using a multi-action approach, which contains different data actions for each Business Unit model. It involves copying data from the Central Entities to other BUs and assigning the correct planning account based on the destination Business Unit. This method ensures a meticulous and efficient distribution of recharges across the relevant Economic Accounts of all involved Business Units, aligning with specific financial and operational requirements.



SocietàGruppoMondadori	Conto di Pianificazione Enti Centrali	Conto CoGe	Area Funzionale	Centro di Costo
100 ARNOLDO MONDADORI EDITORE	C7030901 VIAGGI E SPESE RIMBORSATE	70307001 COSTO CARBURANTE	AFC042 SHARED SERV. GRUPPO	1008246 AMM.NE E BILANCIO DI GRUPPO E AFFARI TRI
100 ARNOLDO MONDADORI EDITORE	C7030901 VIAGGI E SPESE RIMBORSATE	70307002 VIAGGI E SPESE RIMBORSATE	AFC042 SHARED SERV. GRUPPO	1008246 AMM.NE E BILANCIO DI GRUPPO E AFFARI TRI
100 ARNOLDO MONDADORI EDITORE	C7030901 VIAGGI E SPESE RIMBORSATE	70307003 BIGLIETTI VIAGGIO E TRASP.DIV.	AFC042 SHARED SERV. GRUPPO	1008246 AMM.NE E BILANCIO DI GRUPPO E AFFARI TRI
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100 ARNOLDO MONDADORI EDITORE	C7039101 ADDEBITI COSTI SHARED SERVICES DI GRUPPO	80105006 COSTI INTERNI IT GESTIONE	AFC042 SHARED SERV. GRUPPO	1008675 ADDEBITO IT ENTI CENTRALI
100 ARNOLDO MONDADORI EDITORE	C7039102 FACILITIES (AREE OCCUPATE E INFRASTRUTTURE IT	80105008 COSTI INTERNI AREA OCCUPATA	AFC042 SHARED SERV. GRUPPO	1008228 AMMINISTRAZIONE LIBRI EDUCATIONAL
100 ARNOLDO MONDADORI EDITORE	C7039102 FACILITIES (AREE OCCUPATE E INFRASTRUTTURE IT	80105008 COSTI INTERNI AREA OCCUPATA	AFC042 SHARED SERV. GRUPPO	1008240 CREDIT MANAGEMENT
100 ARNOLDO MONDADORI EDITORE	C7039102 FACILITIES (AREE OCCUPATE E INFRASTRUTTURE IT	80105008 COSTI INTERNI AREA OCCUPATA	AFC042 SHARED SERV. GRUPPO	1008443 AMMINISTRAZIONE RETAIL
100 ARNOLDO MONDADORI EDITORE	C7039102 FACILITIES (AREE OCCUPATE E INFRASTRUTTURE IT	80105008 COSTI INTERNI AREA OCCUPATA	AFC042 SHARED SERV. GRUPPO	1008615 AMM.NE CORPORATE E CONSOLIDATO
100 ARNOLDO MONDADORI EDITORE	R6110102 PLUSVALENZE IMM.MATERIALI	61101002 PLUSVAL. DA ALIENAZ.IMM.MAT.	AFC042 SHARED SERV. GRUPPO	1008240 CREDIT MANAGEMENT
110 ADKAORA SRL	C7031811 SERVIZI AMMINISTRATIVI	70302301 SERVIZI AMMINISTRATIVI	AFC042 SHARED SERV. GRUPPO	1103107 SHARED SERVICES
110 ADKAORA SRL	C7031801 PREST.SERVIZI GENERALI E INFRASTRUTTURA IT	70302307 PRESTAZIONI IT GESTIONE	AFC042 SHARED SERV. GRUPPO	1103107 SHARED SERVICES
110 ADKAORA SRL	C7031801 PREST.SERVIZI GENERALI E INFRASTRUTTURA IT	70330013 AREA OCCUPATA	AFC047 FACILITIES	1103108 FACILITIES SERVICES
370 G. EINAUDI EDITORE SPA	C7031811 SERVIZI AMMINISTRATIVI	70302301 SERVIZI AMMINISTRATIVI	AFC042 SHARED SERV. GRUPPO	3706030 SHARED SERVICES DI GRUPPO
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370 G. EINAUDI EDITORE SPA	C7031801 PREST.SERVIZI GENERALI E INFRASTRUTTURA IT	70330013 AREA OCCUPATA	AFC047 FACILITIES	3706032 SEDI AZIENDALI ROMA
385 HEJI S.R.L.	C7031811 SERVIZI AMMINISTRATIVI	70302301 SERVIZI AMMINISTRATIVI	AFC042 SHARED SERV. GRUPPO	3851006 SHARED SERVICES
385 HEJI S.R.L.	C7031801 PREST.SERVIZI GENERALI E INFRASTRUTTURA IT	70330013 AREA OCCUPATA	AFC047 FACILITIES	3851007 FACILITIES SERVICES

Figure 25: Calculating the Recharges

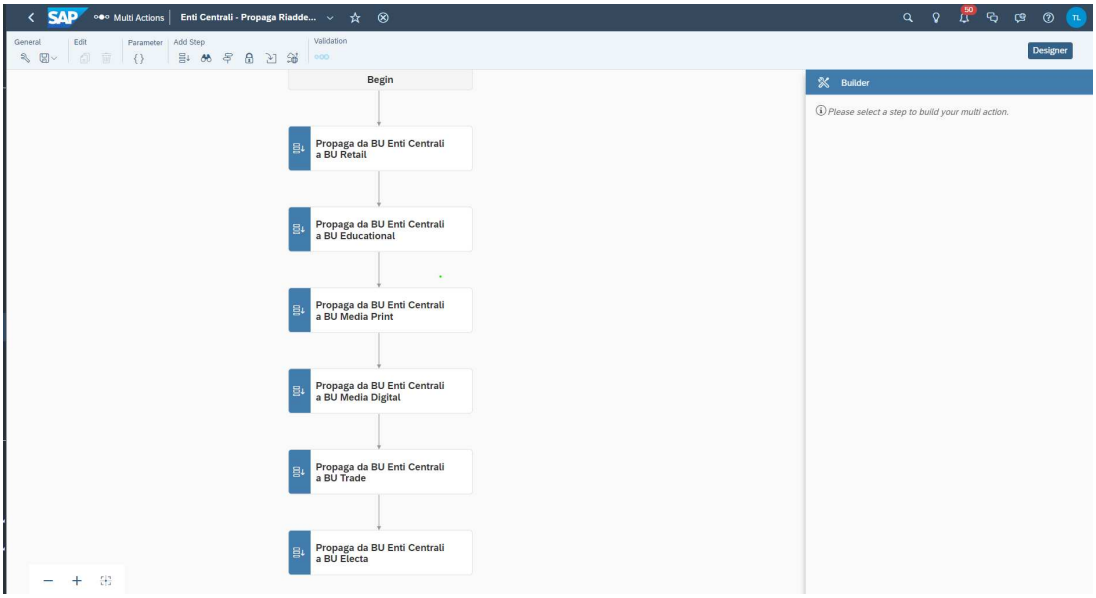

Figure 26: Spreading costs from Enti Centrali to other BUs

5.2 Retail Business Unit

5.2.1 Key Improvement Areas in Retail Planning Process

The new solution introduced for the retail planning process is distinguished by several key strengths. It starts with planning initialization, which employs a baseline established through the system's standard forecasting features. This approach offers an objective and shared foundation for business discussions. Another notable aspect is the incorporation of automated functions for percentage splits across analyzed dimensions (like month, product, channel), streamlining forecast data entry and simulation tasks. Additionally, there's a focus on standardizing direct cost management methods, adaptable to user changes over time, based on preset configurations.

5.2.2 Managing the Scop

Managing the scope effectively is central to this process. It involves the precise configuration of the 'Sales Type' dimension, representing the store. This configuration extends to the valuation of properties such as Opening/Closing Date, Remodeling, and Scope. Scope management is executed through two primary methods:

- **Sales Type Attribute** This property is automatically determined based on the corresponding hierarchy in SAP, offering continuous access to the most current scope configuration. This means that a store, when viewed through this hierarchy, will be tagged with the relevant configuration like L4L, regardless of its settings in the version or time being reviewed.

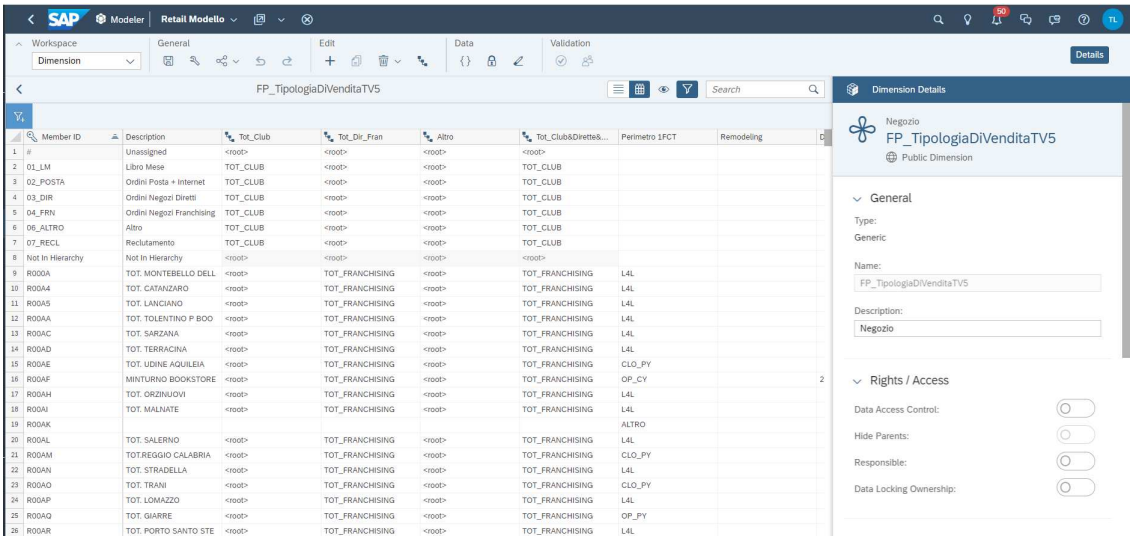

Figure 27: Sales Type Attribute

- **Scope Dimension** The initialization calculation writes data to the scope dimension element matching the aforementioned property. This process allows for historical tracking of the dataset for that version, aiding in identifying the store's status at that time.

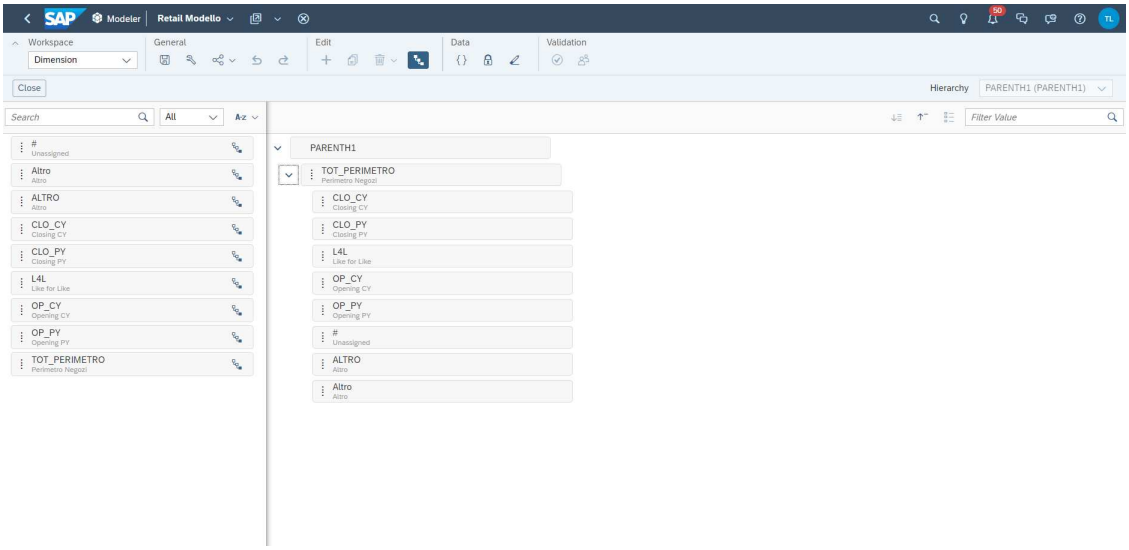

Figure 28: Scope Dimension Hierarchy

Post defining the scope, the next step involves initializing historical data as the baseline for the planning process. This initialization is categorized into three areas: initializing stores with an L4L defined scope using SAC's Predictive Scenarios, new store openings based on a similar store's history, and setting forecast values to zero from the closure date for store closures. The Forecast Version provides the flexibility to choose between utilizing historical data or the data present in the Budget version.

5.2.3 Retail Actual Query Enhancement

Lastly, the query "Retail New - YQ_ZCP_CO05_R_001" in SAP has undergone a transcription process using a specialized table. This enhances the analysis and mapping of data related to BU Retail, ensuring that data in ACDOCA is accurately mapped to the appropriate planning account. Key dimensions focused on in this transcription include Functional Area, Accounting Type, Co.Ge Account, Chart of Accounts, Sales Type, and Profit Centre. This detailed mapping and analysis capability are pivotal for effective planning and decision-making in the retail sector.

5.2.4 Retail - Direct/Web

The following narratives relate to revenue recognition and management of other Comprehensive Income (CI) items with reference to the Direct/Web process.

5.2.5 Net Revenue Dashboard

This story enables users to compare the actual data of year n and n-1 with the forecast and budget data of year n by Product Class for the entire year. It includes detailed information by perimeter and product, expanded by distribution channel.

5.2.6 Net Revenues FY (Fiscal Year)

This narrative provides users with the flexibility to alter the initial data for Budget and Forecast versions (selected through the page filter) across various dimensions, including Scope, Product, and Distribution Channel.

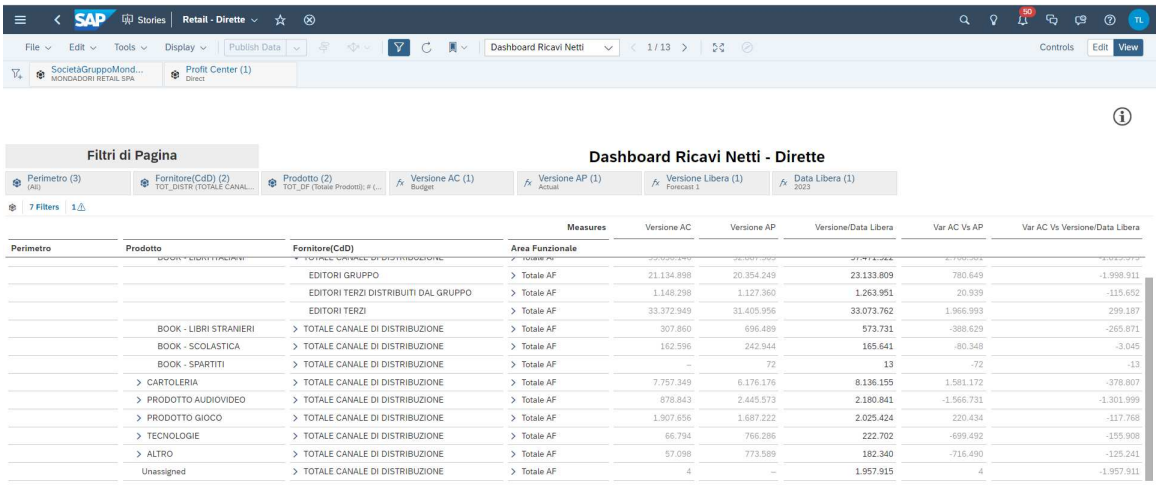

Figure 29: Net Revenue Dashboard

Additionally, there's an option to insert or amend data either for the entire year or on a monthly basis, focusing on Scope and product details, and further broken down by distribution channel."

5.2.7 Pricing and Discounts

This system empowers users to set the Retail Price (PVP - Gross Revenue of Net Product Returns), identified under the account "Gross Billing of Net Product Returns," along with applicable discounts. Users have the capability to input the discount percentage, which is initially based on historical data, and then recalculate the Commercial Discount based on the Gross Revenue. This calculation is triggered on demand by the user. The tool allows for the determination of both the Retail Price (PVP - Gross Revenue of Net Product Returns) and Discounts (Commercial Discounts of MTK), starting from the

net revenues, by reconstructing the discount percentage entered in the table below. ”

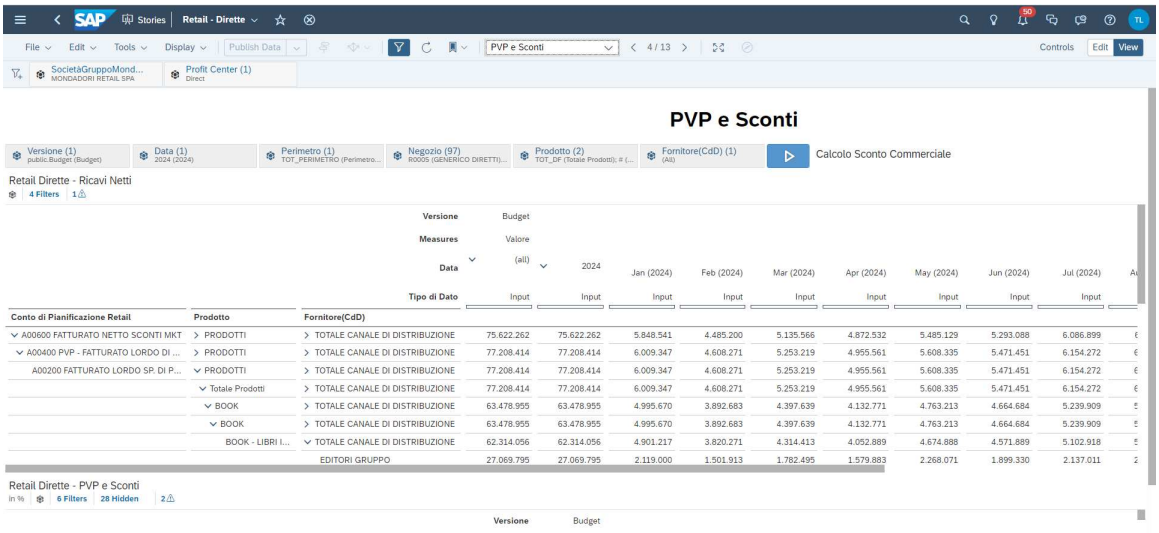

Figure 30: Pricing and Discount story

5.2.8 Cost of Goods Sold Calculation

This system allows users to determine the Cost of Goods Sold by entering a percentage of Gross Revenue (initialized based on historical data). Once the percentage is modified, the system requires an update calculation to refresh the Cost of Goods Sold values.

It enables the calculation of the Cost of Goods Sold (A01110 - Product Cost of Goods Sold) in monetary terms. This is done by multiplying the inputted Cost of Goods Sold percentage, as indicated in the table below, by the Standard Selling Price (PVP), which is used as the calculation base.

This tool simplifies the process of calculating the cost associated with

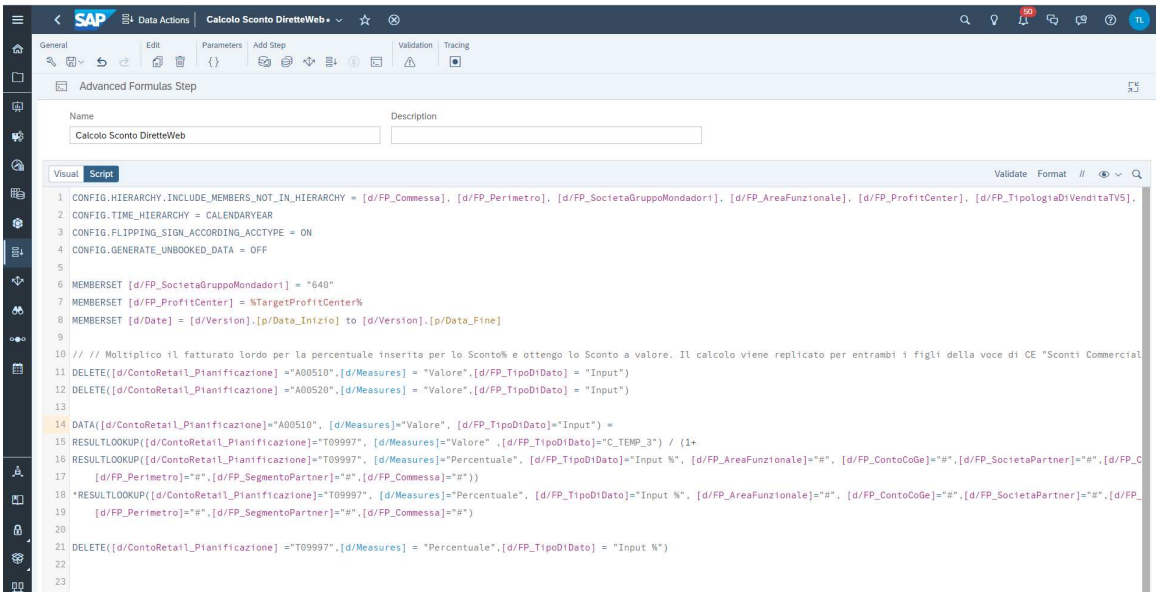

Figure 31: Disconunts calculation Script

goods sold, providing a dynamic way to assess and update financial metrics based on changing percentages and revenue figures.

5.2.9 Input KPI Percentage

This feature allows users to input percentage values for each selected account on a monthly basis. Following the entry of these percentages, it becomes possible to calculate the actual value of the account using various factors.

These factors are assigned through properties (Direct/Web Calculation Drivers) in the Account's Masterdata. The feature enables the determination of the value of Cost and Expense (CE) items available in the Input Control located on the left side of the page. This is achieved by multiplying the percentage entered in the table below with the calculation base displayed in

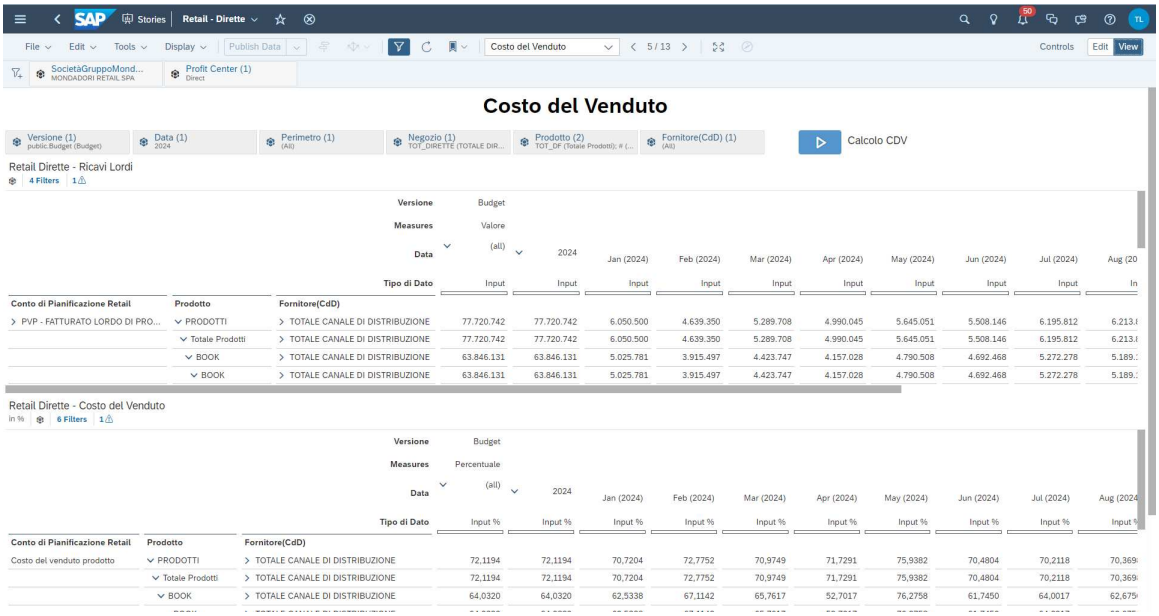

Figure 32: Cost of Goods Sold story

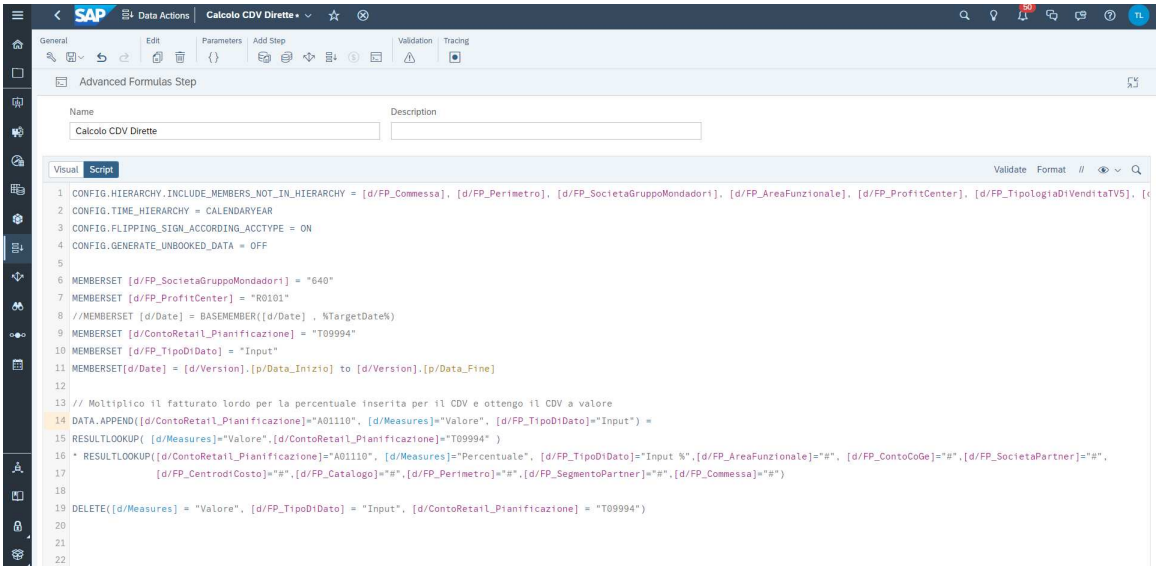

Figure 33: Cost of Goods Sold calculation Script

the "Direct/Web Calculation Drivers" column.

5.2.10 Brokerage Discounts Management

This system empowers users to compute brokerage discounts based on specific contractual agreements. The details of these agreements, including the type of sale, contract terms, start and end dates, and the discount rate in percentage, are uploaded into the system. There is an automatic increase provision for all contracts approaching expiration. The percentage of this increase, set by version and date, will be uniformly applied to all stores from the month following the contract's expiration (as detailed in the uploaded file).

In cases where the increase is significantly different, users have the option to revise the generated discount values. The system also allows for the importation of discounts previously stored in the Data Warehouse Cloud, including detailed information about the store, contract start and end dates, and the discount value in percentage.

Furthermore, the system facilitates the calculation of value-based discounts by multiplying the calculation base with the percentage discounts previously entered. This feature repeats the capability to import discounts from the Data Warehouse Cloud, with specific details about the store, contract duration, and discount percentage, enhancing the versatility and functionality of the system in managing and applying brokerage discounts.

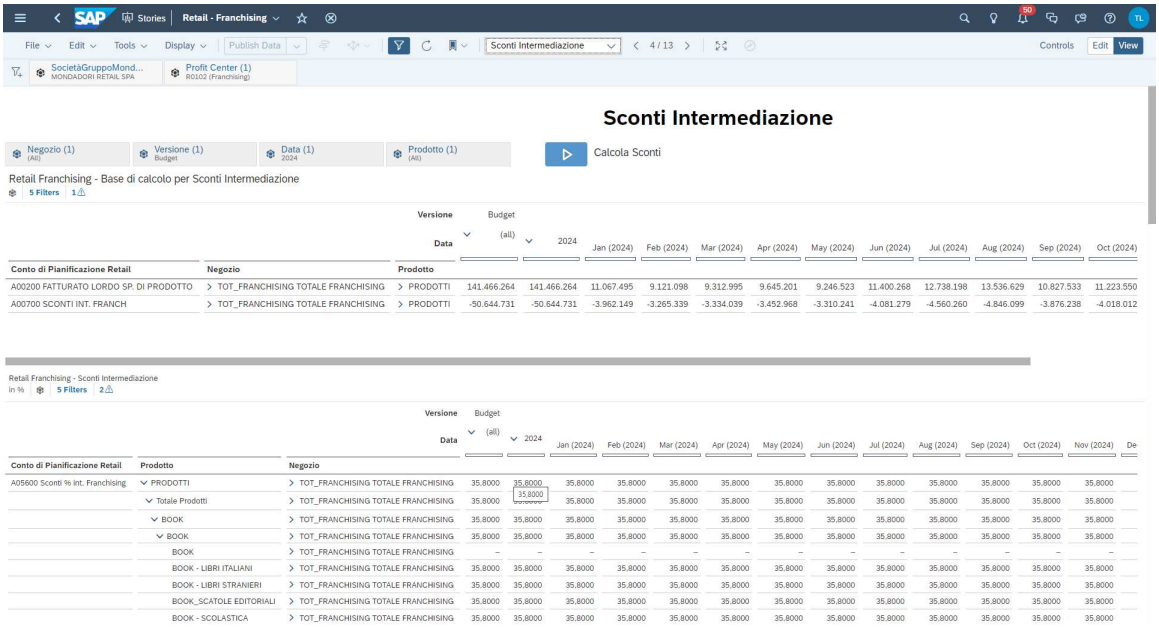

Figure 34: Cost of Goods Sold calculation Script

5.2.11 Retail Overhead Management

This section pertains to the "Central Entities Overhead Recharge Report." It enables retail users to review and verify the overhead charges calculated by the Central Business Unit (BU). These overhead charges are automatically allocated to the respective cost elements (CE) of each individual Business Unit and cannot be altered.

Furthermore, it allows for the replication of these centrally calculated overhead charges from the Central Entities BU into the corresponding accounts of the Retail BU's cost element. This feature ensures consistent accounting and facilitates financial management within the retail sector.

5.2.12 Overhead Cost Planning Framework

This narrative introduces a system that enables users to meticulously plan and manage overhead costs with a focus on detailed aspects like Intercompany transactions, Partner Segments, Cost Centers, and Functional Areas. The system is equipped with page filters that allow users to refine their data view by applying additional layers of filtering on Intercompany and Partner Segments. Users have the flexibility to input data for the entire year or on a monthly basis. Moreover, the values are pre-initialized based on revenue figures, simplifying the initial setup and ensuring a more accurate and efficient planning process. This tool is designed to optimize overhead cost management, making it more intuitive and strategically aligned with business objectives.

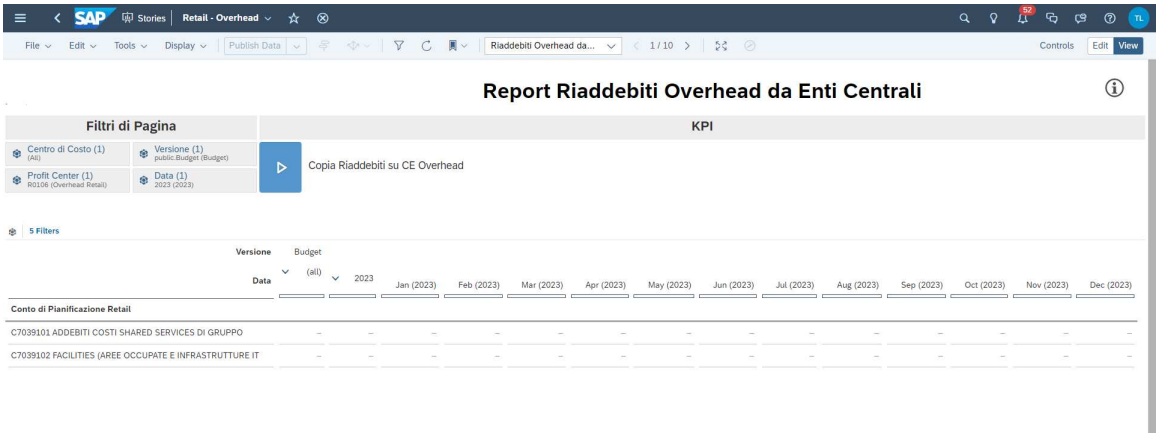

Figure 35: Overhead Cost Planning Dashboard

5.3 HR

The solution we've designed for Workforce Cost Planning aims to achieve peak efficiency and process standardization while maintaining the project's commitment not to alter the upstream HR planning process.

Key Strengths of the New Solution:

Dedicated Environment for Personnel Costs: We've created a restricted-access area specifically for personnel cost data. This space allows for the uploading of necessary data to meet the management and capital planning requirements in BPC, including various detail levels.

Introduction of a Personnel Cost Proxy: This feature is applied to Business Units (BU) in progress, while the data collection process is ongoing. It involves using planned data for the budget and actual data plus the remaining budget months for the forecast.

Automated Aggregation of Actual and Planned Values: This function automatically aggregates significant and useful elements for baseline reporting.

5.3.1 Set-up Process

The Actual data is imported from S4 and then aggregated to align with the planning view. This step marks the first processing of Actual data from Go.ge Account / Functional Area to an HR perspective. This enables the automatic generation of the database for actual reporting and the automatic aggregation of cost types into reporting lines, following the agreed-upon mapping.

This enhanced system promises to streamline the planning and reporting processes significantly, ensuring a more cohesive and efficient approach to handling workforce costs.

5.3.2 Check Current HR Data

This story provides users with the ability to verify actual HR data, specifically focusing on Personnel Costs as recorded in SAP, along with actual Headcount (HC) and Full-Time Equivalent (FTE) figures. The process enables the importation of these actual Personnel Cost data from SAP into SAC, as well as the HC and FTE values obtained from the Restricted Area.

Additionally, a specific link grants access to the Restricted Area where users can upload a flat file. This file contains the actual HC and FTE data pertinent to HR.

Furthermore, the link also leads to a section within the Restricted Area. In this section, users have the capability to update the system data by overwriting it with the latest version imported in the previous step. This ensures that the most current and accurate HR data is always reflected in the system.

5.3.3 Scheduling Data Uploaded

This story enables users to upload and update actual data related to Labor Cost and Detachments in SAP, as well as actual values of HC and FTE. **Carica File HR in area riservata - Costo del Lavoro** This link provides access to the Restricted Area for uploading forecast labor cost data, HC, and FTE from OpenBudget via flat file.

Aggiorna dati in area riservata - Costo del LavoroThis link allows access to a section of the Restricted Area where it's possible to update existing system data by overwriting them with the latest imported version from the previous step.

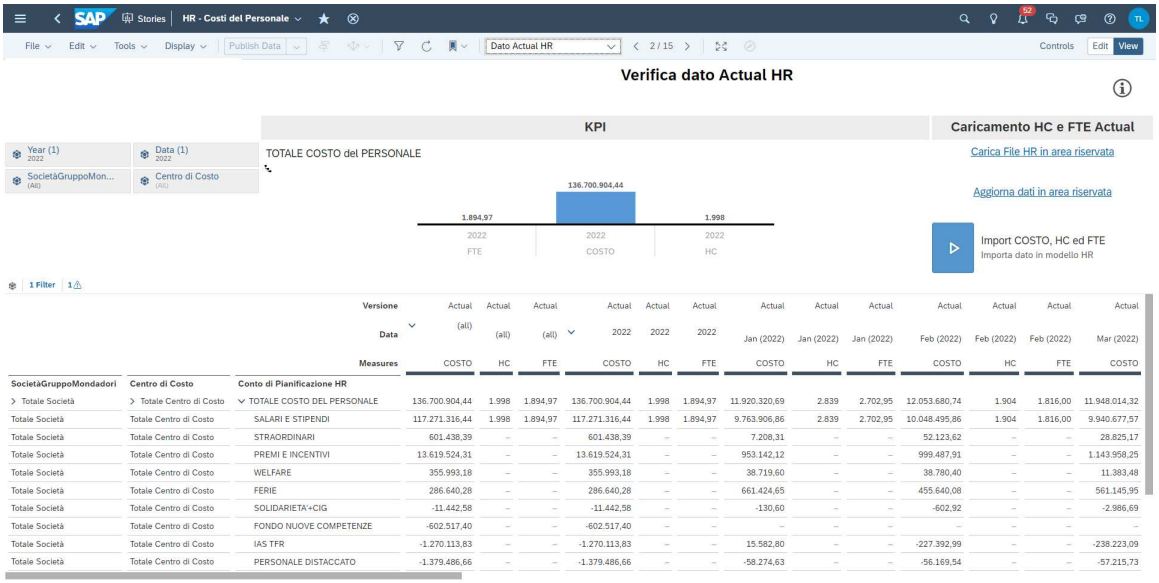

Figure 36: Check Current HR Data Story

5.3.4 Contingency Management Tool

This story enables users to view and potentially modify the Contingency (uploaded into the system via flat files) by adding details of Cost, Headcount, and FTE to the cost centers involved in the reallocation. This link provides access to a Restricted Area where users can upload forecast data related to the Contingency via flat files.

Additionally, this link allows access to a section of the Data Warehouse Cloud platform, from which users can update the existing data in the system.

5.3.5 Contingency Management

Through this feature, users are empowered to input contingency details for different companies, including those associated with an OpenBudget account

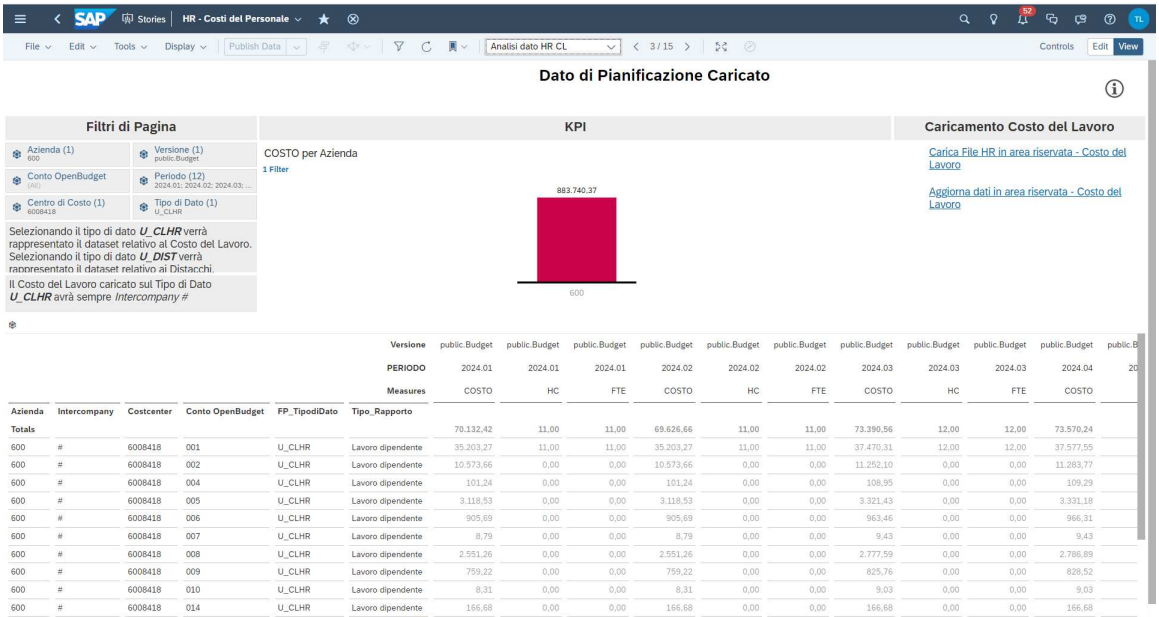

Figure 37: Scheduling Data Uploaded story

and the nature of the contingency. The "Distribute Contingency" function allows users to allocate contingency funds with details specified during the mapping stage to the Cost Elements (CE) of individual Business Units (BU). On the second page of this feature, users can view the mapping provided by each BU, along with details concerning the management and mapping of contingencies.

Executing this task enables the distribution of contingency values to Retail Business Units and Central Entities, ensuring efficient and transparent management of contingency funds. This tool is instrumental in strategic financial planning, offering a clear overview of contingency allocations and utilization across different segments of the organization.

5.3.6 Total HR Report

The "Total HR Report" provides users with access to the Total Labor Cost information for the entire ABC group. This data is enhanced from its initial state at the beginning of the process with direct input from the controllers of various business units (BU).

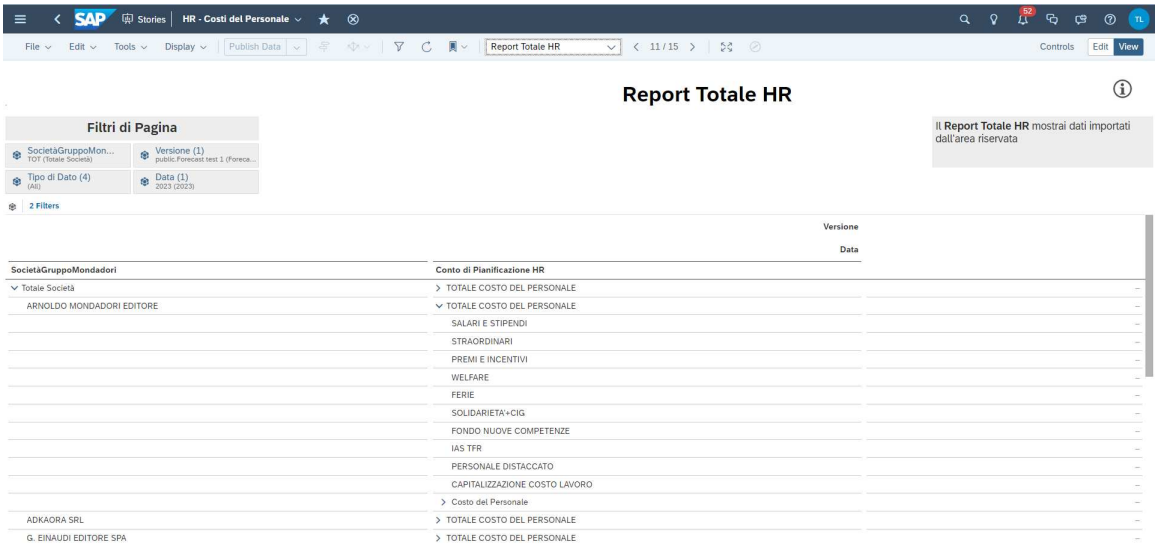

Figure 38: Total HR Report

6 Conclusion

The journey of exploring how data warehousing and business intelligence can revolutionize budgeting and forecasting in a publishing company, as showcased in this thesis, brings to light the immense potential and necessity of a digital transformation in today's business landscape. The narrative of A.B.C. Spa, a company embarking on this transformative journey, serves as a comprehensive case study illustrating the profound impact of integrating advanced data management and analytics tools on business operations.

At the core of this transformation lies the integration of SAP's suite of tools, particularly SAP Analytics Cloud. This integration has been pivotal in converting complex data sets into user-friendly dashboards and reports, facilitating easier and more informed decision-making. The implementation of robust data warehousing solutions like S/4 HANA and BW/4 HANA has been crucial in maintaining data integrity and ensuring scalability. SAP DataSphere's role in orchestrating seamless data flows further underpins a consistent and reliable data ecosystem.

This thesis has walked us through the various stages of the transformation process, starting with an in-depth assessment of the existing infrastructure. This assessment laid the foundation for a tailored solution design, addressing the gaps and inefficiencies identified. The subsequent phases, involving strategic planning, solution development, and integration, highlight the meticulous approach required to bring about a successful digital transformation.

One of the key findings of this study is the identification and overcoming of limitations within the existing economic planning process. The over-reliance

on traditional tools like Excel and legacy systems was found to be a significant hindrance to efficient and agile decision-making. The proposed Planning and Control system, tailored to integrate departmental processes and systems, emerged as a solution capable of capturing the benefits of harmonized accounting management, thereby ensuring greater flexibility, scalability, and efficiency.

The journey across A.B.C. Spa's various business units—Retail, Central Entities, Trade, Education, and Media—provides a microcosmic view of the challenges and opportunities in implementing data-driven solutions in different sectors. Each unit's unique experience contributes to a holistic understanding of the transformative process.

Looking ahead, the significance of this study extends beyond the realm of A.B.C. Spa. It serves as a guide for other organizations navigating similar paths, emphasizing the role of continuous monitoring, feedback integration, and user training. These elements are crucial in aligning new technologies with business objectives and ensuring their effective and user-friendly implementation.

In addressing the research questions, this thesis has not only charted the path taken by A.B.C. Spa but also laid out a roadmap for other organizations. It underscores the need for strategic planning, careful evaluation of potential solutions, and development of a detailed implementation and adoption strategy. The emphasis on assessing the expected benefits and impact through ROI projections and alignment with strategic objectives is particularly notable.

As we conclude, it's clear that the journey of A.B.C. Spa is more than just

a story of technology adoption. It's a narrative about adapting to change, embracing new methodologies, and preparing for a future where data-driven strategies are paramount. This thesis stands as a testament to the transformative power of data engineering in modern business environments. It provides a blueprint for organizations seeking to harness the power of data in an increasingly digital era, steering them toward informed decisions, streamlined operations, and vibrant, data-rich corporate landscapes.

In summary, the insights and strategies detailed in this thesis are universally relevant, offering valuable lessons for any enterprise aiming to optimize budgeting and forecasting processes through enhanced data management and analytics capabilities. The story of A.B.C. Spa is a beacon, guiding enterprises towards a sustainable, vibrant, and innovative future in the digital age.

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