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DELIVERING VALUE ON DAY ONE WITH BUSINESS INTELLIGENCE

A case study of a European insurer company

Breno Isaac Lopes Ferraz

Project Work

presented as partial requirement for obtaining the Master Degree Program in Information Management

NOVA Information Management School
Instituto Superior de Estatística e Gestão de Informação
Universidade Nova de Lisboa

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by

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Project Work presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization in Information Systems and Technologies Management.

Supervised by

Professor Nadine Côrte-Real, PhD

July, 2023

STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

Lisbon, 29 June 2023.

DEDICATION

To my partner and best friend, Cristina, who has been my safe haven and inspiration. To my son, Daniel, who was growing within Cristina's womb way faster than these pages

ACKNOWLEDGEMENTS

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ABSTRACT

The general direction of an organization is directly impacted by the data-driven decisions made to move the organization towards reaching its goals. This scenario is especially true in ABC Inc., a European insurance company subject to this case study. Although reporting tools have traditionally been used in the company, challenges were identified when monitoring business performance. Namely, insufficient visual capabilities that effectively illustrate the desired metrics and data extraction activities delays and bottlenecks. Therefore, there is a need to implement better analytical visualizations and dashboards that enrich the storytelling, exploring solutions that provide information with real-time performance dashboards. This study uses the Design Science Research (DSR) methodology for Information Systems (IS) to develop a Business Intelligence (BI) dashboard through the Microsoft Power BI tool. The developed dashboard adds value to the company by providing a comprehensive visual analytics solution that effectively communicates a story, presents metrics and KPIs, and supports senior executives in their decision-making. In addition, this solution streamlines obtaining, preparing, and sharing business performance insights, thereby improving efficiency, and bringing agility in decision-making.

KEYWORDS

Business Intelligence; Dashboards; Decision-making; Insurance; Key Performance Indicators; Power BI; Visual Data Analytics; Written Premium; Design Science Research.

SUSTAINABLE DEVELOPMENT GOALS (SDG)

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LIST OF ABBREVIATIONS AND ACRONYMS

BI	Business Intelligence
DAX	Data Analysis Expressions
DDS	Decision Support Systems
DM	Data Mart
DSR	Design Science Research
DW	Data Warehouse
ETL	Extract, Transform and Load
ESS	Executive Support Systems
GEC	Group Executive Committee
GEP	Gross Earned Premium
GWP	Gross Written Premium
IIBA	International Institute of Business Analysis
IS	Information Systems
KPI	Key Performance Indicator
NMA	Net Management Account
PMI	Project Management Institute
SME	Subject Matter Expert
UAT	User Acceptance Tests

1. Introduction

A recent study has shown that organizations evaluate speed as a more significant challenge than quality when making good business decisions. Less than half (48 percent) indicated their organizations make quick decisions and more than one-third (37 percent) agreed that the decisions taken process has high quality and velocity. Moreover, only 20 percent said their business firms thrive at decision-making (Aminov et al., 2019). Business firms consistently invest in information systems to achieve competitive advantage through strategic objectives such as sharpening decision-making (C. Laudon & P. Laudon, 2020). The general direction of an organization is directly impacted by the decisions made to move the organization towards reaching its goals. Therefore, it is crucial to set objectives, define concrete ways of measuring closeness to those goals and have insights measures promptly available for increasing decision-making velocity (Larson, 2016).

This scenario is especially true in ABC Inc., a European insurance company subject to this case study *(disclaimer: The alias ABC Inc. is used for confidentiality to protect the company's official name)*. Although reporting tools, such as Microsoft Excel files, have traditionally been used in the company to report business performance to the GEC (Group Executive Committee), which will make decisions based on that information, some constraints were identified. Namely, insufficient visualization capabilities that effectively illustrate the desired metrics, besides those files being often subject to natural error (Aurigemma & Panko, 2014). Therefore, there is a need to implement better analytical visualizations and dashboards that enrich the storytelling for those executive reports. Moreover, source data extractions are performed on an ad-hoc basis by other teams within the organization, often leading to delays and bottlenecks in the decision-making process. The waiting time dramatically impacts the GEC's agenda as they must stand by for a few days until obtaining financial insights. It is, therefore, imperative to develop and explore solutions that promptly provide information with real-time performance dashboards (Eckerson, 2010; Stodder, 2021).

In this context, the following research question was formulated: **What should be the metrics and visualization to provide the European insurer company with an effective financial view on day one?**

With the support of the existing literature, this study proposes to create an interactive and user-friendly visual dashboard through the Microsoft Power BI tool (Ferrari & Russo, 2016), to answer the research question above. This study's main goals are:

- Speed up the process of obtaining, preparing, and sharing business performance insights using a Business Intelligence framework.
- Provide a visual analytical dashboard to communicate a story and present metrics and KPIs that support senior executives' decision-making.

According to the existing literature, a Business Intelligence (BI) framework, among other definitions, is an umbrella of tools, architectures, applications, and methodologies enabling decision-makers access to information to achieve more informed and better decisions (Sharda et al., 2017). BI is also about providing the right data or information to the right people at the right time to make business decisions (Stackowiak et al., 2007). In addition, dashboards can present business intelligence and analytics capabilities for analyzing trends, forecasting, "drilling down" and "drilling up", and exploiting various levels of details (C. Laudon & P. Laudon, 2020).

Given the context of ABC Inc. and its technological maturity and business objectives (Côrte-Real et al., 2012), a BI framework seems to be the best fit-for-purpose solution based on existing literature. The methodology used in this project is Design Science Research (DSR), and the outcome is a dashboard artefact. DSR brings both practical relevance and scientific methods to adapt design research traditions to the Information Systems (IS) context, addressing real-world problems with practical research methods (A. Hevner & Chatterjee, 2010).

1.1. STUDY RELEVANCE

Several authors consider data as the new oil of the XXI century. This analogy comes from the fact that when oil companies find raw oil, they extract and process it to generate value, such as converting it to gasoline or diesel, among other similar products, for profit. Similarly, data is available out there, and when identified, it needs to be extracted, cleaned, and correctly processed to be monetized. In addition, companies produce transactional data daily to support their business processes and operations, and when data is gathered and processed accordingly, this can be analyzed and become a strategic asset that leads to competitive advantage. However, organizations may be unaware of the best practices for innovating their business processes or lack analytical technologies for potentializing the real value of data (Côrte-Real, 2022; Santani, 2018; Shahul, 2018; The Economist, 2017).

This study aims to benefit ABC Inc. by providing a data visualization artefact that presents facts as soon as the data is available to be explored. The dashboard artefact would allow the Finance Department to obtain the necessary information and conduct storytelling to the company's senior executives, enriching their decision-making process. Furthermore, by analyzing the existing data, ABC Inc. can have a snapshot of the current business performance, identify areas of improvement, strengthen organizational intelligence, and apply strategies based on facts rather than stakeholders' opinions (Trieu, 2017).

1.2. CONTEXTUALIZATION

ABC Inc. is a global insurance provider operating in Europe markets. It offers various property-casualty insurance solutions and other financial services to support customers and businesses. It has thousands of customers worldwide, ranging from large and mid-sized companies to small businesses, entrepreneurs, and non-profits worldwide. Its European Finance Department, among other tasks, is responsible for gathering financial data and reporting the business performance to the GEC (Group Executive Committee).

The Finance Analysts spend considerable time obtaining, preparing and sharing business performance indicators for senior executives. Data extractions are performed on an ad-hoc basis by other teams within the organization and then shared with the Finance Team via email, often leading to delays and bottlenecks in the decision-making process. Furthermore, the Finance Analysts perform manual data transformations to prepare the reports as desired before presenting them. Although reporting tools, such as Microsoft Excel Pivot tables, have been traditionally used in the company for this purpose, they also present a few constraints. For example, they lack visual capabilities that effectively illustrate the desired metrics and are often subject to natural error (Aurigemma & Panko, 2014). In addition, the waiting time dramatically impacts the GEC's agenda as they must stand by for a few days until obtaining insights to reflect on business decisions that steer the company towards its business goals. Hence, it is a must that the Finance Analysts have the right resources to provide business performance

insights on day one promptly. That means the Finance Analysts should be able to run those reports on the first working day of each month and have financial and business performance information available to the GEC.

According to the ABC finance analysts, the key performance indicators that the GEC seeks to obtain are the following:

a. **Written Premium and Earned Premium**: Liberto (2020), from Investopedia's website, defines written premium as *"the total amount that customers are required to pay for insurance coverage on policies issued by a company during a specific period. Written premiums differ from premiums earned, which are the premiums that a company books as earnings for providing insurance against various risks during the year."*
b. **Claims Movements:** From ABC Inc's perspective, those are the indemnities paid to policyholders (Claims Paid) and booked expenses attributed to the processing of a specific claim, such as paying lawyers, surveyors, inspectors, etc. (Claims Outstanding).
c. **Written Commissions:** The commission paid to compensate intermediaries (brokers, agencies, or partnerships) for their work when promoting and selling insurance policies on behalf of the company.

1.3. STUDY OBJECTIVES

Based on the existing literature and to ensure value is created for ABC Inc's stakeholders, this paper proposes to use the Microsoft Power BI tool (Ferrari & Russo, 2016) to create a Business Intelligence artefact that responds to the research question previously mentioned. The product consists of a series of visual analytical reports in the form of a dashboard containing metrics and KPIs that support business custodians in decision-making. More specifically, the objectives of this study are:

- Identify and describe essential sources of data for financial insight purposes.
- Define metrics and performance indicators that allow the analysis of the organization's performance.
- Develop an analytical solution that processes the source data to generate information for decision-making promptly.
- Develop a dashboard that allows the visual analysis of the metrics and relevant indicators for performance indicators.
- Identify problems and/or challenges the author faced during the product development.

Thus, it is expected that the outcomes of this study are to enhance information agility by providing a product that generates valuable and accurate information on time and speeds up the decision-making process at ABC Inc.. Furthermore, the proposed solution supports scalability allowing the product to be adapted to additional reports, other business units or larger datasets.

2. Literature Review

2.1. Business Intelligence

The Business Intelligence concept was first introduced by Hans Peter Luhn, in 1958, in an article published by IBM. In this article, the author introduces the idea of a "Business Intelligence System", defining "business" as a collection of activities carried out for a given purpose and "intelligence system" as the communication service that conducts and supports that business. The concept would then be associated with a comprehensive system that identifies and shares information with the most appropriate audience, presenting facts that lead to actions towards its goals (Luhn, 1958).

Over time, the term "Business Intelligence", BI for short, became the center of decision-making, becoming the most used term to represent a set of processes and technologies that generates meaningful insights from raw data (Božič & Dimovski, 2019; Pullokkaran, 2013; Sharda et al., 2017). BI has also been demonstrated to be essential for outstanding management as it provides relevant information promptly and straightforwardly. Organizations can monitor and improve their business operations and activities through initiatives that extract quantified information, which allows them to monitor and evaluate business operations based on facts (Santos & Neto, 2011).

Furthermore, the success or failure of most organizations can be related to the quality of their decision-making. As data-driven decision-making is one of the ways to improve decision-making, it requires data collection and analysis, which can be achieved using BI tools (Pullokkaran, 2013). Finally, the existence of BI systems is justified by their suitability to the various realities within the organizations. For example, companies have business models that rely on business processes and critical activities, and obtaining specific knowledge is essential to the decision processes (Côrte-Real et al., 2012).

2.1.1. Data Warehouse

According to Meredith et al. (2008), data warehousing is a storage resource that supports decision-making activities. Subsequently, a Data Warehouse is a result of integrating several systems and data sources (usually internal to the organization) where data goes through careful extraction, transformation and loading activities until it becomes available in a standard consistent format. This definition follows the one proposed by Inmon (2005) which defines a data warehouse as a *"subject-oriented, integrated, nonvolatile, and time-variant collection of data in support of management's decisions."*. Inmon also further states several usages for the stored data, including the possibility of future requirements that are not yet known.

Larson (2017) defends creating data marts rather than data warehouses. The author prefers having data marts as a "smaller" version of a data warehouse that usually applies to a specific area of the organization. According to him, data warehouses tend to be *"a large, one-stop shopping repository where all the historical data for the organization would be stored, which often leads to large projects that may be outdated when finished or, worst cases, never get concluded"*.

A well-defined data warehouse architecture becomes indispensable to provide users with adequately prepared, structured, and transformed data for BI reporting, dashboards, and other analytics tools (Stodder, 2021). The overall DW/BI architecture chosen for this project is based on Kimbal's proposal and contains the following components, adapted from (Kimball & Ross, 2013):

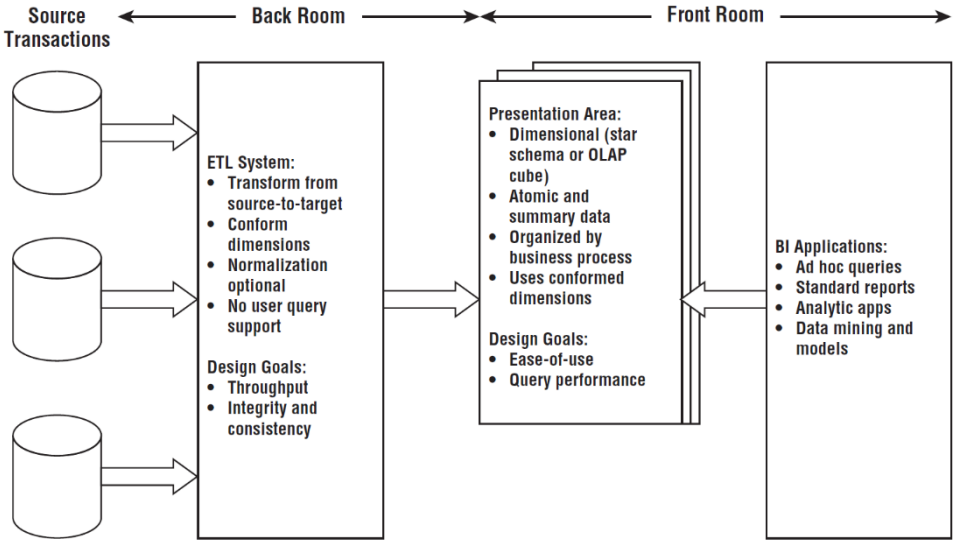

Figure 1: Core elements of DW/BI architecture, adapted from Kimball & Ross (2013)

- **Source Transactions**: Represents operational systems that capture and process business transactions daily. They can assume different forms, such as operating systems, Enterprise Resource Planning (ERP) systems, or even smaller independent applications and external files originating from those source systems.
- **ETL Systems:** Here, business requirements are translated through the extract, transformation, and load (ETL) processes. "Extracting" means collecting and reading the source data and placing a copy of the data needed into the ETL system for further operations. "Transforming" indicates data is enhanced by several potential transformations such as cleaning, correcting misspellings, parsing into standard formats, combining data from multiple sources, and improving the data quality. Finally, "Loading" is when data is loaded into the target's presentation dimensional models.
- **Presentation Area & BI Applications:** These are the front room where data is organized, stored, and becomes available for direct querying by users and other analytical BI tools. Here, data can be accessed through analytical tools like dashboards and other BI applications, such as Microsoft Power BI.

The rationale for choosing this type of architecture is its focus on simplicity and business-driven perspectives. According to (Kimball & Ross, 2013), simplicity is the key for users to comprehend databases and software and navigate them more efficiently and quickly. In addition, a coherent design is established based on organizations' analytical needs when focusing on a business-driven approach for modelling data warehouses and BI solutions. As a result, DW/BI systems are driven by the needs of business users, presenting a simple dimensional perspective (Kimball & Ross, 2013).

2.2. DASHBOARDS

Dashboards can serve many purposes. According to Eckerson (2011), performance dashboards allow organizations to measure, monitor and manage business performance more effectively and they add value to organizations by delivering actionable information to their users. Consequently, dashboards

help organizations take advantage of information, increasing organizational agility and optimizing performance, leading to achieving strategic objectives. Additionally, dashboards simplify complex processes and present insights into small chunks of information, demystifying its contents (Kumar & Belwal, 2018; Nagy et al., 2009; Scholtz et al., 2018).

Several definitions are found in the existing literature about dashboards and the main goal of such artefacts. Those definitions vary from a broader view, such as Wexler et al. (2017), where it is defined as *"a visual display of data used to monitor conditions and/or facilitate understanding."*; to more detailed explanations. For example, Few (2006) states that a dashboard is *"a visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance."*. Regardless of its definition, the main point they all have in common is that a dashboard can be any visual display artefact, and its primary goal is to support communication effectively.

According to Few (2006), dashboards provide a unique and powerful means to present information; however, they rarely live up to their potential. Understanding design principles and practices that reflect what people see and think can lead to successful implementations. For example, the Gestalt Principles of Visual Perception (Ware, 2013)clearly describe patterns in visual displays, and professionals who understand these principles are likelier to develop visuals communicating information effectively (Ware, 2013). Hence, the following principles were considered worthwhile for the context of this project:

- **Proximity**: Spatial proximity gives users a cue for perceptual organization, which means that things that are close together are seen as a group, making this principle very useful.
- **Similarity**: Similar elements are more likely to be grouped together. This technique can be helpful when designing visuals so users can easily choose between patterns.
- **Continuity**: Indicates that we tend to construct visual entities from smooth and continuous visual elements, as opposed to ones that contain abrupt changes in direction. This also makes identifying the sources and targets easier when connecting lines if they are smooth and continuous.
- **Symmetry**: This is useful when comparing similarities between two time-series data sets. It makes it easier to identify similarities if these time series are arranged using vertical symmetry.

The main challenge of a dashboard resides in preserving clarity when trying to squeeze loads of information into a small and limited space. When designing dashboards, Few (2006) recommends adding only the information you need and compressing it to the point that you don't lose the meaning, and highlights the following about effective dashboards: *"Well-designed dashboards deliver information that is: exceptionally well organized; condensed, primarily in the form of summaries and exceptions; specific to and customized for the dashboard's audience and objectives; displayed using concise and often small media that communicate the data and its message most clearly and directly possible."*.

Finally, an important aspect that leads to success in data visualization is understanding the context for the need to communicate. Knowing the context and requirements of your audience regarding who

they are, what your audience wants to know or do, and how to present this data visually; must happen before creating any data visualization or dashboard (Knaflic, 2015).

2.3. POWER BI

According to the official Microsoft Power BI website, Power BI is a *"unified, scalable platform for self-service and enterprise business intelligence (BI). It allows you to connect to and visualize any data, seamlessly infuse the visuals into the apps you use daily, and bridges the gap between data and decision making."*. In other words, Power BI is also a set of business analytics tools that allow companies to analyze data and share insights through that data. In addition, it enables organizations to create dashboards that support businesses to become more data-driven (Microsoft, 2022).

Power BI was first released in 2015, and since then, it has been widely used by people and organizations (Ferrari & Russo, 2017). A recent report from Gartner Inc., the world's leading technological research and consulting firm, compared the existing Analytics and BI Platforms and their market evolution in terms of four perspectives: Niche Players, Visionaries, Challengers, and Leaders. The result shows that Microsoft Power BI has stood as the most outstanding leader against their competition over the last years (Gartner, 2022).

Power BI was chosen for this project as it offers several capabilities, such as performing data analysis and gaining insights from different data sources. It also allows organizations to apply data transformation strategies through the Power Query Editor's capabilities and create powerful interactive dashboards (Deckler, 2019; Ferrari & Russo, 2017; Microsoft, 2022). In addition, the Power BI ecosystem includes components that integrate with other Microsoft tools and technology, making Power BI an essential solution from ABC Inc.'s perspective, as the company already works with other Microsoft 365 tools. This interrelationship makes Power BI a valuable business intelligence platform where the value obtained can exceed compared to other siloed BI platforms in the market (Deckler, 2019).

3. Design Science Research Methodology

This project uses the Design Science Research (DSR) methodology for Information Systems (IS) to develop this study's artefact (dashboard). According to Baskerville et al. (2018), *"Design science research (DSR) is a research paradigm with great potential to address the relevance versus rigour gap in information systems (IS) research."*. This paradigm creates and evaluates artefacts that solve organizational needs and contains valid methods for doing research in information systems research. Furthermore, DSR also presents some characteristics such as problem-solving and creativity and influences the resolution of some dilemmas in IS research, such as rigour, relevance, discipline boundaries, behavior and technology (A. R. Hevner et al., 2004).

There are some benefits to using this research paradigm. For instance, when innovative information technology (IT) artefacts are created, organizations can address critical information-related tasks, impacting people and organizations. Additionally, it is an iterative and creative process in which the researcher is perceptive of improving both the design process and the design artefact as part of the research (A. R. Hevner et al., 2004). Finally, DSR helps to find a balance between the theory of research contributions to science versus the applicability in technological aspects of IS artefacts (Baskerville et al., 2018).

3.1. DSR Process Model

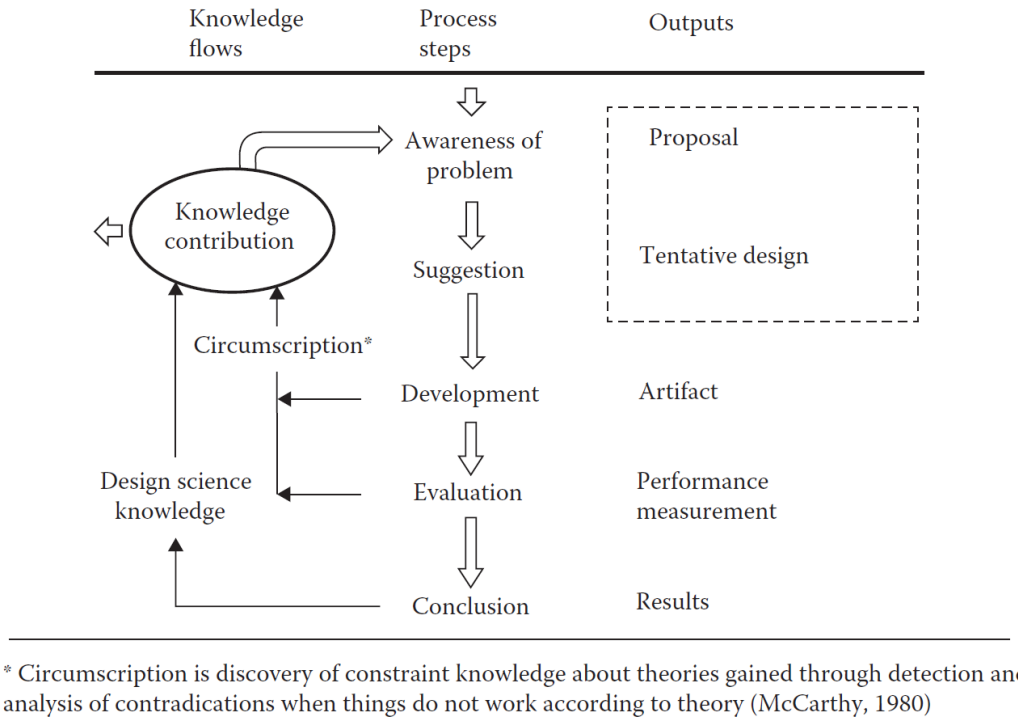

Figure 2: DSR Process Model (Vaishnavi & Kuechler, 2015)

The DSR process model presented above was based on the model proposed by Vaishnavi & Kuechler (2015), which originated from an adaptation of a computable design process model developed by Takeda et al. (1990). The study's author preferred this model due to its applicability to the IS fields and their requirements, which sometimes present some uncertainty. In addition, generating human-computer information and artefacts implies some complexity. Occasionally, some research questions

are answered when “exploring by creating”, and this model allows that flexibility (Vaishnavi & Kuechler, 2015).

This model, adapted from Vaishnavi & Kuechler (2015), is composed of the following steps:

- **Awareness of problem:** The project originated from a need raised by the Finance Department regarding their struggle in collecting, preparing and presenting the data for senior company executives. A considerable amount of working time (3-4 days) was spent preparing the information for the GEC. Also, the existing reports did not have all the desired metrics used and visual capabilities. At this stage, requirements are gathered and understood from a high-level perspective and then decomposed into lower levels to understand better the stakeholder’s needs. The output of this stage is a project proposal.
- **Suggestion:** Several interactions are performed with the SMEs to validate the functional perspective of the requirements, and lately, a solution design document containing deliverables such as user stories, data mapping files, diagrams, dashboard mockups, etc.) is produced and shared with the Finance Team SMEs for their review and sign-off. Those deliverables represent the tentative design.

  Development: The tentative design gets developed through an iterative process. The techniques varied depending on the tasks and subtasks that needed to be performed for the artefact creation. The output of this step is design science knowledge, such as artefacts (constructs, models, frameworks, design principles, etc.). Specifically, the design science knowledge output is a dashboard artefact.
- **Evaluation:** Once developed, the artefact is tested and evaluated against the proposal and their criteria defined at the initial step, “awareness of problem”. Inspection and adaptation are performed based on feedback loops gathered from stakeholders. The artefact is also evaluated to confirm whether it answers the research question raised in the beginning.
- **Conclusion:** This concludes the project. The study’s results are presented, and the value obtained from the artefact is evaluated. Additionally, the knowledge acquired is documented and shared to create knowledge in the area.

4. Project Management Methodology

According to the International Organization for Standardization (ISO), *"a project is a temporary endeavor to achieve one or more defined objectives, and project management is the coordination of activities to direct and control the accomplishment of agreed objectives"* (ISO 21500:2021, 2021). Projects are part of a comprehensive ecosystem, such as organizations (government agencies, enterprises, educational institutions) and a coordinated effort and resources to create a unique product, service or result to enable value creation. (Project Management Institute, 2015, 2017).

Given the complexity of this work project and the level of uncertainty of the requirements at the beginning of the project, the author of this study chose a hybrid project management coordination to achieve the objectives defined in this paper. Hybrid project management combines traditional waterfall and agile methodologies, allowing the author more flexibility in applying the most suitable techniques and finding solutions that best fit the company's needs within their context (*Hybrid Project Management: Agile & Traditional (Update 2022)*, n.d.).

This project work and coordination is divided into five macro activities as follows:

- **Planning & Monitoring**: The work to be done is identified, planned, and distributed to those responsible for executing them. Deadlines are set, and activity progress is tracked and monitored regularly for inspection and adaptation.
- **Design:** Stakeholder needs and project requirements, functional and non-functional requirements, are identified, analyzed, and decomposed into further details as needed. The product functional design is conducted, and the solution design deliverables (e.g., user stories, diagrams, dashboard mockups, etc.) are produced and shared with the Finance Team SMEs for their review and sign-off.
- **Build:** Comprises the development tasks and subtasks performed to build the product that will deliver value to the stakeholders. At this stage, the author is focused on creating the product increment based on the specifications detailed in one or more solution design deliverables produced during the design activity.
- **Testing:** Coordinates the User Acceptance Tests (UATs) executed by the product's end-users and SMEs to ensure the product is error-free and meets their expectations. This activity allows the end-user to use the product increment and identify bugs or issues that must be corrected before release.
- **Deployment:** Releases a product increment and, eventually, the fully developed product, making it available for live usage.

Each macro activity may derive tasks and sub-tasks describing the details of the work to be performed to achieve this study's objectives. The work is divided into small chunks of product increments delivered in a fixed length event of three weeks, called iteration. Once an iteration ends, a new one starts afterwards, and this approach continues until the product is fully incremented and value is obtained.

4.1. PROJECT MANAGEMENT TOOL

Gathering requirements and translating them into technical work are some of the activities data analysts perform to understand the businesses' needs and find relevant data that can be turned into insights. Those are complex tasks that require coordination and communication to reduce the gap between business users and IT practitioners. Therefore, data analyst professionals often rely on communication and collaborative tools for work coordination (Kandogan et al., 2014). Jira Software, for example, is an issue and project management tool developed by Atlassian that technology companies widely use. According to Atlassian, it promotes collaboration by tracking the projects, helping teams to manage and report their work, and monitoring the progress fluently and transparently across the company (*Jira | Issue & Project Tracking Software | Atlassian*, n.d.).

This study's author uses Jira Software as a project planning and coordination resource. The reason for that is the main capabilities of bug tracking, issue tracking, and project management functions which simplify the communication process and reduce problems in coordination (Ortu et al., 2015). Additionally, Jira Software is already the project management tool widely used in the company subject of this study; therefore, no additional expenses would be needed.

4.2. REQUIREMENT ELICITATION

Whenever people and organizations decide to change or improve something that already exists, to create new products or provide new services, they must understand what they want. Likewise, the needs and desires of stakeholders (who are benefiting from that outcome or being directly impacted by that) are the requirements of things they want to build or deliver (Glinz et al., 2022).

The approach chosen for analyzing the business needs and describing the functional and non-functional requirements of the project is based on Agile Business Analysis, and the techniques used are User Stories and Job Stories. The rationale for this decision is that they tend to focus on stakeholder motivations rather than defining implementation. These techniques help to remove the focus on features and instead, focus on the stakeholder's desired future state (International Institute of Business Analysis (IIBA), 2015).

According to the International Institute of Business Analysis (IIBA):

- **User Story:** User Stories aim to express a customer's need and desired value. The requirement is presented from the perspective of the user or role. For instance, a user story can be formatted as follows: "As a <role>, I need to <feature> so that <goal or value>." or "In order to <business value>, as a <role>, I need to <behaviour>."
- **Job Story:** Job Stories aim to represent the requirements from the perspective of the scenario or action performed by the system or the user. It can be written in first-person or third-person format. For instance, a job story can be formatted as follows: "When <situation> I want to <motivation> so I can <expected outcomes>." or "When someone <situation>, actor(s) <motivation> so that <expected outcomes>."

5. Conceptual Model

This chapter contains the "Suggestion" (tentative design) adopted from the DSR process model (Vaishnavi & Kuechler, 2015), and it gathers the requirements elicitation outcomes (user stories and job stories). It also describes the source-to-target dataflow until the presentation layer of the dashboard artefact. Finally, it shows the conceptual data model and the dashboard conceptual model (mockup) that supports the project objectives.

5.1. Business Requirements

The author conducted a series of interviews and meetings with the Finance Team SMEs to identify the business needs and gather the project requirements. Furthermore, while interviewing the business stakeholders, it was also possible to identify potential measures, facts and dimensions that could be leveraged for the data warehouse model design. The outcome of this work is illustrated in section 11.1. Business Requirements List, in the format of user stories/jobs stories, adapted from Agile Business Analysis techniques (International Institute of Business Analysis (IIBA), 2017).

5.2. Data Flow

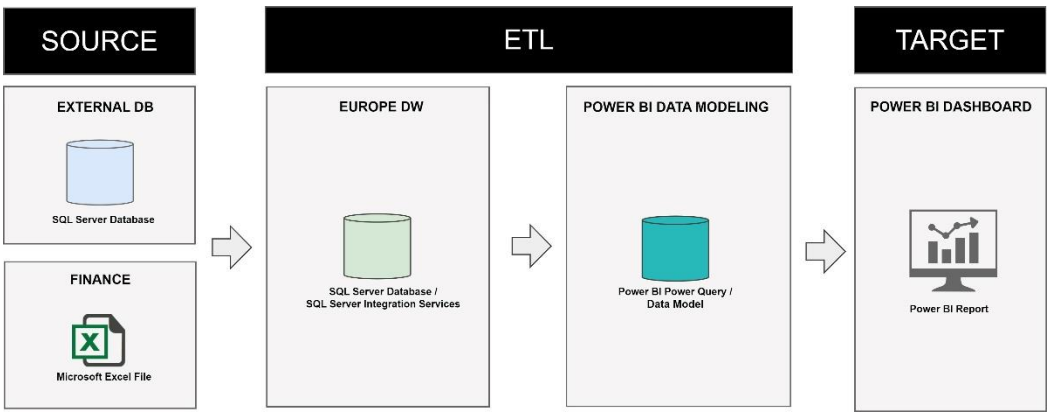

Figure 3: Data Flow, adapted from Microsoft Learn (2023)

The data flow starts with two primary sources: one Microsoft Excel File and one SQL Server Database. Next, the ETL process captures the source data, and the business requirements are translated through the extract, transformation, and load activities. Afterwards, data is enhanced by Power BI Power Query and imported into the Power BI Data Model. Finally, data is available to be consumed by the Power BI Report. The dashboard artefact is then published, achieving the target state of this project's outcome.

5.3. Conceptual Data Model

The model used in this project is based on the constellation schema concept, which remembers the shape of a star; however, there is more than one fact table that stores business events. For example, this project has two fact tables: Actual Movement and Scenario Movement. The first contains current business events such as policy written premiums or claim movements. In contrast, the second one stores financial-related scenarios events such as budget, role forecast and prior year premium figures (provided by the Finance Team). Each fact table is surrounded by dimensions or look-up tables connected through foreign keys, such as business units, distribution channels and NMAs. Those

dimensions may contain hierarchies allowing users to roll-summary levels, for example, calendar: year, quarter, month (Lemahieu et al., 2018; Microsoft, 2023; Stackowiak et al., 2007).

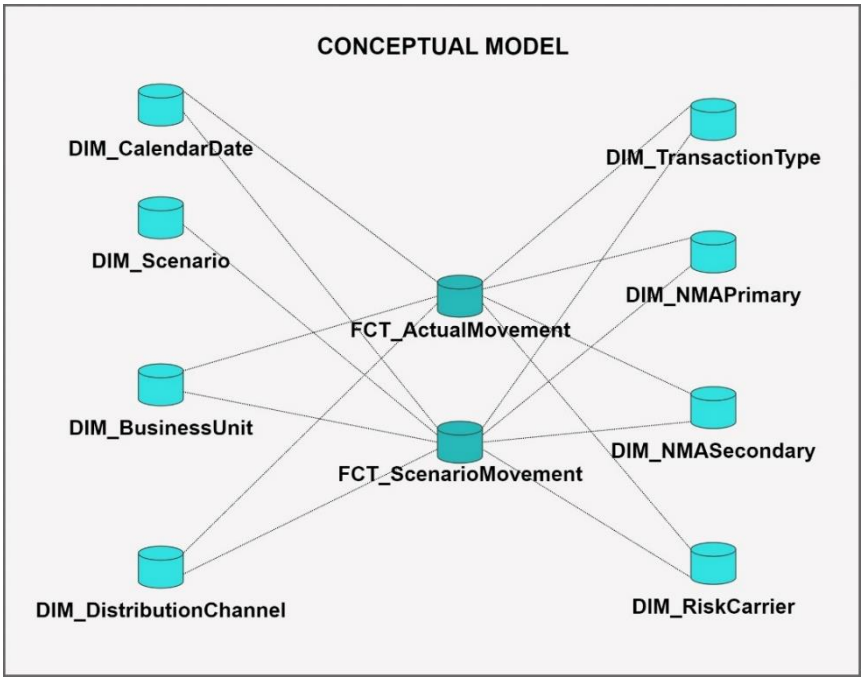

Figure 4: Constellation Schema, adapted from Microsoft Learn (2023)

5.4. METRICS AND KPIS

The metrics and KPIs identified during the interviews with Finance Team SMEs were analyzed and converted into DAX language, leveraging the data modelling capability on Microsoft Power BI Dashboard Model as they are both query and functional language (Seamark, 2018). The outcome of this work can be found in section 11.2 Metrics and KPIs.

5.5. CONCEPTUAL DASHBOARD

The dashboard mockup was designed following the literature review recommendations (Eckerson, 2011; Few, 2006; Ware, 2013), focusing on preserving clarity when squeezing loads of information into a limited space while simultaneously satisfying the business requirements listed in session 11.1. Business Requirements List. The report's first page displays four KPI cards at the top that present crucial information for stakeholders. Below these cards, additional visuals provide a more detailed overview of the company's performance across various dimensions.

Other features, such as toggle buttons (illustrated by diagonal bars), enrich the visuals by allowing the users to switch between visual tiles to seek additional details. Moreover, a filter panel was designed to provide the end-user flexibility to navigate and explore the dashboard across various dimensions per their requirements.

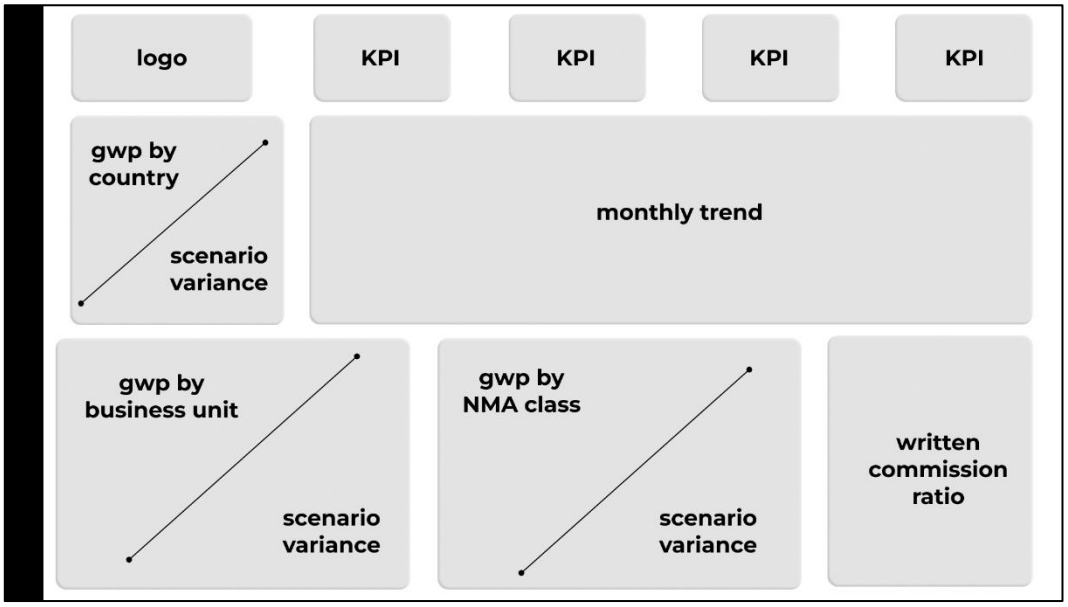

Figure 5: Main page report mockup

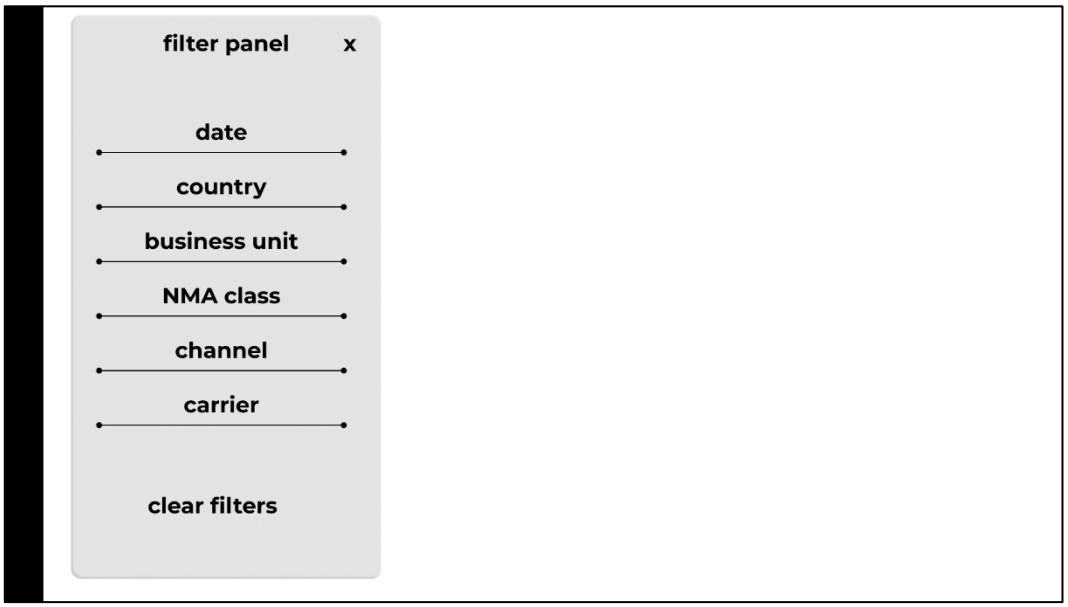

Figure 6: Filter panel mockup

6. Development

In this chapter, the "Development" phase adopted from the DSR process model (Vaishnavi & Kuechler, 2015) is put into practice. All increments of value and deliverables are gathered to produce the dashboard artefact, this project's primary design science knowledge output.

6.1. Data Source

The data is derived from two main sources: a monthly Microsoft Excel file provided by the Finance Team and a SQL Server Database containing transactional systems data from the European business units, as shown below:

Source	Type	Description	Owner	Table Name
Scenario Movements	Microsoft Excel File	This file contains budget, past, and future written premium policy sales provisions. The finance team mainly uses it to create and speculate three scenarios: Budget, Prior Year and Role Forecast, where they control or anticipate the company's profit, sales provision and NMA's figures.	Functional Department (Finance Team)	N/A
Actual Movements	SQL Server Database	This database contains near-real-time transactional data from business operations and policy movements initially created from various European business operational systems. For the context of this project, three primary business transactions are used: Written premium movements, earned premium movements and Claim movements (both Paid and Outstanding).	Enterprise	WrittenPremium; EarnedPremium; ClaimMovement CalendarDate; NMAPrimary; NMASecondary; RiskCarrier; BusinessUnit; DistributionChannel; TransactionType

Figure 7: Data Source Overview

6.2. Dimensional Model

As per good practice, the Microsoft SQL Server Integration Services (SSIS) tool supports the ETL activities and processes as much data as possible before loading data into Power BI. On the first day of each month, source data is made available, and the data is extracted, transformed, and loaded into staging tables that lately give origin to view tables. Only then the view tables are imported to Power BI, which benefits Power Query regarding data retrieval optimization (Microsoft Learn, 2023). Subsequently, data is enhanced by multiple transformations accomplished using Power Query Editor's capabilities and loaded into the Power BI data model. More details about the ETL process are presented in the diagram in section 11.1. End-To-End Data Flow.

As mentioned in the literature review section 2.1. Business Intelligence, the solution implemented is adapted from Kimball & Ross (2013) as this dimensional modelling presents some benefits such as lower maintenance and implementation costs and faster development in terms of time-to-market. The steps taken to design the data model in this project were:

- Identify the business requirements and process the model should represent (e.g., financial scenarios and business operations, such as policy and claims movements).
- Identify the grain which determines the meaning of each Fact table.

- Design the Dimensions tables and their respective data fields and hierarchies.
- Design the Fact tables, the measures and formulas, and their respective data fields and hierarchies.
- Design the final data model (constellation schema) and establish its relationships as shown in the picture below:

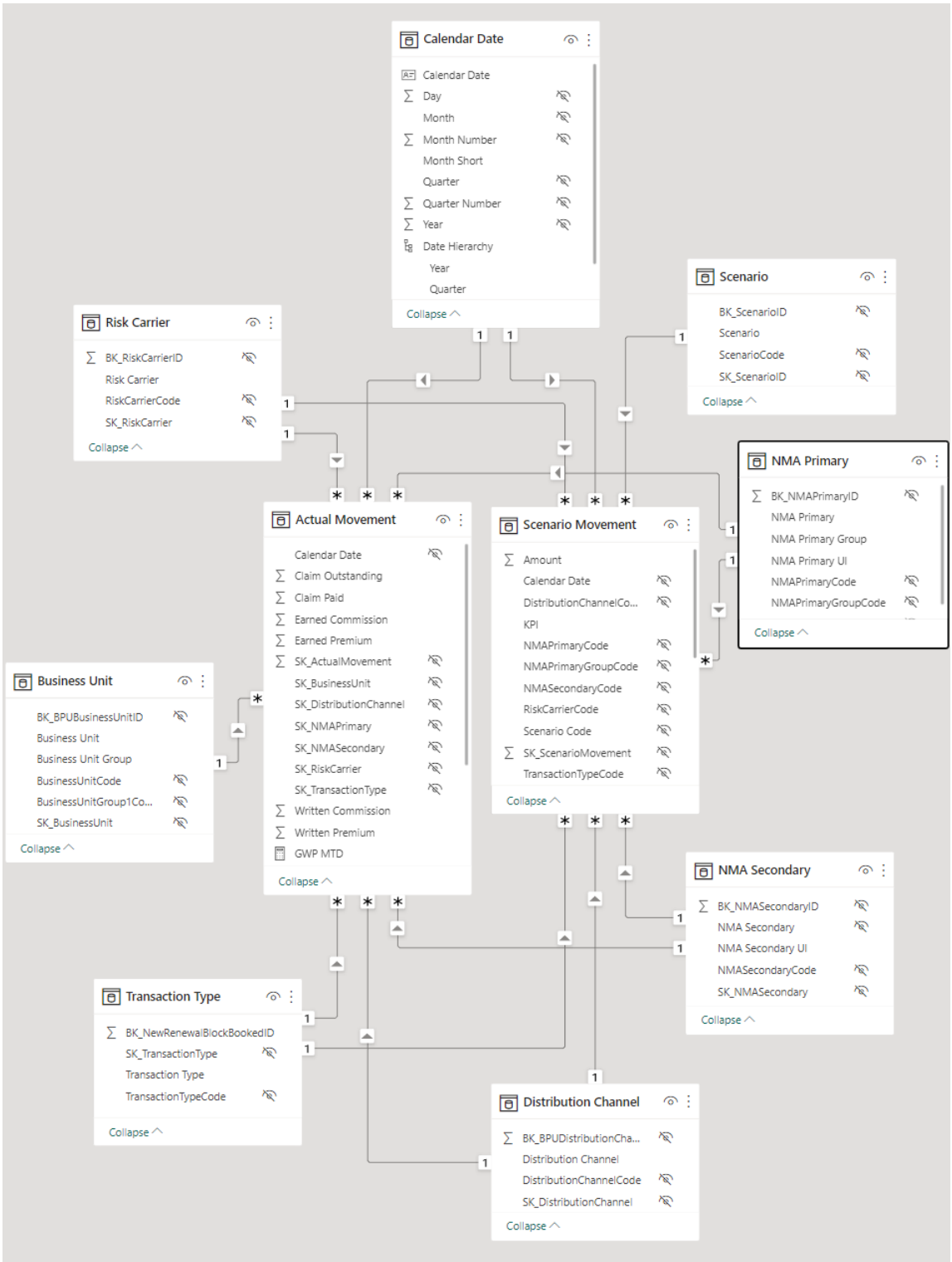

Figure 8: Power BI Data Model

6.2.1. Power BI Data Tables

The Power BI data model for this project is composed of the following tables:

Table Name	Fact/Dim	Overview
FCT_ActualMovement	Fact	This table contains current business operations and policy movements data. Main figures: Written premium, earned premium, paid claims and outstanding claims.
FCT_ScenarioMovement	Fact	This table contains financial scenarios related to the written premium policy, including budgeting and forecasting for future provisions created by the Finance Team. Main figures: budget, prior year, and role forecasting.
DIM_CalendarDate	Dimension	This table contains calendar dates, including the full date, day, month, quarter, and year.
DIM_NMAPrimary	Dimension	From a financial standpoint, this table contains business regions and branch office locations for financial reports. Typically, stakeholders can break down the company's revenues, expenses, and profits by region or office location by looking at these primary Net Management Accounts.
DIM_NMASecondary	Dimension	Same as above, however, applied for secondary Net Management Accounts dedicated to products, services, and policy covers.
DIM_RiskCarrier	Dimension	This table distinguishes the insurance companies responsible for assessing and underwriting the risk and managing premiums, claims, the other financial resources.
DIM_BusinessUnit	Dimension	This table contains the list of company divisions specialized by a line of business, insurance cover or client type and portfolio.
DIM_DistributionChannel	Dimension	This table contains the channels by which insurance products and services are made available to the clients. For example, brokers, intermediaries, agencies, and direct channels (self-service).
DIM_TransactionType	Dimension	This table contains the list of transactions within a policy life cycle context. For example, quotes, new business, renewal, endorsement, and cancellation.
DIM_Scenario	Dimension	This table contains the financial scenarios used by stakeholders, such as budgeting, prior year, and role forecasting.

Figure 9: List of Power BI Tables

The complete list of attributes from each table is present in section 11.2. Fact and Dimension Attributes List.

6.3. DASHBOARD

The recommendations in the literature review were an asset for this dashboard development, especially when managing loads of information presented in small and limited areas (Eckerson, 2011; Few, 2006; Ware, 2013). The dashboard's final outcome and results are detailed in the following section 7. Results and discussion.

7. Results and Insights

For this chapter, the dashboard usage was brainstormed with stakeholders, and the data were analyzed to derive some conclusions related to the main KPIs and overall business situation within the different financial scenarios. For confidentiality purposes, the company logo and the official title of the dashboard have been replaced by Microsoft's Power BI official logo. The remaining items were kept exactly as the current version deployed at ABC Inc.

7.1.1. Home Page

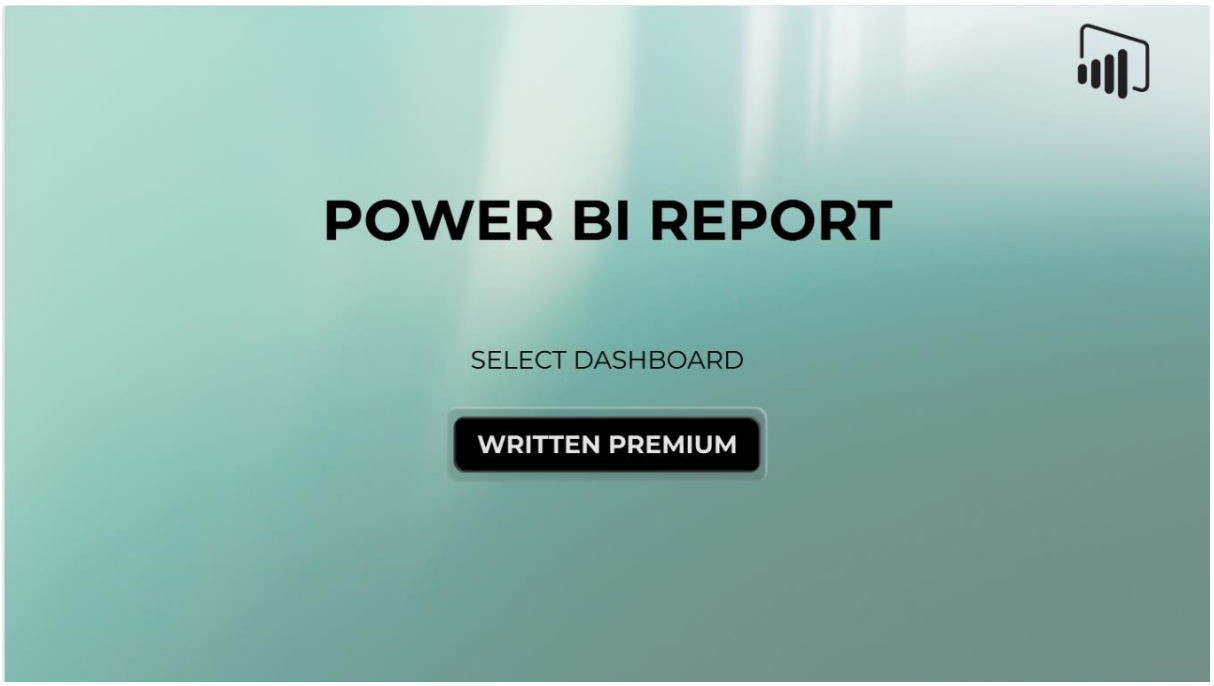

Figure 10: Dashboard Home Page

The report's first page is clean and objective, with an interactive button in the center. This simple, effective design allows flexibility to add buttons that may lead to new reports as business needs evolve. When the "Written Premium" button is selected, it directs the user to the main page, which is the ultimate goal of this project.

7.1.2. Main Page

This report gathers all the KPIs and metrics identified from the business requirements raised during the project. The dashboard assembles into one page all the necessary information for the Finance Team to deliver meaningful insights to the company's senior executives per the stakeholder's requirement (ID# 1; 2). Four KPI cards at the top present the most relevant information for the senior executives at a glance (ID# 3).

- **Written Premium**: presents the total premium amount the customer pays for the entire policy coverage period.

- **Earned Premium**: presents the total premium earned as the coverage period progresses, e.g., monthly.
- **Claims Outstanding**: presents booked expenses attributed to processing a specific claim that may or may not end up being paid.
- **Claims Paid**: presents effective payments made to policyholders regarding claims expenses.

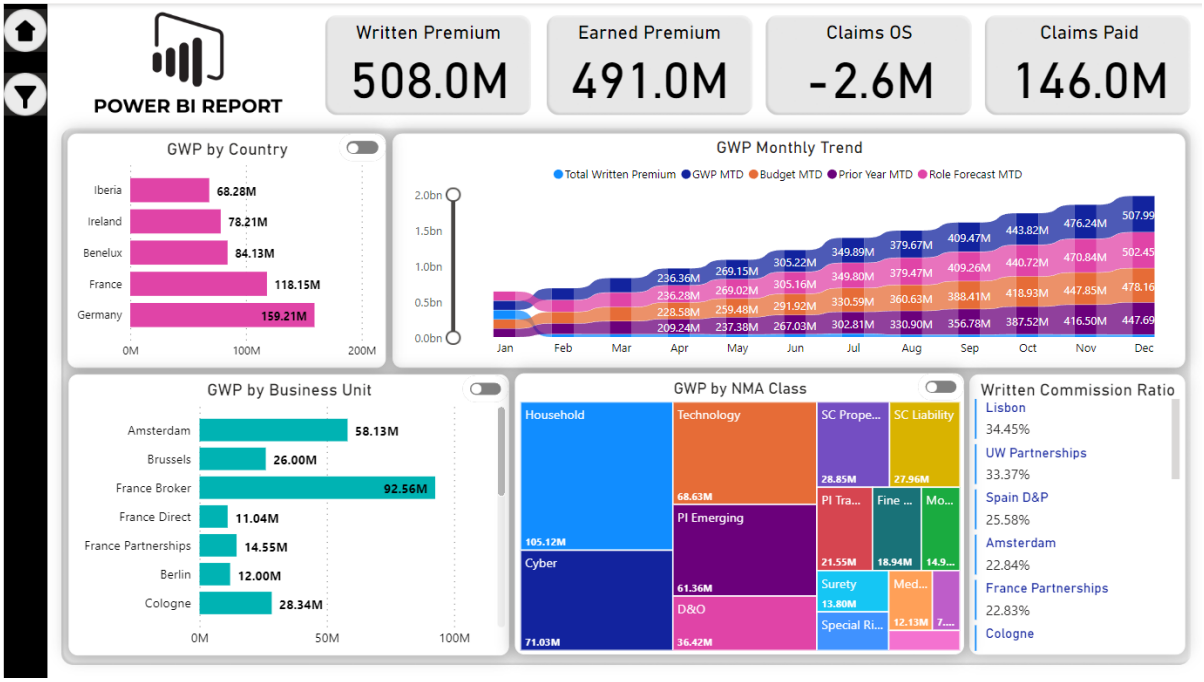

Figure 11: Dashboard Main Page

Underneath those KPI cards, several visuals present in more detail the company's performance from different dimensions as per below:

- **GWP per "Country"**: presents the Gross Written Premium sold for each location. From the company's perspective, it represents the politic-economic union area where those offices are located, not necessarily a specific country. For example, Benelux only contains data from two countries (Belgium and the Netherlands) (ID# 4).
- **GWP Monthly trend**: allows the user to compare four measures from several financial scenarios. For example, the sum of the Gross Written Premium of each month versus the cumulative GWP, the Budget, the Prior Year and the Role Forecast cumulative. This is because the stakeholders want to see different views and how they vary monthly (ID# 8).
- **GWP per Business Unit**: follows the same logic as the one from Country, however, from a different dimension on a more granular level. The Business Units are the European operational units that conduct business on behalf of ABC Inc. Those can vary from offices owned by the company to agencies and/or business partnerships or representatives (ID# 4).
- **GWP per NMA Class**: presents a set of products/main covers sold by the company in terms of premium, which from the financial report's perspective, are the different classes of Net Management Accounts (ID# 4).

- **Written Commission Ratio**: characterizes the commission percentage of each Business Unit. It is calculated based on the commission paid to brokers and intermediaries that sell policies on their behalf, divided by the total premium paid by customers (ID# 9).

7.1.3. Additional Features

Some of those visuals contain a **toggle button** on their top-right corner. This functionality enriches the end-user experience by allowing the dashboard to present the right message without visual clutter. For example, the user can switch on/off to compare the different financial scenarios (budget, prior year, and role forecast) as shown in the pictures below (ID# 5; 6; 7):

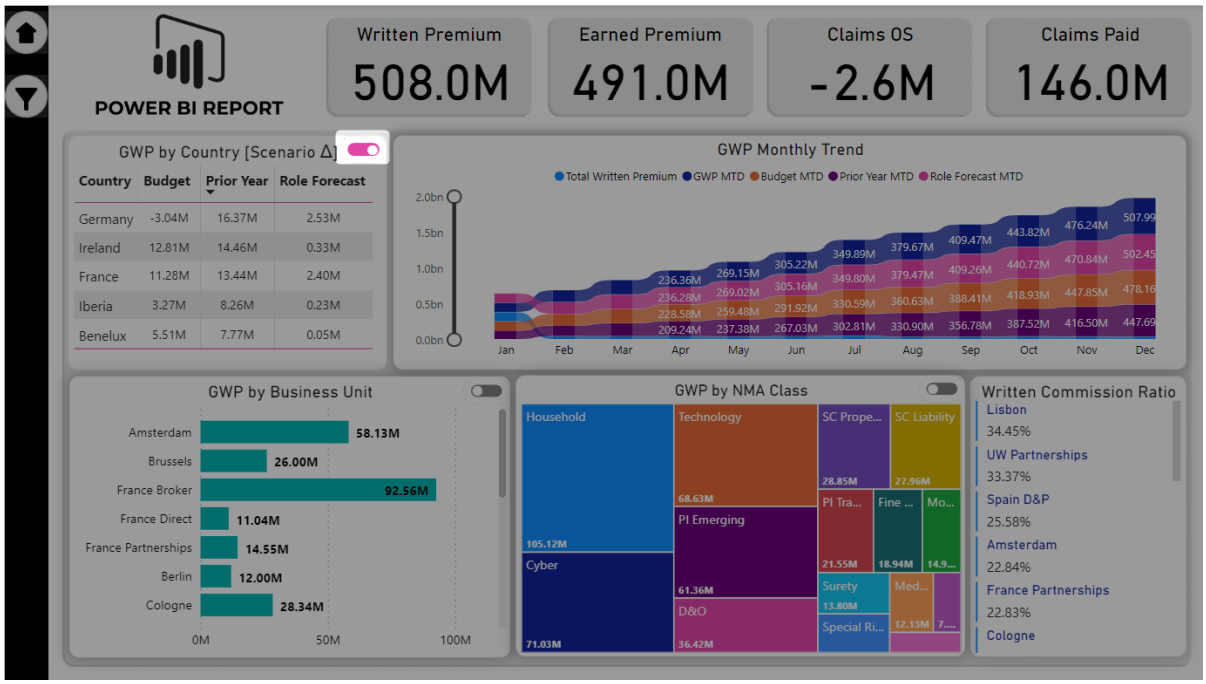

Figure 12: Toggle Button ON (Single Selection)

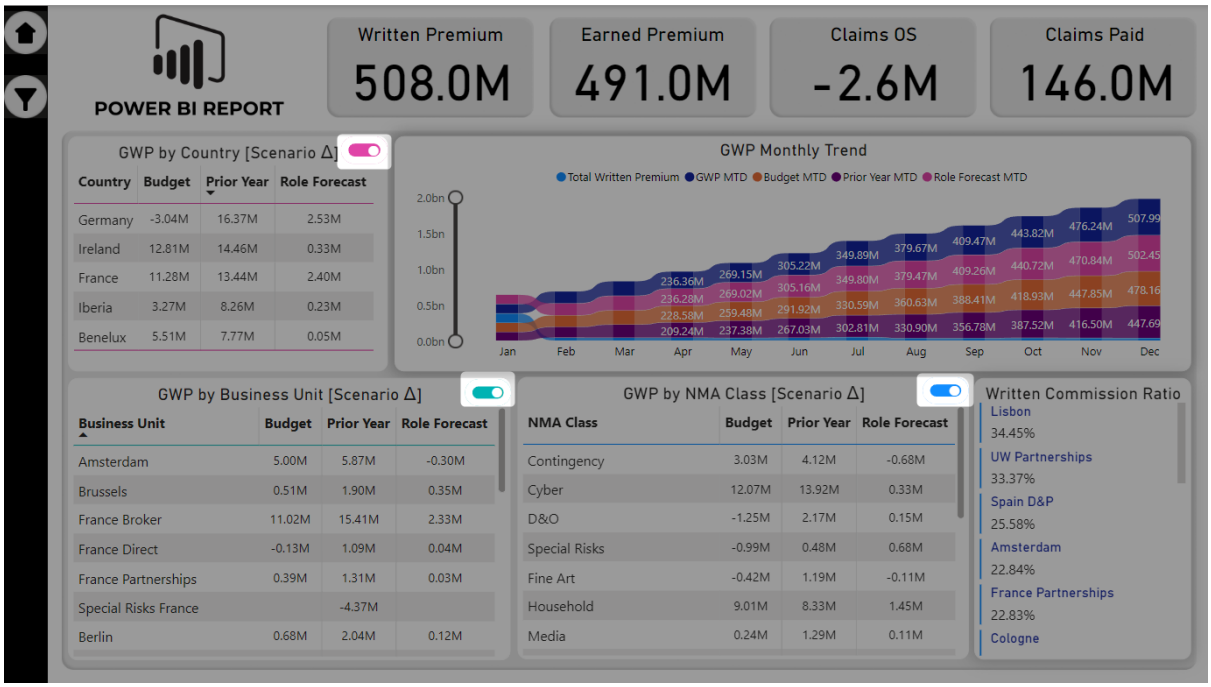

Figure 13: Toggle Button ON (Multiple Selection)

Finally, the **filter panel** located on the left-hand side of the dashboard offers the end-user the flexibility and freedom to navigate and explore the data according to their preferences. This filter panel provides multiple dimensions for analysis, including Country, Business Unit, NMA Class, Distribution Channel, and Risk Carrier. Moreover, it allows the user to view data across different time frames, such as year, quarter, and month, providing a comprehensive overview of trends and patterns.

With this level of customization, users can focus on the specific data points that matter most to them and analyze the information in a way that is most meaningful and relevant to their needs, as listed in section 11.1. Business Requirements List.

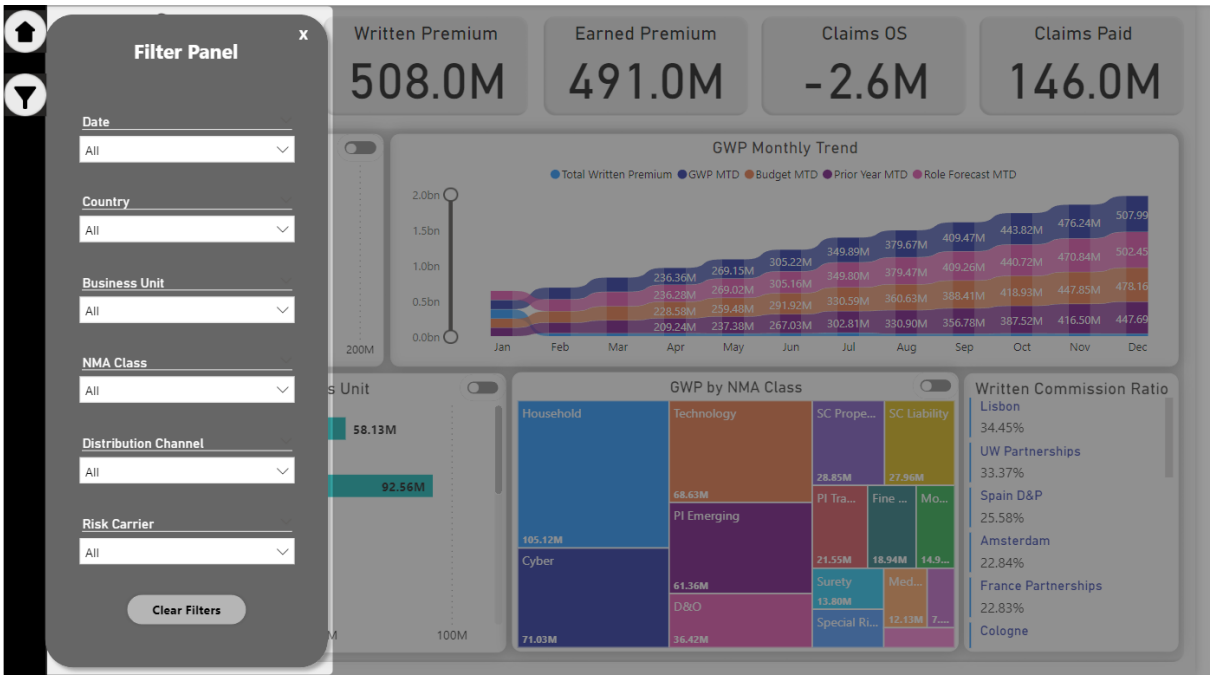

Figure 14: Dashboard Filter Panel

7.1.4. Business Insights

The dataset used in this project contains business transactions for the accounting year of 2022; hence insights presented correspond only to the given year, except for the scenario movements that also have previous year data (2021). Apart from the accounting year filter, the region Europe filter has also been applied since the project is an initiative sponsored by the European Finance Department. The business unit and risk carriers were also anonymized to keep the company's identity undisclosed.

Overall, besides having the stakeholders' requirements met in terms of performance indicators and KPIs from section 11.1. Business Requirements List, some interesting conclusions regarding the activity of ABC Inc. were also identified as follows:

- **Written premium outliers**: January is the period that contains the highest figures in terms of written premiums sold in that year (126.8 M€), which according to the Finance SMEs, is justified by the fact it is the most common renewal period, whereas August is the lowest (29.8 M€) which can be explained by the holiday season and summer vacations in Europe.
- **Most profitable locations:** Germany concentrates the highest parcel of the business, 31.3% (159.2 M€), followed by France at 23.3% (118.2 M€) and Benelux at 16.6% (84.1 M€). Despite the fact those countries have the highest written premiums figures, it is in the France Broker 18.2% (92.6 M€), Amsterdam 11.4% (58.1 M€), and Dublin 9.6% (48.7 M€) offices that most of the policy risks are evaluated and written.
- **Higher commission expenses:** Iberia (Portugal and Spain) is the location that has the lowest figures in terms of written premium, 13.4% (68.3 M€); however, it concentrates two of the highest commission ratio percentage paid to brokers and intermediaries (Lisbon 34.45%; Spain Direct & Partners 25.58%)

- **Best sales channel:** In terms of sales distribution channel, the most performative in terms of written premium sold are Broker 84.6% (429.9 M€), Direct and Partnerships 9.6% (48.6 M€), and UW Partnerships 5.9 % (29.9 M€), respectively.
- **Company risk ownership:** In terms of risk carrier, "ABC12" is the outstanding leader (506.3 M€), with almost 100% of the risk being carried there, followed by "ABC 33" 0.2% (1.2 M€) and "ABC 3624" 0.1% (0.5 M€).
- **Products and insurance coverage market value**: The most valuable insurance products in terms of written premium are Household 20.7% (105.12 M€), Cyber 14% (71.03 M€) and Technology 13.5% (68.63 M€), whereas the lowest one is Employers Liability 1.3% (6.64 M€), Contingency 1.5% (7.68 M€) and Media 2.4% (12.13 M€).

8. Conclusions

The work began when the author was presented to the organization and discovered the pain points and challenges faced by finance stakeholders in obtaining the data for monitoring business performance and making timely and informed decisions.

Once introduced to the context of the company and the main business goals, the project goals were defined, and the DSR methodology was chosen to support the scientific aspects of the project through the Awareness of the problem, Suggestion, Development, Evaluation and Conclusion phases of the methodology.

With the support of the existing literature, this study proposed designing and creating a visual dashboard using the Microsoft Power BI tool, which presented the KPIs and metrics desired by financial stakeholders using Business Intelligence systems and tools. The project was managed using Jira Software, and the activities and tasks were organized through phases such as Planning & Monitoring, Design, Build, Testing, and Deployment.

The final product artefact added value to the company by allowing the presentation of metrics and relevant performance indicators as a dashboard on day one. Once data is available, the dashboard is updated on the same day, allowing stakeholders to make decisions promptly, speeding up the decision-making capacity and moving the organization towards their goals.

Despite the solution being deployed only to the European Finance Team, it can also be adapted and deployed to other business functions according to their requirements. Furthermore, the project also answers the research question presented in the Introduction section, providing the European insurer company with a compelling financial view on day one.

9. Limitations and recommendations for future works

The main limitation of this study is that the dashboard was developed for a specific company only. As a result, it creates an opportunity for future works to validate and build the same dashboard and DSR methodologies for other companies within the insurance industry, allowing those organizations to offer and explore a standardized financial view.

Another constraint was identifying reliable data sources to replace the outdated Microsoft Excel files previously utilized by the Finance Team. Substantial time was invested in comprehending the Finance team's manual data transformations while the author familiarized himself with insurance business concepts to grasp the context better.

A further limitation was placing all the desired visuals on a single page. As this requirement was a must, it was necessary to discuss with finance stakeholders the main metrics they would like to have and develop alternative solutions, such as the “toggle button” that would allow adding more details to the report without visual clutter. However, the literature review exercise covered in section 2.2 Dashboards helped to ease this process. Future works may explore user experience concepts and visualization solutions alternatives for intuitive data exploration.

As the company grows and the data volume increases, the business needs evolve creating opportunities for scaling up the solution and exploring new business functions that aim to make more informed decisions based on facts. Hence, future works may also monitor and evaluate the dashboard performance to ensure insights are available on time.

Furthermore, one of the data sources (Microsoft Excel file) could also be decommissioned if integration networks were in place when this project was developed. For example, it could be worth exploring data integration techniques to streamline the data pipeline, removing manual activity performed by the finance team when facilitating the scenario movement records.

Finally, it is believed by the author that the insights gained from this project would help guide future researchers and deliver projects related to BI and dashboard solutions for other organizations, adding value to both business and academic scenarios.

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11. Annexes

11.1. BUSINESS REQUIREMENTS LIST

ID	User Story	Fact / Measure (potential)	Dimension (potential)
1	As a Finance SME, I need to speed up the process of obtaining, preparing, and sharing business performance insights, so that I can present business insights to Senior Executives in a timely manner.	N/A	N/A
2	As a Finance SME, I need to provide a single page visual analytical dashboard, so that I can communicate a story and present metrics and KPIs that support senior executives' decision-making.	N/A	N/A
3	As a Finance SME, I need to know the total amount of written premium, earned premium, claims paid and claims outstanding (as KPI cards) by country, by business unit, by channel, by risk carrier, by NMA class, across different time periods (month, quarter, year), so that I can monitor performance from different perspectives.	actual movement	country; business unit; channel; risk carrier; NMA class; date (month; quarter; year);
4	As a Finance SME, I need to know the total written premium by country, by business unit, by NMA class, across different time periods (month, quarter, year), so that I can monitor performance from different perspectives.	actual movement	country; business unit; NMA class; date (month; quarter; year);
5	As a Finance SME, I need to know the variance amount of budget written premium compared with actual written premium by country, by business unit, by NMA class, across different time periods (month, quarter, year), so that I can check performance against from multiple targets scenarios.	actual movement; budget scenario movement;	country; business unit; NMA class; date (month; quarter; year);
6	As a Finance SME, I need to know the variance amount of prior year written premium compared with actual written premium by country, by business unit, by NMA class, across different time periods (month, quarter, year), so that I can check performance against from multiple targets scenarios.	actual movement; prior year scenario movement;	country; business unit; NMA class; date (month; quarter; year);
7	As a Finance SME, I need to know the variance amount of role forecast written premium compared with actual written premium by country, by business unit, by NMA class, across different periods (month, quarter, year), so that I can check performance against from multiple targets scenarios.	actual movement; role forecast scenario movement;	country; business unit; NMA class; date (month; quarter; year);
8	As a Finance SME, I need to know the written premium monthly trend, compared with the MTD (cumulative) actual written premium, budget written premium, prior year written premium and role forecast written premium, by country, by business unit, by channel, by risk carrier, by NMA class, so that I can compare the sales performance of each month against multiple scenarios.	actual movement; budget scenario movement; prior year scenario movement; role forecast scenario movement;	country; business unit; channel; risk carrier; NMA class; date (month);
9	As a Finance SME, I need to know the written commission ratio percentage by business unit, across different time periods (month, quarter, year), so that I can track expenses over the time.	actual written commission	business unit; date (month; quarter; year);

Figure 15: Business Requirements

11.2. FACT AND DIMENSION ATTRIBUTES LIST

	Fact Table		Dimension Table							
Hierarchy/ Attribute	FCT_ActualMovement	FCT_ActualMovement	DIM_CalendarDate	DIM_NMAPrimary	DIM_NMASecondary	DIM_RiskCarrier	DIM_BusinessUnit	DIM_DistributionChannel	DIM_TransactionType	DIM_Scenario
CalendarDate (BK,SK)	X	X	X							
NMAPrimaryID (BK,SK)	X			X						
NMASecondaryID (BK,SK)	X				X					
RiskCarrierID (BK,SK)	X					X				
BusinessUnitID (BK,SK)	X						X			
DistributionChannelID (BK,SK)	X							X		
TransactionTypeID (BK,SK)	X								X	
ScenarioID (BK,SK)		X								X
GrossWrittenPremium	X	X								
WrittenExternalCommission	X	X								
GrossEarnedPremium	X									
EarnedExternalCommission	X									
GrossClaimOS	X									
GrossClaimPaid	X									
Day			X							
MonthNumber			X							
MonthName			X							
MonthNameShort			X							
QuarterNumber			X							
QuarerName			X							
Year			X							
NMAPrimaryCode		X		X						
NMAPrimaryName				X						
NMAPrimaryGroupCode		X		X						
NMAPrimaryGroupName				X						
NMASecondaryCode		X			X					
NMASecondaryName					X					
NMASecondaryGroupCode					X					
NMASecondaryGroupName					X					
RiskCarrierName						X				
RiskCarrierCode		X				X				
BusinessUnitCode							X			
BusinessUnitName							X			
BusinessUnitGroupCode							X			
BusinessUnitGroupName							X			
DistributionChannelCode		X						X		
DistributionChannelName								X		
TransactionTypeCode		X							X	
TransactionTypeName									X	
Scenario KPI		X								
ScenarioAmount		X								
ScenarioCode		X								X
ScenarioName										X

Figure 16: Fact and Dimension Attributes

11.1. END-TO-END DATA FLOW

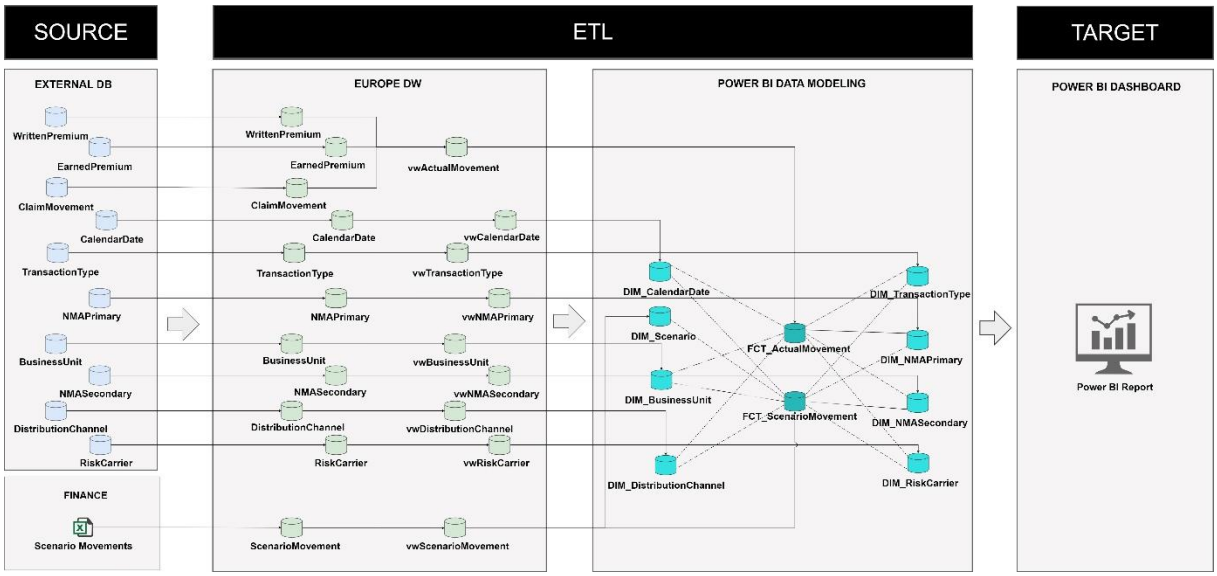

Figure 17: End-To-End Data Flow

11.2. METRICS AND KPIS

Metric	DAX
Actual Written Commission Ratio	Written Commission Ratio ACT = DIVIDE(SUM('Actual Movement'[Written Commission]), SUM('Actual Movement'[Written Premium]))
Budget Month-to-date	Budget MTD = CALCULATE (SUM('Scenario Movement'[Amount]), 'Scenario Movement'[Scenario Code] = "BUD", 'Scenario Movement'[KPI] = "GWP", 'Calendar Date'[Calendar Date] <= MAX('Calendar Date'[Calendar Date]), DATESYTD('Calendar Date'[Calendar Date], "31 Dec"))
Budget Variance Amount	Budget Variance Amount = SUM('Actual Movement'[Written Premium]) - CALCULATE (SUM('Scenario Movement'[Amount]), 'Scenario Movement'[Scenario Code] = "BUD", 'Scenario Movement'[KPI] = "GWP")
GWP Month-to-date	GWP MTD = CALCULATE (SUM ('Actual Movement'[Written Premium]), DATESYTD ('Calendar Date'[Calendar Date]))
Prior Year Month-to-date	Prior Year MTD = CALCULATE (SUM('Scenario Movement'[Amount]), 'Scenario Movement'[Scenario Code] = "PY", 'Scenario Movement'[KPI] = "GWP", 'Calendar Date'[Calendar Date] <= MAX('Calendar Date'[Calendar Date]), DATESYTD('Calendar Date'[Calendar Date], "31 Dec"))
Prior Year Variance Amount	Prior Year Variance Amount = SUM('Actual Movement'[Written Premium]) - CALCULATE (SUM('Scenario Movement'[Amount]), 'Scenario Movement'[Scenario Code] = "PY", 'Scenario Movement'[KPI] = "GWP")
Role Forecast Month-to-date	Role Forecast MTD = CALCULATE (SUM('Scenario Movement'[Amount]), 'Scenario Movement'[Scenario Code] = "RFQ", 'Scenario Movement'[KPI] = "GWP", 'Calendar Date'[Calendar Date] <= MAX('Calendar Date'[Calendar Date]), DATESYTD('Calendar Date'[Calendar Date], "31 Dec"))
Role Forecast Variance Amount	Role Forecast Variance Amount = SUM('Actual Movement'[Written Premium]) - CALCULATE (SUM('Scenario Movement'[Amount]), 'Scenario Movement'[Scenario Code] = "RFQ", 'Scenario Movement'[KPI] = "GWP")
Total Claim OS	KPI Total Claim OS = SUM('Actual Movement'[Claim Outstanding])
Total Claim Paid	KPI Total Claim Paid = SUM('Actual Movement'[Claim Paid])
Total Earned Premium	KPI Total Earned Premium = SUM('Actual Movement'[Earned Premium])
Total Written Premium	KPI Total Written Premium = SUM('Actual Movement'[Written Premium])

Figure 18: Metrics and KPIs