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“Business Intelligence for Competitive Pricing: Development of a Dynamic Dashboard for Retail on Amazon EU”

Supervisor

Prof. Eliana PASTOR

Candidate

Carola BRINGIOTTI

320063

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Summary

This thesis addresses the strategic importance of competitive pricing in the context of Amazon EU's Wireless retail segment. Initially, price monitoring activities were carried out using manual Excel spreadsheets, which presented substantial limitations in terms of scalability, accuracy and analytical depth. These tools lacked automation and required significant human effort, hindering the ability to rapidly adapt to dynamic market conditions.

To overcome these limitations, the project proposes the development of a set of interactive dashboards built with AWS QuickSight, aimed at automating data collection and visualization over a dynamic 13-week period. Before visualizing the data, a critical preparatory step was the creation of optimized data tables on DataCentral, following an extensive SQL query development process. This foundational work enabled efficient integration with QuickSight, ensuring real-time analytics, intuitive graphical representations and customizable filters for brand, category, competitor and time range. The dashboards report on a wide range of KPIs critical for pricing strategy, including total revenue, NetPPM%, contribution profit, CCOGS, price erosion and daily-level pricing drivers. By enabling both high-level overviews and ASIN-level detail, the tool supports informed decision-making for Brand Specialists, Vendor Managers and AVS Managers across the EU10 markets.

The implementation of this Business Intelligence system led to significant improvements in operational efficiency, reducing manual reporting time and enabling faster, more accurate pricing decisions. Due to its strong performance and impact in the Wireless segment, the solution is currently being extended across all Amazon Retail categories, demonstrating its scalability and strategic value beyond the original scope.

In addition to optimizing resources, costs and decision-making speed, this thesis lays the foundation for broader retail analytics innovation and contributes to the long-term development of data-driven pricing strategies within Amazon.

Chapter 1 – Introduction

1.1 Thesis Context

The modern retail landscape has undergone a radical transformation, driven by the rise of e-commerce and the increasing digitalization of consumer habits. In this **dynamic online retail sector** [1], competition is no longer defined solely by product variety, but by the speed and precision of data-driven decision-making. Pricing strategies have become highly volatile, requiring retailers to monitor market fluctuations and competitor moves in real-time. In this global scenario, companies must navigate the challenges of price transparency and high-frequency market shifts, where the ability to transform vast amounts of raw data into actionable insights is the primary competitive advantage [2]. As one of the world's leading technology and retail companies, Amazon represents the benchmark for operational excellence in this context, managing a complex ecosystem where Business Intelligence tools are essential to maintain leadership across diverse international markets, such as the European Union (EU).

Focusing on the specific business case, Amazon operates in a highly competitive environment where pricing represents a fundamental strategic lever for business success. This thesis was developed within Amazon Retail's Hardlines division, in the Total Consumer Electronics area, focusing on the Wireless category, where efficient price management represents a daily challenge for Brand Specialists, Vendor Managers and AVS Managers.

The operational context is characterized by two main aspects. First, the market complexity: the European Wireless team manages a wide range of products across the EU10 marketplaces (United Kingdom, Germany, France, Italy, Spain, Netherlands, Sweden, Poland, Belgium and Ireland). The product portfolio encompasses numerous devices and accessories: smartphones, tablets, smartwatches, wearable devices, wireless earbuds, networking devices such as routers and repeaters, as well as accessories like cases, chargers and cables. Leading manufacturers including Apple, Samsung, Huawei and other major brands constitute the core business. This diverse product range, coupled with operations

across multiple markets with distinct competitive dynamics, demands constant monitoring of pricing strategies and continuous adaptation of commercial policies.

Secondly, prior to this work, a significant operational gap existed: competitive price analysis relied primarily on Excel spreadsheets, with evident limitations. This approach required manual data updates, lacked scalability and showed restricted capability in analyzing large volumes of data, resulting in inefficient use of team resources.

Given these challenges, the need emerged for a more structured and automated solution to support strategic pricing decisions. This thesis focused on developing interactive dashboards using AWS QuickSight, creating a Business Intelligence tool capable of automating data collection and processing, providing intuitive visualizations, ensuring real-time information updates and extending the analysis across the entire European Wireless sector.

The work's distinctive characteristic lies in its interdisciplinary nature, combining economic expertise for understanding market dynamics with technical skills essential for implementing Business Intelligence solutions. This dual approach reflects the complexity of modern business, where data analysis and strategic decisions are increasingly interconnected.

The primary challenge lies in creating a tool that effectively manages and analyzes substantial data volumes across the EU10 markets, considering their unique competitive landscapes and consumer preferences. The goal is to provide Amazon's decisionmakers with a powerful and flexible means to navigate this complex environment, enabling informed and timely pricing decisions that benefit business performance throughout the European Wireless sector.

1.2 Practical Objectives and Benefits of the Thesis

Building upon the context described above, this thesis work focuses on the development of five interactive dashboards in AWS QuickSight, each supporting specific analytical needs

in the pricing decision-making process. These dashboards analyze data over a standard 13week period, while offering users the flexibility to customize time intervals through specific filters. The interconnected dashboards, each with its distinctive focus, are:

1. Pricing Map: An analytical tool providing detailed Amazon metrics at brand or ASIN level through three views:
 - Key metrics overview by competitor (total revenue, NetPPM%, CP and CCOGS as a percentage of PCOGS)
 - Temporal analysis of weekly performance trends, including revenue percentage and Amazon's NetPPM% and CP
 - ASIN-level detail showing revenue, CP and NetPPM% in relation to selected competitors

2. Industry Pricing: Visualizes price trends of selected competitors for specific brands, categories, or ASINs, enabling market players to track and compare price movements and understand competitive positioning within the industry. In addition to the graphical representation, this dashboard includes a daily table at the ASIN level, comparing Amazon's price with the lowest price among all competitors. This feature not only provides a granular view of price competitiveness but also serves as a validation tool for Amazon's pricing algorithm, allowing teams to verify if the tool used to set Amazon's prices is competitive and functioning correctly, or if there are any discrepancies or errors that need addressing.

3. Pricing Erosion: Features a line graph showing the relationship between price erosion and funding mechanisms. The Price Erosion percentage represents what has been "lost" in terms of margin, calculated as the differential between the Average Selling Price (ASP) and List Price (RRP) excluding VAT. This erosion is then compared with CCOGS, which comprises two key components: Vendor Allowance (funding provided by vendors to compensate for Amazon's competitive price reductions) and COOP (the cost of services that Amazon offers to vendors). The dashboard visualizes these elements through a green "Opportunity" line that indicates the distance from value 1, representing the Break Even Point. This visualization enables teams to understand how much of the price erosion is

effectively compensated by vendor funding mechanisms, providing crucial insights for pricing strategy decisions. Users can refine their analysis through various filters including marketplace, timeframe, category and brand levels.

4. Industry Profitability: Delivers comprehensive profitability analysis through these visualizations:
 - Amazon's NetPPM% by categories across EU10 marketplaces
 - Industry NetPPM% with parallel analysis structure
 - Heat map of bps differentials between Amazon and industry
 - Competitor NetPPM% by category or subcategory for direct profitability comparisons
5. Pricing Drivers: Enables daily tracking of pricing drivers by ASIN, monitoring key financial indicators such as total revenue, PCOGS, CCOGS and CP, with detailed metric examination capabilities through filter applications. This final section significantly expands the dashboard system's analytical capabilities by enabling ASIN-level performance monitoring on a daily basis, complementing the strategic overviews provided by the other four dashboards.

The implementation of this integrated system delivers benefits across multiple organizational dimensions. Operationally, it introduces automation in data collection and analysis, eliminating manual spreadsheet updates while providing real-time pricing information and standardized analysis across all EU10 marketplaces.

Strategically, the system enhances decision-making through its integrated market view. Quick response capability to competitive variations, combined with pricing strategy optimization based on historical data and trends, ensures more accurate pricing decisions and sustainable competitive advantage.

From an organizational perspective, the solution democratizes data access for all stakeholders, establishing a common language for pricing analysis. The reduction in report preparation time and enhanced team collaboration through the shared platform foster a more efficient and cohesive working environment.

This comprehensive dashboard system represents a significant advancement in competitive pricing management, equipping stakeholders with essential tools for informed and timely decision-making in the dynamic wireless retail market, while providing Amazon with a scalable solution for future market challenges.

1.3 Dashboards as Decision-Making Tools

According to Few (2006), 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" [3]. This definition underpins the role of dashboards in modern business intelligence, emphasizing their ability to condense complex data into actionable insights.

A fundamental characteristic of effective dashboards is their user-friendly interface. Kajava (2018) demonstrates through his case study research that most dashboard users in strategic positions may not understand the technical complexities behind dashboard construction and data processing [4]. Therefore, the ability to present complex data through an intuitive and immediately accessible interface becomes paramount, ensuring that decision-makers can focus on data interpretation and strategic thinking.

The evolution of dashboard technology reflects the broader transformation in business decision-making. While traditional static reporting methods required significant time for data processing and analysis, modern interactive dashboards enable real-time monitoring and immediate response to market changes. Borra (2024) highlights how this capability is particularly crucial in dynamic environments such as retail pricing, where decisions need to be made quickly based on various factors including competitor behavior, market demand and internal performance metrics [5].

Modern dashboards distinguish themselves through several key characteristics:

1. **Real-time Data Integration:** Contemporary dashboards process and display data as it becomes available, enabling immediate response to market changes.
2. **Interactive Visualization:** Users can drill down into data, filter information and customize views according to their specific needs, moving beyond passive data consumption to active data exploration.
3. **Data Democratization:** By presenting complex data in accessible formats, dashboards enable stakeholders at various organizational levels to make data-driven decisions, regardless of their technical expertise.

The effectiveness of dashboards ultimately depends on their ability to balance sophistication with accessibility. Kajava's research (2018) shows how organizations that manage this balance gain significant competitive advantages, especially in decisions requiring simultaneous analysis of market data, competitor behavior and internal performance [4]. His case study reveals how companies transitioning from traditional reporting methods to interactive dashboards experienced substantial improvements in their ability to respond to market changes and make data-driven decisions.

1.4 Relevance of the Topic in ICT Context

The convergence of Business Intelligence and cloud computing marks a significant milestone in Information and Communication Technology (ICT), particularly in the retail sector. Borra's (2024) comprehensive analysis highlights how this transformation has made real-time data analysis and visualization critical success factors [5].

In the context of pricing strategies, the impact of real-time data visualization has been particularly profound. Borra (2024) cites a study by Enterprise Strategy Group that highlights the significant benefits of implementing AWS QuickSight [5]. According to this study, organizations experienced a 74% decrease in BI solution costs over three years, up to a 300% increase in BI analytics usage and a projected return on investment of 275% [6]. While these figures are impressive, Borra notes that the actual impact may vary depending on the specific context and implementation of the BI solution.

AWS QuickSight, as a cloud-based BI solution, exemplifies the advantages of modern dashboard technology over traditional Excel-based solutions. Borra's comparative analysis emphasizes QuickSight's superior capabilities:

- **Scalability and Performance:** Efficient handling of large data volumes and seamless integration with existing AWS services.
- **Real-time Capabilities:** Automated data refresh mechanisms and live connections to multiple data sources.
- **Collaborative Features:** Multi-user access and cross-team dashboard sharing, enhancing organizational communication.
- **Advanced Analytics Integration:** Built-in machine learning capabilities and predictive analytics features.
- **Cost Optimization:** Pay-per-use pricing model and reduced infrastructure maintenance costs.

The relevance of dashboard technology in the ICT context extends beyond mere data visualization. Kajava (2018) emphasizes how these solutions have become integral to business strategy and operations [4]. The adoption of dashboard technologies is driven by the need to manage increasing volumes of business data, the pressure for rapid decisionmaking in competitive markets and the growing complexity of IT ecosystems requiring unified data views.

Looking forward, Borra (2024) anticipates several emerging trends in dashboard technology, including deeper integration of artificial intelligence and machine learning, enhanced mobile accessibility, greater emphasis on predictive analytics and the evolution of natural language processing capabilities [5]. These advancements promise to further enhance the role of dashboards as critical decision-making tools in the increasingly datadriven business landscape.

The implementation of modern dashboard solutions represents a fundamental shift in how businesses interact with their data. This transformation is not merely technological but represents a fundamental change in how businesses operate and compete in the digital age, underscoring the growing importance of effective data visualization and analysis in driving business success.

1.5 Main Contributions and Thesis Structure

The work presented in this thesis represents a concrete and scalable application of Business Intelligence to a real-world pricing challenge. By combining technical and analytical skills, the project resulted in a fully automated dashboard system that replaced manual reporting with a centralized, data-driven decision-making tool. The five dashboards developed provide consistent insights across the EU10 Wireless markets, offering users the flexibility to explore strategic KPIs at various levels of granularity.

One of the most significant outcomes of this project is its impact beyond the initial scope: after proving successful in the Wireless segment, the solution is currently being extended to the entire Amazon Retail organization. This highlights not only the technical soundness of the implementation but also its organizational value and potential for widespread adoption.

The thesis is structured to reflect the full development cycle of the project. The next chapter provides a theoretical background on Business Intelligence and competitive pricing, followed by a detailed description of the existing tools and data sources. The third chapter delves into the technical implementation, including the creation of SQL queries and the construction of data tables on DataCentral. Chapter four focuses on data visualization and dashboard design within AWS QuickSight, including the structure and specific role of all five dashboards. The fifth chapter analyzes the strategic impact of the dashboards on Amazon's pricing operations. Finally, the conclusion summarizes the key results, outlines limitations and suggests future improvements, including broader applications of the solution.

Chapter 2 – Theoretical Background

This chapter provides the theoretical foundation for the research, starting with the definitions and objectives of Business Intelligence. It explores competitive pricing models in the retail sector and concludes by identifying the key performance indicators (KPIs) and metrics that are essential for monitoring market dynamics and financial performance [14].

2.1 Business Intelligence: Definitions, Goals and Applications

Business Intelligence (BI) encompasses a set of technologies and practices aimed at transforming raw data into actionable insights to support decision-making at all organizational levels. Modern BI systems provide accessible, self-service analytics that allow users to interact with data directly and in real time [7]. According to Watson, BI can be categorized into strategic and operational approaches: the former focuses on long-term trends and planning, while the latter supports immediate, day-to-day decisions [8]. The ability to integrate BI into daily workflows is critical in data-intensive environments. Davenport and Harris argue that organizations that systematically embed analytics into their operations outperform their competitors by making faster and better-informed decisions [9]. This is particularly relevant in sectors like e-commerce, finance and supply chain management, where timely access to accurate information can determine the success of strategic initiatives or operational efficiency.

From an organizational standpoint, BI contributes to multiple dimensions:

- **Operational efficiency:** BI tools automate recurring reporting tasks, reduce errors from manual data handling and streamline workflows.
- **Decision quality:** Interactive dashboards and drill-down capabilities help decisionmakers identify root causes, test hypotheses and prioritize actions based on evidence rather than intuition.

- **Cross-functional collaboration:** A shared BI environment enables different teams—finance, marketing, operations—to access a consistent data foundation, fostering alignment and faster consensus.
- **Data democratization:** BI platforms empower non-technical users to independently explore and interpret data, reducing reliance on centralized analytics teams.

Empirical studies have confirmed these impacts. Kajava's case study [4] highlights the transformation in reporting speed and decision-making accuracy following the implementation of Microsoft Power BI in a mid-sized company. Borra [5], analyzing Amazon QuickSight and other BI platforms, quantifies organizational gains such as increased BI usage, improved scalability and reduced cost of ownership. These benefits suggest that BI has evolved from being a support function to a core component of competitive advantage in digital enterprises.

The following sections will examine how these general principles translate into a specific context of application—competitive pricing in the retail sector—and how a customized BI solution can enhance performance in a complex multinational environment.

2.2 Competitive Pricing: Definitions, Models and Impact on Retail

Pricing is one of the most critical levers in a company's commercial strategy, particularly in competitive markets such as e-commerce. Academic literature has long analyzed different pricing strategies, among which the most relevant are:

- **Cost-plus pricing**, where a fixed markup is added to the product cost;
- **Value-based pricing**, which sets the price according to the perceived customer value;
- **Competitor-based pricing**, where the price is determined by monitoring and responding to competitors' pricing;

- **Dynamic pricing**, which involves adjusting prices in real-time based on market conditions, demand, or competitor activity [10].

In the context of Amazon Retail, particularly in the Wireless EU segment, pricing follows a predominantly **competitor-based approach**. Brand Specialists are responsible for monitoring the price landscape for each product (ASIN) across relevant competitors. They assess whether Amazon's pricing tool—designed to automatically match or undercut the lowest available market price—is performing correctly and intervene only in case of anomalies or strategic adjustments. This strategy prioritizes **price competitiveness over margin preservation**, though maximizing margin remains an important goal when market conditions allow.

A key mechanism underlying Amazon's pricing strategy is the **BuyBox**, the prominent section of the product detail page containing the “Add to Cart” and “Buy Now” buttons. When multiple sellers offer the same product (same ASIN), only one is selected to appear in this space. Winning the BuyBox is essential for sales performance, as over 80–90% of purchases are made through the default seller displayed in that box [11].

Competition for the BuyBox involves two categories of sellers:

- **Internal competitors**: third-party sellers operating directly on the Amazon marketplace. These may use either Fulfilled by Amazon (**FBA**)—where Amazon stores, ships and handles customer service for their products—or Fulfilled by Merchant (**FBM**)—where the seller manages logistics independently [12]. Although they operate within the Amazon platform, these sellers directly compete with Amazon Retail for BuyBox visibility.
- **External competitors**: retailers or marketplaces outside of Amazon, such as MediaMarkt, Fnac, Unieuro, or brand-owned e-commerce sites. These do not compete directly within the Amazon interface but significantly influence pricing decisions. Amazon benchmarks its prices against them to maintain market competitiveness.

A visual representation of Amazon's internal retail organization helps clarify how marketplace types and fulfillment channels are structured—elements that directly impact the BuyBox mechanism and competitive pricing rules. This is illustrated in [Figure 1](#).

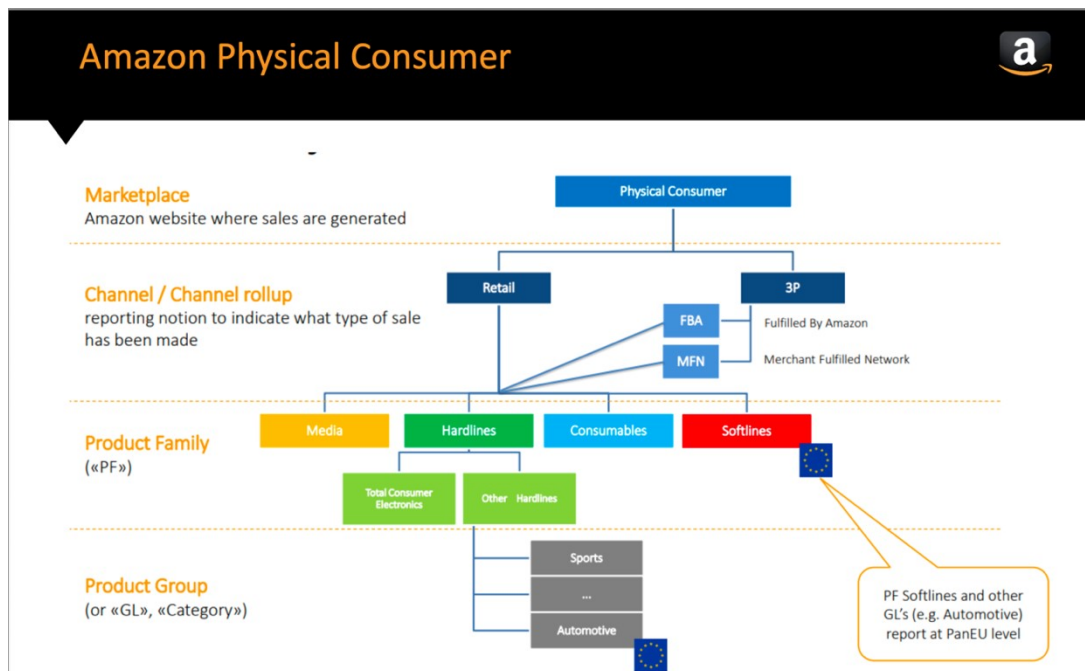


Figure 1 – Overview of Amazon Retail Structure and Fulfillment Channels

This diagram illustrates the hierarchical structure of Amazon's Physical Consumer segment, breaking down sales channels into Retail (Amazon Retail) and 3P (third-party sellers), as well as fulfillment methods (FBA, MFN). It also maps product categorization into Product Families and Product Groups (GLs), including Wireless under Hardlines. This framework provides the organizational context for pricing operations and BuyBox competition within Amazon Retail.

Internally, Brand Specialists use proprietary tools to track competitor prices and current BuyBox status for each ASIN. However, price setting remains a manual process, which can occasionally lead to pricing errors, such as price mismatches, slow updates, or margin erosion. In extreme cases, poorly aligned prices may result in Amazon losing the BuyBox to a third-party seller or in compliance risks if prices are perceived as uncompetitive or inaccurate.

From a performance standpoint, pricing directly affects key metrics such as total revenue, NetPPM%, contribution profit and BuyBox win rate.

The combination of high decision frequency, cross-market complexity and manual processes makes **Business Intelligence an indispensable asset** for Amazon's pricing

operations. A robust BI system enables teams to systematically track competitor prices, monitor internal KPIs, detect pricing anomalies and analyze historical performance, offering a data-driven foundation for timely and accurate decisions while reducing the risk of human error. These aspects will be further explored in the upcoming sections.

2.3 KPIs and Metrics in the Context of Competitive Pricing

In competitive retail environments like Amazon EU's Wireless division, tracking and interpreting the right performance metrics is critical to optimizing both pricing and profitability. The dashboards developed in this project provide daily and weekly visibility into a series of KPIs designed to capture various aspects of price competitiveness, margin structure and commercial effectiveness. These KPIs are calculated at the ASIN level and are used to support both operational decision-making and strategic planning. The most relevant metrics are described below. The selection and structure of these metrics follow the industry standards for dimensional modeling, ensuring that the analytical environment provides a consistent 'single version of the truth' for decision-makers [14].

NetPPM%

Net Pure Product Margin (NetPPM%) is a profitability metric that accounts for vendor funded contributions (VFCC) and sales discounts. It is calculated as the ratio between the net adjusted margin and total revenue, where the adjustment incorporates both cost reductions and commercial discounts:

$$NetPPM\% = \frac{NetPPPlessSD}{Revenue}$$

Where

$$NetPPPlessSD = Revenue - PCOGS + VFCC - SalesDiscount$$

VFCC (Vendor Funded Contra COGS) represents reductions in the effective cost of goods sold through agreements like co-op funding, damage allowances, promotions and price protection mechanisms.

NetPPM is widely used by Account Managers and Brand Specialists to monitor profitability across vendors and product portfolios. It supports several critical tasks, including:

- Tracking NetPPM targets at both company and portfolio levels;
- Identifying vendors that are not meeting profitability expectations;
- Initiating corrective actions when margins fall below thresholds;
- Supporting negotiation processes with vendors.

It is also important to note that NetPPM targets can vary depending on marketplace, product line (PL), or general ledger (GL) classification. When profitability for a given Vendor or ASIN drops below target, specific actions must be taken to restore alignment with financial goals.

Contribution Profit (CP)

Contribution Profit (CP) measures Amazon's ability to cover variable costs with the revenue generated from sales. The portion of revenue that remains after covering these costs is then used to absorb fixed costs or contribute to profit.

The basic calculation is straightforward: it consists of revenue minus the cost of goods sold and variable operating expenses.

When a product is sold, it passes through several stages—manufacturing, shipment to the Fulfillment Center (FC), customer ordering and delivery to the customer. Each of these stages involves costs that must be covered by the price paid by the customer.

CP allows for profitability analysis at various levels, including ASIN, vendor, category and sub-category. It helps determine whether individual products generate enough profit to contribute to Amazon's fixed expenses, such as salaries, facility costs and depreciation of assets.

Vendor Profitability (VP)

Vendor Margin represents the profitability of a vendor by focusing on specific components that fall under the vendor's direct control. It takes into account factors such as Net PPM, display advertising investments, inbound freight costs, liquidation impacts and vendor recoveries.

This metric helps Amazon build and maintain sustainable relationships with vendors by assessing whether they meet predefined profitability targets. It also enables the company to determine the true profit or loss generated by each item sold to customers. Target thresholds for vendor profitability may vary depending on the marketplace, product line and subcategory.

Price Erosion (%)

Price erosion occurs when products experience consistent price declines below their regular pricing levels. This is particularly problematic when excessive discounting conditions customers to make purchases only during promotional periods, making it difficult for vendors to sustain their standard pricing over time.

One of the main factors contributing to price erosion is price matching with external competitors, which affects both regular and promotional prices. To mitigate its impact, it is essential to monitor competitor pricing closely and ensure appropriate list price setting by vendors.

To measure price erosion, Amazon uses a metric that captures the deviation between the actual selling price and the product's list price (excluding VAT). It is calculated as the ratio between the average selling price (ASP) and the list price. A value below 1 indicates erosion—meaning the market price is lower than the intended list price. Two key strategies are typically adopted to manage price erosion effectively:

- Applying controlled discounts that offer customer value without severely compromising base pricing;
- Using time-limited promotions to avoid setting long-term expectations of reduced prices.

Monitoring this metric helps Amazon teams assess the intensity of competitive pressure, evaluate the effectiveness of pricing strategies and quantify the financial impact of markdowns and promotions across ASINs and categories.

CCOGS as % of Price

CCOGS, which stands for "Contra-Cost of Goods Sold," represents a crucial financial mechanism in Amazon's vendor relationships. This system enables Amazon to receive monetary returns from vendors based on the Cost of Goods Sold (COGS) through various service agreements. The primary purpose of CCOGS is to establish legally-binding agreements that allow Amazon to accrue money from vendors for different services and arrangements. These agreements are essential for maintaining profitable vendor relationships and must be properly set up, actively maintained and formally signed by vendors.

CCOGS encompasses several types of vendor-funded arrangements, including Damage Allowance (compensation for damaged goods that aren't returned to vendors), Strategic Vendor Services, Marketing Agreements, Deals Funding and Marketing Allowances—funds that Amazon reinvests in marketing activities.

The system operates through a dedicated tool that manages these vendor agreements. For the agreements to be effective, they must meet three critical criteria: they must be properly configured in the system, maintained in an active status and formally reviewed and signed by the vendor.

From a financial standpoint, CCOGS plays a vital role in Amazon's operations by providing a mechanism to offset the original Cost of Goods Sold through vendor-funded arrangements. This helps Amazon maintain better cost structures while ensuring proper documentation and legal compliance in its vendor relationships.

Shipped Units and Product GMS

Shipped Units represent the actual number of products delivered to customers, while Product Gross Merchandise Sales (GMS) represents the total value of products provided to Amazon's customers at the price listed on products' detail pages, including shipping revenues, gift wraps, sales discounts and refunds.

2.4 BI System Architecture and Tools:

SQL, DataCentral, QuickSight

2.4.1 Data Access and Query Development

The data architecture for this thesis was built by designing two complex SQL queries based on approximately ten existing source tables available within **DataCentral**. These source tables included a wide range of financial, operational and competitor-related attributes relevant to pricing analysis. The queries were first developed and tested using **Hubble**, Amazon's internal query execution platform, which allows previewing results with a row limit of 1,000.

Once the logic was confirmed to be accurate and aligned with the structure of Amazon's internal data, I proceeded to create two **physical tables in DataCentral**, using **partition type REPLACE** to enable daily refresh. The tables were structured specifically to support downstream analytics and dashboard integration, ensuring both consistency and scalability across the EU10 scope. Further technical details on query logic, optimization and data validation are provided in [Chapter 3 – Proposed Technical Solution](#).

2.4.2 ETL Job Creation and Table Population

The ETL pipeline for the Competitor Pricing Dashboard was implemented using Redshift jobs and Andes ingestion flows. Once the SQL logic was validated, two automated processes were scheduled to run daily and populate the DataCentral tables accordingly.

Data integrity was ensured by cross-validating key metrics—such as revenue, NetPPM and contribution profit—against Turismo, Amazon’s internal benchmark platform. Additional implementation details, including partitioning strategy and ETL orchestration, are discussed in [3.1 High-Level System Overview](#) and [3.3 Query Construction: Logic, Filters, Joins, Aggregations](#).

2.4.3 Data Structure and Table Design

The two resulting tables—**Competitor_Pricing** and **Competitors_Price**—contain complementary data needed for pricing and margin analytics:

- **Competitor_Pricing** includes key financial indicators such as revenue, PCOGS, CCOGS, NetPPM%, CP, VP, vendor funding components and pricing drivers.
- **Competitors_Price** captures external market dynamics, including daily competitor prices, list prices with tax and seller characteristics.

Both tables share a common set of keys—such as `asin`, `marketplace_id`, `region_id`, `calendar_day` and `country_code`—allowing for efficient and reliable join operations during the visualization phase.

2.4.4 Data Integration in QuickSight

Once the tables were fully populated and validated, I connected them to **Amazon QuickSight** by creating a **dedicated data resource** within the Wireless team’s cluster. In QuickSight, I performed a join between the two tables using the nine shared attributes. This setup allowed me to create unified views combining internal performance metrics and external pricing insights.

Additional KPIs—such as NetPPM%, Competitor and Industry’s NetPPM%, Price Erosion % and CCOGS as % of Price—were derived through **calculated fields** directly in QuickSight. These metrics formed the basis of the visualizations and supported both highlevel trend monitoring and ASIN-level drill-down analysis.

2.4.5 Cluster Management and Access Control

The final dashboards were deployed within a **QuickSight cluster created specifically for the Wireless team**. While this cluster is accessible to authorized team members, I remain the sole developer and maintainer of the data architecture, ETL pipeline and dashboards. Access to the data resource and dashboards is managed through Amazon's internal identity system and LDAP group permissions, ensuring proper governance and collaborative access.

2.5 Description of the “Competitor Pricing Dashboard” Project

2.5.1 Introduction of the Pre-Existing Version and Subsequent Developments

The idea for developing a centralized and automated Competitor Pricing Dashboard originated within the Wireless GL of Amazon Retail, which includes consumer electronics such as smartphones, smartwatches, speakers, earbuds and GPS devices. Initially, the team had created several Excel-based dashboards focused on Apple in the EU5 market (UK, FR, DE, IT, ES). These dashboards required manual weekly updates based on the download and processing of large datasets. The time and effort required for this process was significant, particularly because the team lacked advanced Business Intelligence (BI) skills.

When I joined the team as a Business Intelligence Engineer (BIE), I was asked to transform this manual workflow into a robust, scalable and automated dashboard system that could be extended beyond Apple and the EU5 region. My role included both technical development and a strong understanding of economic and operational KPIs. Weekly meetings with my manager – a team leader for Apple – allowed me to iteratively prototype and validate key design decisions.

The development followed a structured process:

- Identification of business needs: defining key output metrics and input filters.

- Exploration of Amazon's data infrastructure via DataCentral to locate relevant tables.
- Construction of SQL queries through Hubble, integrating data from approximately ten source tables.
- Validation of query output against reference datasets (e.g., Turismo platform).
- Deployment of production tables through Redshift jobs using partition type REPLACE.
- Connection of finalized datasets to Amazon QuickSight and design of custom visual components.

The resulting product, named **CMT - Competitor Pricing Dashboard**, includes five distinct dashboards tailored to different decision-making use cases. Once published, we invited the team to test and provide feedback, which led to the successful implementation of several enhancements.

The new dashboards have drastically reduced manual workload and improved the ability to monitor market dynamics and internal KPIs in real time.

Unlike the initial Excel version focused on Apple in EU5, the new BI solution was designed from the start to cover all vendors within the Wireless GL across EU10 markets (UK, FR, ES, IT, DE, BE, SE, NL, PL, IE).

Given the success and scalability of the model, a potential rollout to the entire Amazon Retail organization is currently being evaluated. The main challenge in this expansion lies in managing the significantly higher data volume, which may require further infrastructure optimization.

2.5.2 Datasets and Data Sources: Description and Structure

In Business Intelligence (BI) systems, the structure, origin and modeling of data represent foundational aspects that determine the analytical power, flexibility and accuracy of the

entire reporting infrastructure. According to Kimball and Ross [14], a solid data warehouse foundation relies on the proper identification of fact tables, dimension tables, granularity and data refresh logic. These concepts are especially critical in environments like Amazon Retail, where data volume, variety and velocity are extremely high.

In this project, the dataset supporting the Competitor Pricing Dashboard was engineered specifically to address operational and strategic pricing analysis needs within the Wireless GL. The solution leverages Amazon's internal BI infrastructure, specifically:

- DataCentral, used to explore metadata, identify relevant source tables and manage final outputs;
- Hubble, for query validation and sampling (limited to 1000 rows);
- Redshift ETL, where SQL logic was deployed into daily jobs;
- and finally QuickSight, used as the visualization layer for building the dashboard.

The data model consists of two physical tables created ad hoc:

- `Competitor_Pricing` (internal Amazon pricing and profitability data),
- `Competitors_Price` (external price tracking data).

Both were published with partition type REPLACE, enabling automated daily refresh and full replacement logic. These are physical tables, accessible to anyone with DataCentral privileges and optimized for high-frequency, low-latency dashboard queries.

From a data modeling theory perspective, we can distinguish two critical representations of the data structure:

- a conceptual schema, which identifies the main business entities (e.g., product, market, vendor, pricing entry) and the semantic relationships among them, typically visualized as an ER diagram;

- a logical schema, which defines how these entities are physically structured in the data layer—i.e., tables, columns, data types and join conditions. This level also supports relational algebra and SQL query execution [13].

In our case, the model exhibits characteristics of both star schema and fact constellation schema [14]. However, due to the focused nature of the dashboard and limited dimensional scope, a simplified dual-fact model was adopted. Each table serves as an analytical fact source—internal vs. external pricing—which can be queried independently or joined for comparative analysis.

This hybrid modeling approach allows the system to balance three priorities:

- high-performance query execution;
- semantic clarity for business users;
- future extensibility across GLs or market scopes.

Internal Data Table: Competitor_Pricing

The `Competitor_Pricing` table is the main internal dataset used to evaluate Amazon's financial performance at the ASIN level. It captures the interaction between cost, revenue and vendor funding mechanisms, enabling a granular profitability view. The table is built at daily resolution per ASIN per marketplace, which is the lowest level of granularity that allows actionable insights without data overload.

The attributes can be classified across five dimensions:

- **Temporal:** `calendar_day`, `week`, `quarter`, `year`
- **Product and vendor identifiers:** `asin`, `item_name`, `unprefixed_company_code`, `wbr_gl_description`, `category_description`, `gl_product_group`, `subcategory_description`
- **Geographic and fiscal metadata:** `marketplace_id`, `country_code`, `region_id`

- **Competitor info:** `competitor_name`, `is_MKPL`, `pricing_driver_1`, `pricing_driver_2`
- **Financial metrics:**
 - **Raw values:** `revenue`, `pcogs`, `ccogs`, `ppp`
 - **Vendor-funded contra costs:** `Vendor_Allowance`, `Discretionary_COOP`
 - **Aggregates:** `netppp`, `netppplessd`, `vp`, `cp`, `shipped_units`

External Data Table: Competitors_Price

The `Competitors_Price` table serves as the external counterpart to the internal metrics, capturing the actual market prices of selected ASINs across the EU10 markets. The data is extracted through Amazon’s internal scraping and monitoring systems and stored in a unified format suitable for join with internal data.

Attributes include:

- **Temporal:** `snapshot_day`, `week`
- **Product and vendor identifiers:** `asin`, `unprefixed_company_code`, `category_description`, `subcategory_description`, `list_price_with_tax`
- **Geographic and fiscal metadata:** `marketplace_id`, `country_code`, `VAT`, `region_id`
- **Competitor values:** `competitor_name`, `is_MKPL`, `competitor_price`

Granularity and Integration

Granularity defines the resolution of facts stored in a table—how “deep” each row goes in describing a business event [14]. In dimensional modeling, granularity must be defined explicitly before building metrics or integrating data sources.

In this case, both tables are structured with the same row-level granularity:

One record per ASIN, per day, per marketplace, per vendor, per competitor.

Maintaining aligned granularity is crucial for valid and lossless joins. To enforce this, only atomic and native fields are used in the integration, excluding:

- Derived attributes (e.g., is_MKPL)
- Redundant fields (e.g., country_code, which is inferred from marketplace_id)
- Aggregated or categorical dimensions (e.g., region_id, category_description)

The actual join is performed in Amazon QuickSight using the following five primary keys:

- asin
- calendar_day / snapshot_day
- marketplace_id
- unprefixed_company_code
- competitor_name

This structure guarantees row-level consistency, avoids duplication and supports dynamic filtering by any of the included dimensions.

The star schema representation not only facilitates the organization of measures and dimensions in a fact table, but also plays a critical role in clarifying the level of data granularity. In dimensional modeling, granularity refers to the depth of detail captured by each record in the fact table—typically defined by the lowest combination of dimensional keys. A well-defined star schema makes this explicit by linking the fact table to dimension tables through atomic identifiers, thereby helping analysts understand at which resolution metrics are computed and ensuring consistency in aggregations and joins [14].

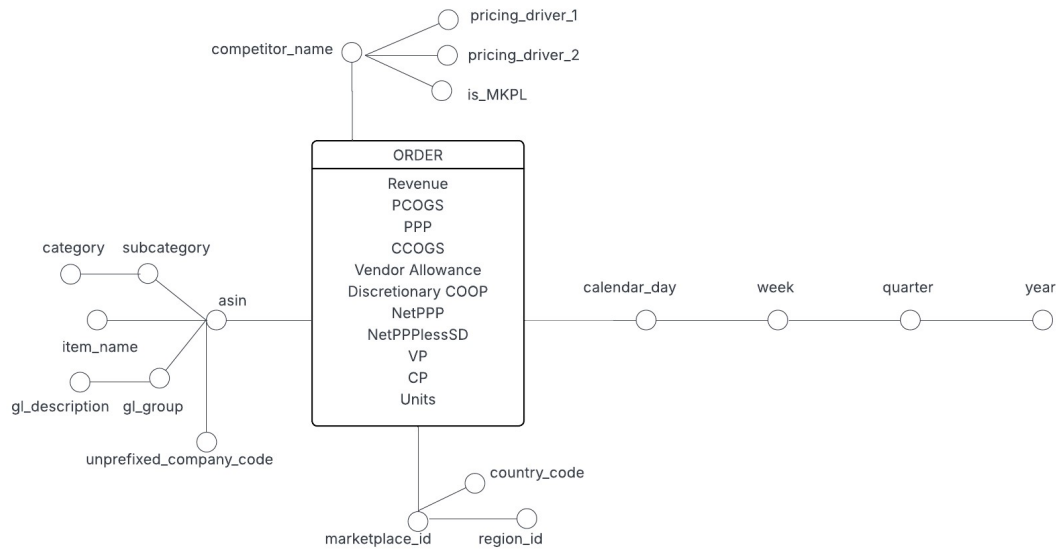


Figure 2 - Star schema representation of the Competitor_Pricing dataset.

The schema models the table as a central fact containing profitability and pricing metrics, surrounded by conformed dimensions such as Product, Date, Marketplace, Region and Competitor. The structure emphasizes atomic granularity and supports efficient slicing across multiple business dimensions.

Logical-Conceptual Schema

The two datasets operate as dual fact tables with overlapping identifiers. From a theoretical perspective, this model reflects a **fact constellation schema**, where multiple facts share common dimensions—such as product, time, geography, vendor and competitor.

To illustrate this structure, [Figure 3](#) displays a schema that connects the two tables (Competitor_Pricing and Competitors_Price) through their shared atomic keys. These include asin, calendar_day/snapshot_day, marketplace_id, unprefixed_company_code and competitor_name, ensuring row-level alignment and analytical consistency across datasets.

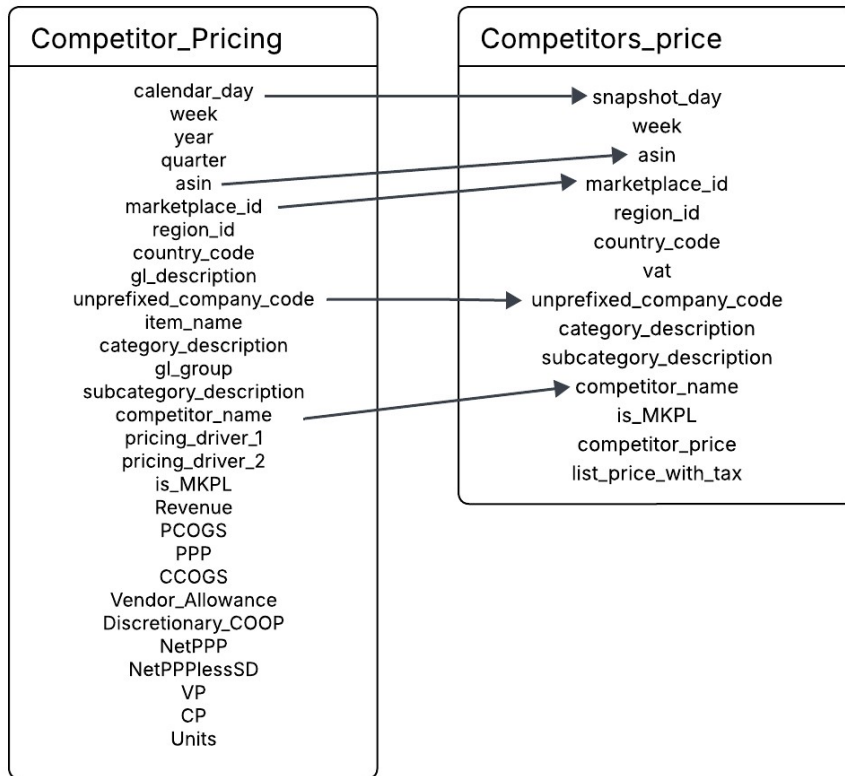


Figure 3 – Join Schema for Competitor Pricing Dashboard.

This figure illustrates the joinable fields between the internal and external tables, emphasizing their role in enabling scalable integration and consistent metric computation.

The use of a **shared schema architecture** allows the dashboard to unify internal KPIs with external market pricing, while maintaining the flexibility to manage independent ETL pipelines and refresh cycles. Furthermore, this modular setup supports potential extensions beyond the Wireless GL—scaling to the entire Amazon Retail EU10 domain—by removing GL-specific filters.

To complement the overview in [Figure 3](#), **Figure 4** introduces a detailed **EntityRelationship Diagram** that models the internal dataset structure (Competitor_Pricing). This ER diagram abstracts the core dimensional entities used in the table—namely PRODUCT, DATE, COMPETITOR, MARKETPLACE and REGION.

Each entity is presented with its **primary key** (●) and **descriptive attributes** (○), while the ORDER **relationship** is drawn with correct cardinalities and standard ER notation.

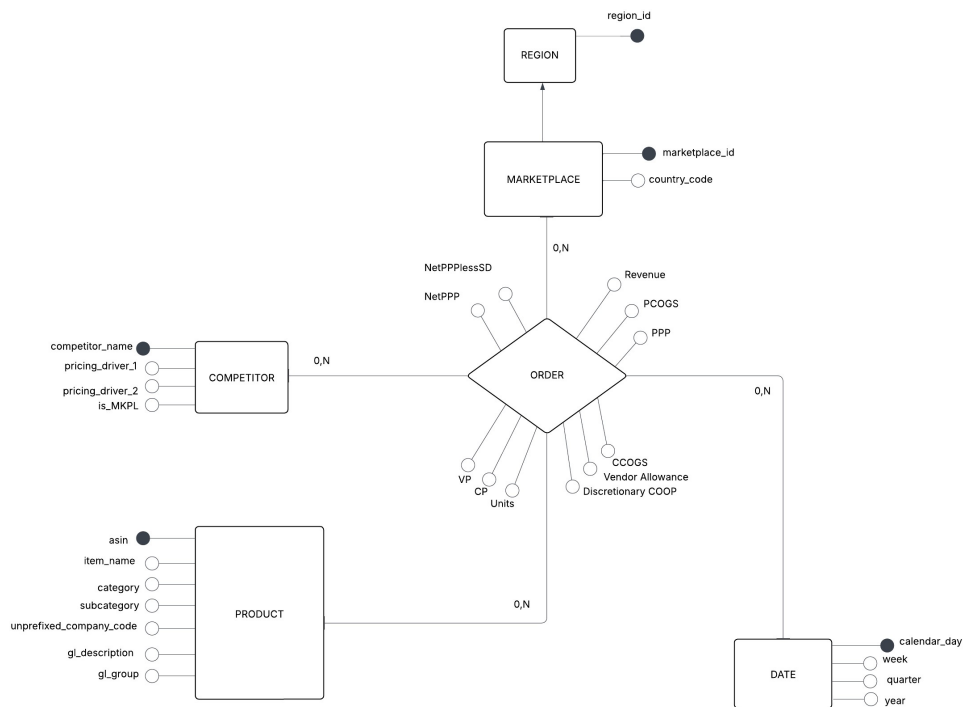


Figure 4 – Entity-Relationship Diagram of the Competitor Pricing Data Model.

The diagram also reflects the hierarchical link between MARKETPLACE and REGION, reinforcing the dimensional logic applied in the data model and enabling accurate regional segmentation in downstream analyses.

Chapter 3 – Proposed Technical Solution

This chapter illustrates the technical framework of the project, describing the data pipeline from ingestion to visualization. It details the process of data transformation, focusing on the integration between Amazon Redshift and QuickSight, ensuring an automated and reliable data flow for the final dashboard.

3.1 High-Level System Overview

The data architecture supporting the Competitor Pricing Dashboard was designed to guarantee automation, consistency and scalability across Amazon’s EU10 marketplaces. The system manages the full end-to-end lifecycle—from SQL development to data visualization—through a set of tightly integrated internal tools and governed infrastructure components.

The proposed solution is specifically designed to serve the unified Amazon EU organization. Within this framework, Brand Specialists operate in a centralized team but are specialized by product category (GL) and subdivided by geographic focus (managing specific European countries) or functional focus (tasks such as inventory management, funding and promotions). To support this highly specialized structure and ensure data consistency, I developed **specific SQL scripts** to perform Data Cleaning and Transformation within the Amazon Redshift environment. This manual development was essential to re-aggregate raw data into the specific KPIs required for the Wireless division’s daily operations. [15]

3.1.1 End-to-End Data Flow

The technical pipeline begins with the development of SQL logic on **Hubble**, Amazon’s internal query interface. These queries consolidate information from over ten source tables containing financial, pricing and competitor-related data. After extensive testing and

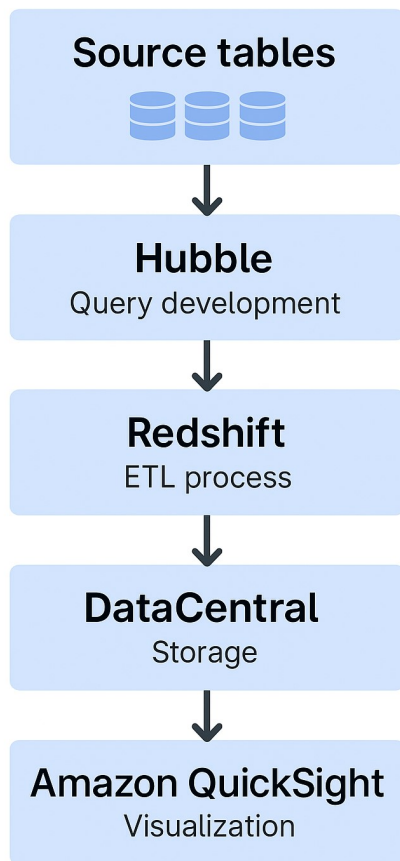
validation, they are promoted to production and scheduled as automated **Redshift jobs**, executed every day at **midnight (00:00)**.

Upon successful execution, the results are ingested and stored in DataCentral using the REPLACE partitioning strategy, ensuring a full refresh of the tables on a daily basis. This ETL workflow is fully automated through Amazon's **ETLManager platform**, where two distinct jobs were configured: a **Transform Job**, applying reusable transformation logic via a defined profile and a **Load Job**, which inserts the processed data into final DataCentral tables.

These jobs are synchronized and run every day at midnight (00:00), referencing dynamic tokens such as {JOB RUN_DETAILS} to maintain temporal granularity and traceability. The first table, *Competitor Pricing*, contains internal pricing, cost and margin metrics and currently holds around 4.76 million rows per day. The second, *Competitors Price*, tracks daily market prices and seller details across competitors, reaching over 47 million rows. Job processing time ranges from 5 to 20 minutes, depending on volume and server load.

Once the data is refreshed, both tables are linked in Amazon QuickSight, joined on shared atomic keys such as `asin`, `calendar_day`, `marketplace_id`, `competitor_name` and `unprefixed_company_code`. Dashboards are updated automatically every day at 07:00 CET, enabling business teams across Europe to access timely and reliable pricing insights at the start of the workday.

This workflow is illustrated in [Figure 5](#) and highlights the modular and automated nature of the Competitor Pricing pipeline, integrating SQL development, ETL execution and visualization within Amazon's internal tools.



High-level system overview

Figure 5 – High-Level System Overview

This diagram illustrates the core data pipeline supporting the Competitor Pricing Dashboard. It shows the sequential flow of information, starting from SQL development and automated Redshift jobs, through Andes ingestion and DataCentral publishing and culminating in Amazon QuickSight dashboards. The visual emphasizes the system's automation, modularity and integration across Amazon's internal data tools.

3.1.2 Infrastructure and Access Control

The deployment of this data pipeline is governed by Amazon's internal data governance framework, which ensures secure access, clear ownership and operational accountability. Each dataset is owned by a **Provider**, which is associated with a **Bundle**—a structured collection of team-owned resources. Teams manage membership and roles, while **LDAP groups**—centrally maintained collections of users—are used to control access to datasets

and tools. Permissions are granted at the group level, enabling scalable and consistent authorization across team members.

The creation of Providers also requires specification of the **Fleet**, which identifies the computing capacity assigned to the team. A *Fleet* is a hierarchical set of infrastructure resources—ranging from a single hostclass to an entire organizational environment—used to define ownership and operational boundaries for data processing and storage.

These components—Teams, LDAP groups, Bindles, Providers and Fleets—must be configured in a specific sequence to enable table publishing in **DataCentral**. This layered structure ensures secure access control, accurate metadata management and operational reliability throughout the entire data workflow.

3.2 Data Analysis and SQL Tables Used

The foundation of the Competitor Pricing Dashboard is based on two custom-built tables—**Competitor_Pricing** and **Competitors_Price**—each consolidating only the attributes strictly necessary for analysis. This separation was necessary to avoid structural issues such as many-to-many relationships, which would have led to duplicated rows and inflated revenue or cost metrics by several orders of magnitude.

The two datasets were created by extracting and integrating data from 11 distinct internal Amazon tables, covering financial performance, classification, pricing metadata, FX conversion and seller information. The most relevant among these include:

- `O_WBR_CP_EU`: contribution profit and revenue at shipment level
- `d_marketplace_merchants`: metadata on merchant type, retail status, activity flags
- `d_mp_active_asin_wbr_classification`: ASIN-level classification (GL, category, subcategory)

- `vm_vendor_code_hierarchies`: mapping from vendor code to brand
- `d_daily_pricing_ship_details`: pricing driver data (if available)
- `o_reporting_days`: time-window control for 13-week rolling period
- `o_daily_asin_comp_prices`: competitor pricing data
- `d_daily_asin_ref_prices`: Amazon list price with VAT
- `amazon_merchant_attributes`: Buy Box merchant information
- `O_MS_MARKETPLACES`: currency and region metadata
- `o_exchange_rates`: FX conversion to EUR

The **Competitor Pricing** table serves as the backbone for internal KPI tracking, consolidating daily-level financial metrics such as revenue, CCOGS, contribution profit and vendor funding by ASIN and marketplace. The **Competitors Price** table captures daily price snapshots from external sellers, enabling direct comparisons with Amazon’s list price on a per-ASIN basis.

Some of the source tables include Third-Party (3P) data, which is subject to internal access restrictions. To comply with Amazon’s data governance policies, only Retail-compliant data was extracted, applying conditional joins and filters where necessary. Full implementation details are described in [3.3 Query Construction: Logic, Filters, Joins, Aggregations](#).

During the implementation phase, each attribute within both tables was explicitly assigned a content type (e.g., VARCHAR, DECIMAL, TIMESTAMP) to ensure schema compatibility with the output of SQL operations, particularly for fields involved in joins, filters and aggregations. The complete schema specifications are documented in Appendix A.

While the current implementation is scoped to the Wireless GL (`gl_product_group = '107'`), the logic is fully generalizable. By removing this filter, the system can be extended

across multiple GLs, enabling centralized pricing analytics at scale across all of Amazon Retail.

Once the logic was finalized and tested, both tables were published in DataCentral using ETLManager. Transform and Load Profiles ensured daily refresh and schema consistency, leveraging partitioning logic and dynamic path naming as detailed in [3.1.1 End-to-End Data Flow](#).

After verifying the structure and content of the resulting tables, each one was assigned to a specific **Provider** and **Fleet**, activated via the *Manage Provider* console and made available for downstream tools such as QuickSight and Workbench.

3.3 Query Construction: Logic, Filters, Joins, Aggregations

The two final datasets—`Competitor_Pricing` and `Competitors_Price`—were generated through complex SQL queries designed to filter, aggregate and join only the attributes strictly needed for analysis. The logic was structured into modular blocks using Common Table Expressions (CTEs), which allowed for better organization, traceability and performance tuning during query development.

In both queries, the starting point was the classification of active ASINs using the `d_mp_active_asin_wbr_classification` table, enriched with brand and vendor metadata through a join with `vm_vendor_code_hierarchies`. This base was then progressively joined with transactional data sources, either financial (`o_wbr_cp_eu`) or competitive (`o_daily_asin_comp_prices`), depending on the target table.

All queries use a **13-week rolling time window**, enforced through a join with the `o_reporting_days` calendar table. This constraint ensures temporal consistency across all dashboards and aligns with the time filters used in Amazon’s reporting platform. **Joins and Filtering Logic**

The query for `Competitor_Pricing` applies several inner joins to enforce data integrity, such as:

- ASIN and marketplace matching across classification, financial and merchant tables
- Merchant filtering via `d_marketplace_merchants`, with strict conditions:
 - `is_retail = 'Y'`: ensures Retail-only data
 - `is_active = 'Y'`: exclude inactive or 3P-only records

To preserve important but potentially missing details, **LEFT JOINS** are used for:

- `d_daily_pricing_ship_details`: to capture pricing drivers when available
- `o_exchange_rates`: to normalize currency into EUR

In `Competitors_Price`, the logic follows a similar structure but is adapted for snapshot-based data. It filters out all rows with `competitor_price <= 0` or `list_price_with_tax <= 0` and enforces a region-wide match using `region_id = 2`. The table also incorporates hardcoded **VAT rates per country**, allowing for potential net price calculations downstream.

Aggregation Strategy

To avoid revenue inflation due to one-to-many relationships, the `Competitor_Pricing` query includes a `GROUP BY` clause at the ASIN-day level, applying `SUM()` to all financial metrics. This ensures unique granularity and prevents metric duplication. Currency normalization is handled inline using `NVL(exchange_rate, 1)` multiplied across all monetary fields, with fallback logic in case FX data is missing.

In both queries, data quality and readability are improved through extensive use of:

- COALESCE and NULLIF for default values (e.g., 'Unknown Competitor', 'No Data')
- Conditional tags such as is_MKPL (Marketplace competitor flag)
- Standardized marketplace ID to country code mapping

Validation and Calibration

Once the final SQL logic was implemented, a rigorous validation process was carried out to ensure metric accuracy and alignment with Amazon’s official reporting systems. This process followed a dual approach:

- **Manual cross-checking:** Core financial metrics—including revenue, NetPPM% and Contribution Profit—were compared for selected high-revenue ASINs across the EU10 marketplaces. These were validated against *Turismo*, Amazon’s internal reference platform for financial reporting, to ensure correctness of FX conversions, aggregation logic and join structure.
Importantly, both the query and the Turismo dashboard were filtered using the **exact same date range (February 11 to May 13, 2025)**, along with the same brand (Samsung) and subcategory (0160 - Smart Phone). This alignment ensured that the comparison was methodologically sound and based on fully synchronized data slices.
- **Automated metadata monitoring:** DataCentral’s “Overview” interface was used to verify job status and refresh timestamps, helping detect any issues with daily ETL execution.

Figure 6 and Figure 7 illustrate the output comparison between the SQL-generated dataset and the official Turismo dashboard for the same product group. The alignment across marketplaces confirms that the query logic preserves data integrity, both in terms of granularity and calculation methodology.

To comply with confidentiality requirements, all sensitive values in the screenshots have been deliberately obscured. Nonetheless, the structural coherence and matching row order between the two sources demonstrate the robustness and reliability of the pipeline.

This dual-layered validation guarantees that the Competitor Pricing Dashboard is based on accurate, consistent and auditable data—ensuring trust among business stakeholders who rely on these metrics for operational decisions.

| MARKETPLACE_ID | COUNTRY_CODE | SUBCATEGORY_DESCRIPTION | UNPREFIXED_COMPANY_CODE | NETPPM | REVENUE | NETPPM |
|----------------|--------------|-------------------------|-------------------------|--------|---------|--------|
| 733556281 | IE | 0160 Smart Phone | SAMSU | | | |
| 679831871 | BE | 0160 Smart Phone | SAMSU | | | |
| 5 | FR | 0160 Smart Phone | SAMSU | | | |
| 784483121 | SE | 0160 Smart Phone | SAMSU | | | |
| 334851 | NL | 0160 Smart Phone | SAMSU | | | |
| 712115121 | PL | 0160 Smart Phone | SAMSU | | | |
| 44551 | ES | 0160 Smart Phone | SAMSU | | | |
| 4 | DE | 0160 Smart Phone | SAMSU | | | |
| 35691 | IT | 0160 Smart Phone | SAMSU | | | |
| 3 | UK | 0160 Smart Phone | SAMSU | | | |

Figure 6 – Output of SQL query (DataCentral) used to populate the Competitor_Pricing table.

Revenue and NetPPM% values have been masked to preserve confidentiality. Data is grouped by marketplace and filtered for Samsung smartphones (subcategory 0160) over the February 11 – May 13, 2025 period.

Columns of views: rev per marketplace | Time Period: Feb 11, 2025 to May 13, 2025 | Trend | YoY | Export and Schedule

Filters: Is Goldfish Merchant = N | And | Product Subcategory Description = 0160 Smart Phone | And | Manu Company Code = SAMSU | Apply

| Marketplace Name | Is Goldfish Merchant | Product Subcategory... | Manu Company Code | Revenue Share | Net PPM (%) | Product Subcategory Description |
|--|----------------------|------------------------|-------------------|---------------|-------------|---------------------------------|
| <input type="checkbox"/> amazon.ie | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| <input type="checkbox"/> amazon.com.be | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| <input type="checkbox"/> amazon.fr | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| <input type="checkbox"/> amazon.se | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| <input type="checkbox"/> amazon.nl | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| <input type="checkbox"/> amazon.pl | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| <input type="checkbox"/> amazon.es | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| <input type="checkbox"/> amazon.de | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| <input type="checkbox"/> amazon.it | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| <input type="checkbox"/> amazon.co.uk | N | 10700160 | SAMSU | | | 0160 Smart Phone |
| Totals | | | | | | |

Figure 7 – Turismo report with official revenue and Net PPM% for the same filters (Samsung, subcategory 0160).

Used as reference for manual validation. The order and values match the output of the custom-built SQL table, using the same 13-week time window.

3.3.1 Query Optimization Techniques

To ensure high performance and minimize server load, several optimization strategies were applied during the development of the `Competitor_Pricing` SQL query. These techniques allowed the system to efficiently process millions of rows per day while maintaining clarity, modularity and scalability. The main choices included:

- **Modular query design using CTEs:** The query was structured through multiple Common Table Expressions (CTEs)—namely `asins`, `reporting_days` and `shipped_units`. This modularization enabled better logic separation, easier debugging and improved performance by allowing the query engine to isolate computation steps and apply early filtering.
- **Early filtering at source:** Filters such as `gl_product_group = '107'`, `is_retail = 'Y'` and `is_active = 'Y'` were applied within the JOIN clauses rather than at the end. This strategy ensured that only relevant data was passed through each join, reducing the number of rows processed in downstream aggregations.
- **Efficient JOIN usage:** All joins were written explicitly using the `JOIN ... ON` syntax, which is clearer for the SQL parser and optimizer compared to traditional comma joins with WHERE filters. This is considered best practice in modern SQL.
- **Avoidance of subqueries and DISTINCT inflation:** To prevent metric duplication, the query was designed to maintain 1:1 or N:1 join relationships wherever possible. Aggregations were applied only after joining filtered datasets, ensuring consistency and avoiding overcounting.
- **Use of positional GROUP BY:** Although not affecting execution time directly, the use of `GROUP BY 1, 2, 3...` simplified the query structure and avoided repetition of long column expressions—improving readability and maintainability in the long term.

- **Inline currency normalization with NVL(exchange_rate, 1):** This ensured robust handling of missing FX data without requiring outer joins or subqueries, reducing complexity and guaranteeing safe fallback behavior.

Together, these practices contributed to a streamlined and performant SQL implementation capable of supporting daily ETL jobs and real-time dashboard refreshes without bottlenecks or excessive memory usage.

3.4 Data Cleaning and Transformation

Data cleaning and transformation were fundamental to ensure both the reliability and interpretability of the metrics computed in the `Competitor_Pricing` table. The dataset was constructed from raw transactional data, which often included incomplete, inconsistent, or null values. Several strategies were adopted to preprocess and normalize these records before aggregation and dashboard visualization.

Handling Missing and Null Values

During initial data exploration, a significant number of records exhibited missing values in key fields such as `competitor_name`, `pricing_driver_1`, `pricing_driver_2` and `unprefixed_company_code`. These attributes were standardized using SQL functions like `COALESCE` and `NULLIF`, assigning meaningful placeholders such as "Unknown Competitor", "No Data", or "Unknown Code" to preserve row integrity without discarding valuable observations. These placeholders are also visible in the dashboards and serve an informational purpose, allowing users to quickly identify missing data or unexpected patterns in competitor attribution and pricing drivers. This approach ensured that missing fields did not break aggregations or joins, while still signaling data gaps to dashboard users.

Revenue and Price Validation

A critical business-specific transformation involved filtering out records with revenue ≤ 0 or `competitor_price` ≤ 0 . These cases typically arise when Brand Specialists or Vendor Managers deliberately set the price of problematic or delisted ASINs to zero, as a way to force them out of the BuyBox without formally deactivating the product. Including such records would skew key metrics like NetPPM% or CP, leading to incorrect business insights. Therefore, a post-aggregation filter was applied to retain only meaningful rows for analysis:

```
WHERE revenue > 0

AND (competitor_name != 'Unknown Competitor'

     OR (competitor_name = 'Unknown Competitor' AND
pricing_driver_1 != 'No Data'))
```

Feature Engineering and Semantic Tags

To enhance interpretability, derived fields were created through conditional logic. For instance, the field `is_MKPL` was defined based on a substring match against `competitor_name`, indicating whether the seller operated on Amazon Marketplace. Similarly, `country_code` was mapped from `marketplace_id` through an inline CASE expression, ensuring a consistent country reference for all ASINs.

Temporal transformations were also included: ISO week and calendar quarter values were extracted directly from the shipment date using Redshift's `TO_CHAR` and `EXTRACT` functions. These fields support time-series visualizations and trend analysis across the 13week window.

Currency Handling

While most monetary fields were normalized to EUR using exchange rates (`fx.exchange_rate`), one exception was made at the visualization layer in QuickSight. In alignment with manager guidelines, `list_price_with_tax` was required to appear in the local currency for each country. This was achieved by implementing a calculated field in QuickSight that mapped `country_code` to the appropriate currency label (e.g., EUR, PLN, GBP), ensuring that price displays matched customer-facing formats without further transformations in SQL.

In addition to the SQL layer, key transformation and formatting rules were also configured within the **Transform Profile** in ETLManager. This reusable configuration defined the structure and data types for each column, enforced formatting constraints (e.g., decimal precision, field lengths) and handled schema standardization without modifying the original query. This abstraction enabled easier maintenance and consistent behavior across runs.

The Load Profile automatically retrieved the dataset produced by the Transform Job, ensuring seamless integration and synchronized scheduling. Technical implementation details are covered in [3.1.1 End-to-End Data Flow](#). Both transform and load executions were scheduled daily and versioning was managed directly in the DataCentral provider console.

This architecture allowed for modular management of the ETL pipeline, improving robustness, automation and traceability across the entire data pipeline.

3.5 Extraction of Key KPIs

The final output of the SQL pipeline includes a comprehensive set of financial and operational indicators designed to support pricing analysis, margin evaluation and competitive monitoring across Amazon Retail EU. These KPIs were extracted and

computed directly from Amazon’s internal contribution table `o_wbr_cp_eu`, integrated with exchange rate data and product metadata. All monetary values were normalized to EUR using the `o_exchange_rates` table, with fallback logic in case of missing currency data.

The metrics were selected to ensure alignment with the financial reporting standards used across Amazon retail teams and to provide Vendor Managers and Brand Specialists with actionable insights. Aggregations were performed at `ASIN × marketplace × calendar_day` level to ensure granularity and traceability.

Below are the most relevant KPIs calculated through SQL logic and included in the `Competitor_Pricing` table.

| KPI Name | SQL Logic (Simplified) | Description |
|---------------------------|--|---|
| Revenue | <code>SUM(revenue_share_amt) / exchange_rate</code> | × Net sales received from the customer, postdiscounts, in EUR. |
| PCOGS | <code>SUM(product_cogs_amt) / exchange_rate</code> | × Product cost of goods sold (purchase cost), normalized to EUR. In case of price protection agreements, this may reflect the protected price paid by Amazon. |
| CCOGS | <code>SUM((vendor_allowances_amt + discretionary_coop_amt + quick_pay_discounts_amt) / exchange_rate)</code> | + Total commercial funding provided by the vendor, including allowances and discounts. |
| Vendor Allowance | <code>SUM(vendor_allowances_amt) / exchange_rate</code> | × A form of vendor funding used to reduce the effective sale price and support margin recovery. |
| Discretionary COOP | <code>SUM(discretionary_coop_amt) / exchange_rate</code> | × Temporary or negotiated co-marketing funding outside standard agreements. |

| | | | |
|---------------------------------|--|---|--|
| NetPPPlessSD | $\text{SUM}(\text{revenue} - \text{pcogs} + \text{cogs_adjustments} + \text{all_coop_sales_discounts}) \times \text{exchange_rate}$ | + | Net product profitability excluding sales discounts. |
| VP | $\text{SUM}(\text{NetPPP} - \text{inbound_freight} + \text{liquidation_adjustments}) \times \text{exchange_rate}$ | + | Vendor profitability after subtracting freight and adding liquidation adjustments. |
| CP (Contribution Profit) | $\text{SUM}(\text{contribution_profit_amt}) \times \text{exchange_rate}$ | × | Final profitability metric including all direct and indirect costs. |
| Shipped Units | $\text{SUM}(\text{quantity_shipped})$ | | Number of units shipped within the 13-week window. |

Note: CCOGS is defined as the sum of Vendor Allowance, Discretionary Coop and Quick Pay Discounts, as per Amazon's internal margin model.

All exchange rate adjustments were handled using the expression `NVL (fx.exchange_rate, 1)` to ensure robustness in the presence of missing currency data.

Post-SQL Derived KPIs

Additional indicators—such as CCOGS ratios, BPM, Industry NetPPM% and competitive erosion metrics—were later derived in QuickSight based on the core variables extracted in SQL. These indicators, while not part of the SQL layer, play a fundamental role in the analytical dashboards and will be discussed in detail in [Chapter 5 – Strategic Impact and Business Value](#).

Chapter 4 – Data Visualization

This chapter illustrates the technical framework of the project, describing the data pipeline from ingestion to visualization. It details the process of data transformation, focusing on the **custom SQL scripts** developed to clean and re-elaborate information from existing DataCentral tables. The chapter also explains the integration between Amazon Redshift and QuickSight, ensuring an automated and reliable data flow for the final dashboard.

4.1 Purpose and Scope of Visualization

The dashboards developed in this project were designed to streamline strategic pricing decisions across Amazon Retail EU. By integrating key financial and competitive metrics into five interactive dashboards, users can explore relevant insights—such as ASIN-level performance, brand comparison and regional trends—without relying on static reports or manual queries.

Compared to Turismo, Amazon’s internal reporting platform, the new dashboards provide a more agile and intuitive interface. Turismo delivers financial data in static formats with limited filtering options, while the dashboards enable dynamic cross-market comparisons and immediate access to actionable KPIs.

This visualization layer supports Brand Specialists, AVS Managers and Vendor Managers in tracking margin erosion, comparing competitor prices and evaluating funding effectiveness—promoting faster, data-driven decisions at scale.

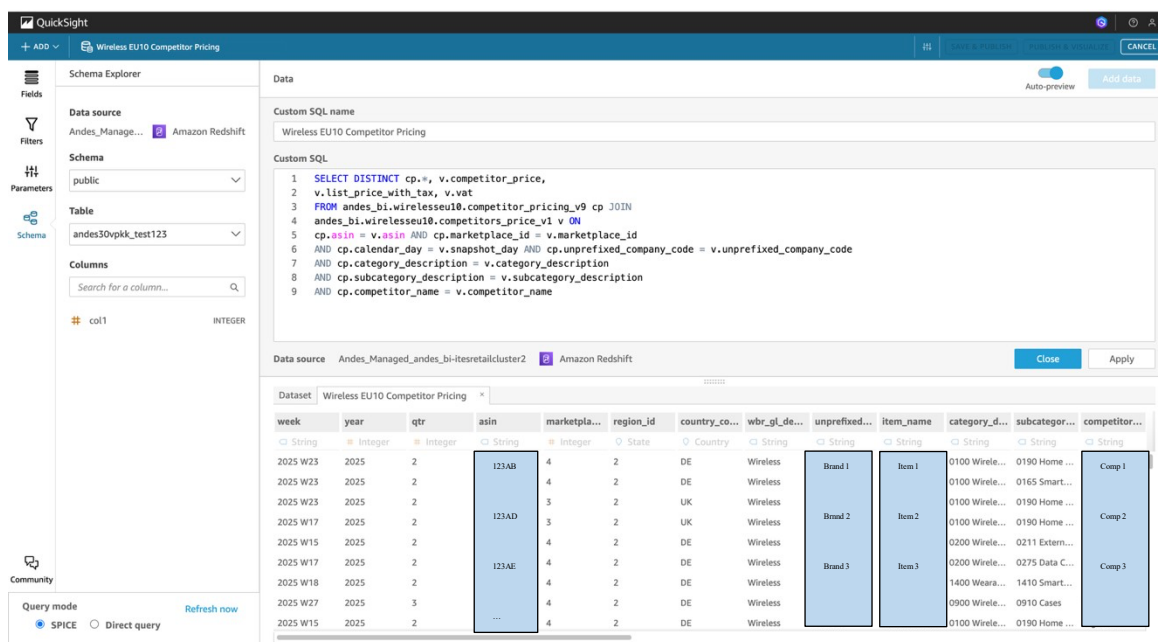
To ensure maximum usability for the different stakeholders involved (Brand Specialists and Vendor Managers), I designed the visualization layers focusing on a hierarchical information flow. This involved selecting specific visual encodings—such as trend lines for temporal analysis and heatmaps for marketplace comparisons—enabling users to identify outliers and pricing opportunities at a glance, a feature that was previously unavailable in static internal reporting.

4.2 Technical Setup in QuickSight

To build the visualization layer, a unified dataset was created in Amazon QuickSight by joining the two core tables—**Competitor_Pricing** and **Competitors_Price**—using a custom SQL query written directly in the dataset editor.

As shown in **Figure 8**, the join was performed on four atomic keys: `asin`, `marketplace_id`, `unprefixed_company_code` and `competitor_name`.

These fields were selected to preserve one-to-one relationships and avoid row duplication.



The screenshot shows the Amazon QuickSight interface. On the left, the Schema Explorer shows the 'public' schema with a table named 'andes30vpkk_test123'. The main area displays a custom SQL query:

```
1 SELECT DISTINCT cp.*, v.competitor_price,
2 v.list_price_with_tax, v.vat
3 FROM andes_bi.wirelesseu18.competitor_pricing_v9 cp JOIN
4 andes_bi.wirelesseu18.competitors_price_v1 v ON
5 cp.asin = v.asin AND cp.marketplace_id = v.marketplace_id
6 AND cp.calendar_day = v.snapshot_day AND cp.unprefixed_company_code = v.unprefixed_company_code
7 AND cp.category_description = v.category_description
8 AND cp.subcategory_description = v.subcategory_description
9 AND cp.competitor_name = v.competitor_name
```

Below the query, the resulting dataset is shown as a table with the following columns: week, year, qtr, asin, marketplace_id, region_id, country_code, wbr_gl_de..., unprefixed..., item_name, category_d..., subcategor..., and competitor... The table contains several rows of data, with some cells highlighted in blue.

Figure 8 – Custom SQL query used to generate the unified dataset in QuickSight.

The dataset joins the `Competitor_Pricing` and `Competitors_Price` tables using four key attributes (`asin`, `marketplace_id`, `unprefixed_company_code` and `competitor_name`).

These fields were chosen to preserve the correct granularity and avoid data duplication, enabling the extraction of accurate competitive and financial metrics for dashboard use.

While additional shared fields (e.g., `snapshot_day`, `region_id`) were available, they were intentionally excluded from the join condition to maintain metric consistency. This design choice echoes the rationale presented in [3.2 Data Analysis and SQL Tables Used](#).

The dataset was configured to use **SPICE mode** (Super-fast, Parallel, In-memory Calculation Engine), enabling faster refreshes and reducing load on Redshift. It was scheduled to refresh daily at **7:00 AM CET**, ensuring that the dashboards always reflect up-to-date data.

Custom calculated fields—such as NetPPM%, CCOGS ratio and competitive deltas— were defined within QuickSight, building on the outputs of the SQL layer.

IAM roles and LDAP group associations were configured via DataCentral to control access, ensuring that authorized users from Retail EU teams could interact with the dashboards securely and seamlessly.

4.3 Design Strategy: Filters, Layout and Interactivity

The dashboard design followed a principle of modularity, balancing analytical depth with visual clarity. Each dashboard begins with a concise textual introduction placed above the visuals, helping users understand the scope and focus of the page.

Visual elements were selected based on the analytical purpose:

- **Pivot tables** were the primary tool, allowing multidimensional exploration across variables such as marketplace, competitor, pricing_driver and financial metrics like revenue, NetPPM% and CCOGS. Their matrix-like layout enables flexible slicing and aggregation of large datasets.
- **Line charts** were used for time-series analysis, with labeled axes and color-coded series supporting trend comparison across marketplaces or brands.
- **Simple tables** mirrored the SQL logic behind the dataset, allowing non-technical users to explore data using filters and sorting without writing queries.
- A **heatmap** was included in the *Industry Profitability* dashboard to visually highlight Buybox Price Mix (BPM) gaps across countries and competitors.

Filters were consistently placed at the top of each dashboard and adapted to the specific analytical context. For example:

- The *Pricing Map* included filters for week, country, brand, subcategory, pricing driver and competitor.
- The *Industry Profitability* dashboard used filters for GL, country, is_MKPL and competitor, aligning with benchmarking needs.

All filters are global and synchronized within the same dashboard. Furthermore, **QuickSight's cross-highlighting** allows dynamic interaction—when a user selects a competitor in one visual, corresponding elements in other visuals are automatically emphasized.

This design was initially inspired by Excel prototypes provided by the project's manager, later expanded with QuickSight-native features such as calculated fields, conditional formatting and daily refresh automation.

Where relevant, screenshots of each dashboard are included in the following sections to support visual comprehension.

4.4 Pricing Map

The *Pricing Map* dashboard serves as a high-resolution diagnostic tool for Amazon's internal pricing performance. Rather than comparing Amazon metrics directly with competitor figures, it segments Amazon's financial indicators by the **competitor that acted as pricing driver**—i.e., the external player that influenced Amazon's pricing decision for a given ASIN in a specific market and timeframe.

The dashboard is composed of **three pivot tables**, each providing a different analytical angle:

- The **first pivot table** displays *Revenue*, *Amazon NetPPM%*, *Contribution Profit (CP)* and *CCOGS as % of PCOGS* across ASINs and pricing drivers.
- The **second pivot table** shows *Amazon Revenue Mix %*, *NetPPM%* and *CP* by competitor and week.
- The **third pivot table** reports the same metrics across ASINs and competitors, for product-level inspection.

The screenshot shows a dashboard with a 'Pricing Map' tab selected. Below the navigation tabs is a 'Controls' section with various filters: Week (All), Country (DE), is a competitor MKPL? (All), Manu Company Code (All), Category (107-0100 Wireless Phones), Subcategory (107-0160 Smart Phone), ASIN (All), ASIN Name (All), Pricing Driver 1 (All), Pricing Driver 2 (All), Competitor (empty), and GL (All). Below the filters is a pivot table titled 'T13W Revenue, NetPPM% and CP at competitor level'. The table has a 'Competitor' column and 'Weeks' columns from 2025 W14 to 2025 W25. The rows are grouped by competitor: Alternate, Coolblue-DE, Cyberport, and Euronics-DE. Each competitor group has three rows: Amazon Rev Mix %, Amazon NetPPM%, and CP.

Figure 9 – Weekly breakdown of Revenue Mix %, NetPPM% and CP by competitor.

Pivot table showing Amazon metrics over time, grouped by pricing driver and week. The layout and filtering logic is consistent across the three pivot tables included in the dashboard.

All tables are synchronized through filters like week, country, is_MKPL, brand, category, subcategory, asin, asin name, pricing driver, competitor and GL. The dashboard is mainly used by Brand Specialists and AVS Managers to evaluate profitability trends and exposure to specific competitors.

QuickSight’s interactive features—such as cross-highlighting—enhance the user experience and enable immediate visual correlation across views.

Key Calculated Metrics in QuickSight

Several metrics displayed in the *Pricing Map* dashboard were calculated directly within QuickSight using the output table `Competitor_Pricing`. These include:

- **Amazon Revenue Mix % (week level)** `percentOfTotal (sum (revenue) , [week])`

→ Measures each pricing driver's share of Amazon's weekly revenue.

- **Amazon NetPPM%**

`SUM (netpplessd) / SUM (revenue)`

→ Represents net pure margin after coop and funding, as a share of revenue.

- **Contribution Profit (CP)**

`SUM (cp)`

→ Total contribution profit, as extracted directly from the SQL table.

- **CCOGS as % of PCOGS**

`SUM (ccogs) / SUM (pcogs)`

→ Indicates how much of Amazon's procurement cost is offset by vendor funding.

These metrics help isolate margin erosion patterns and funding effectiveness under competitive pressure.

4.5 Industry Pricing

The *Industry Pricing* dashboard provides a time-based overview of how competitor prices evolve for a specific ASIN across the main EU10 marketplaces. Its primary purpose is to offer a visual tool for **monitoring price dynamics across competitors**, helping teams understand **which players are most relevant** in shaping market conditions and how their pricing strategies change over time.

The dashboard consists of **three core visual components**, each designed to support a different level of granularity:

- A **standard table** listing the selected ASINs, their names, the **local currency** (derived in QuickSight using the `country_code`) and the **RRP (Recommended Retail Price)**, corresponding to the *list price with tax* extracted from the `Competitors_Price` table. This serves as a starting point for product-level analysis.
- A **line chart** plotting **competitor prices over time**, with `calendar_day` on the x-axis and `competitor_price` on the y-axis. Each competitor is color-coded, allowing users to observe fluctuations and identify pricing leaders or outliers during the 13-week reference window.
- A **pivot table** that compares Amazon's and competitors' prices day by day. The rows display the ASIN and its associated `country`; columns represent `calendar_day`; and the values include:
 - **Amazon price with tax**, calculated in two steps:
 - First, Amazon's base price is computed as:
$$\text{SUM}(\text{revenue}) / \text{SUM}(\text{units})$$
 - Then, the local VAT is applied using the formula:

```
amazon_price * (1 + avg(vat))
```

- **Minimum competitor price**, recalculated daily to provide a direct benchmark.

While the dashboard's main function is to **visualize competitive behavior over time**, it also supports a secondary use: **identifying pricing misalignments** where Amazon's list price may exceed the minimum market price. This insight can help surface potential issues in pricing governance or missed opportunities to maintain Buy Box competitiveness.

Filters include `calendar_day`, `country`, `is_MKPL`, `week`, `brand`, `category`, `subcategory`, `asin`, `asin_name`, `competitor` and `GL`, enabling users to narrow the analysis to specific product and market combinations.

4.6 Pricing Erosion

The *Price Erosion* dashboard is designed to monitor Amazon's price compression in comparison to the product's list price (RRP) and to evaluate whether available funding offsets this erosion. The visualizations help stakeholders assess how close a product is to reaching its **break-even point**, by combining pricing gaps and cooperative funding into a unified framework.

The dashboard is composed of two main elements:

- A **line chart** showing the evolution of three key metrics over a 13-week period, with `calendar_day` on the x-axis and values normalized in percentage on the yaxis.

Each line represents:

1. **Price Erosion %**: Calculated as

```
(SUM(revenue) / SUM(units)) / AVG(list_price_wo_tax)
```

This indicates the relative gap between Amazon's price and the product's official list price (excluding VAT).

2. CCOGS as % of price:

Calculated as

$$\frac{\text{SUM}(\text{ccogs})}{\text{SUM}(\text{units})} / \text{AVG}(\text{list_price_wo_tax})$$

This represents the percentage contribution of vendor funding relative to the product's price.

3. Opportunity: Price Erosion + CCOGS:

Computed as

$$\{\text{CCOGS as \% of price}\} + \{\text{Price Erosion in \%}\}$$

This composite metric helps gauge how much of the price erosion is compensated by available funding. A value approaching 1 suggests that Amazon is close to breaking even.

- A **pivot table** listing detailed values at the ASIN level. The rows contain the ASIN, its associated country and product name. The columns include:
 - Core financial metrics: Revenue, Amazon NetPPM%, Units, PCOGS, CCOGS, Vendor Allowance, Discretionary COOP
 - Comparative pricing: Amazon price with tax, List price with tax
 - The three metrics shown in the line chart: Price Erosion %, CCOGS as % of price and Opportunity

This table enables users—especially **Brand Specialists and Vendor Managers**—to understand **the structural causes behind margin compression**, particularly in cases where

the product fails to reach the break-even point. By correlating funding values with pricing gaps, the table supports root-cause analysis at the ASIN and marketplace level.

Users can refine the analysis using filters such as country, year, month, week, brand, category, subcategory and individual ASIN.

4.7 Industry Profitability

The *Industry Profitability* dashboard provides a comprehensive overview of margin performance across Amazon and its competitors, enabling stakeholders to assess Amazon's relative position in the market. By comparing NetPPM% values from multiple perspectives—Amazon, industry average and individual competitors—it supports strategic pricing and funding decisions across product lines and geographies.

The dashboard includes **three pivot tables and one heat map**, organized as follows:

- The **first pivot table** shows **Amazon's NetPPM%** per country, broken down by category and subcategory. It enables users to compare margin levels across the EU10 marketplaces and identify subcategories with strong or weak profitability from Amazon's side.
- The **second pivot table** mirrors the structure of the first, but instead displays the **Industry NetPPM%** using the formula:

$$\frac{(\text{AVG}(\text{competitor_price_wo_tax}) * \text{SUM}(\text{units}) - \text{SUM}(\text{pcogs}) + \text{SUM}(\text{ccogs}))}{(\text{AVG}(\text{competitor_price_wo_tax}) * \text{SUM}(\text{units}))}$$

This metric estimates the average margin achieved by competitors, weighted by units sold and adjusted for Amazon's cost structure. It is used as a benchmark to understand whether Amazon's pricing strategy is aligned with or lagging behind the market.

- The **heat map** visualizes **BPM** values, calculated as:

$$(\text{Amazon NetPPM\%} - \text{Industry NetPPM\%}) * 10,000$$

This metric is expressed in basis points (bps), highlighting the gap—positive or negative—between Amazon and the rest of the market across a country-category grid. Intense color gradients help identify areas of significant margin divergence at a glance.

- The **final pivot table** presents the **Competitor NetPPM%** for each selected competitor, broken down by category and subcategory. The formula used is:

$$\text{SUM}(\text{netppplesssd}) / (\text{AVG}(\text{competitor_price}) * \text{SUM}(\text{units}))$$

This view allows for side-by-side profitability comparisons at the player level and supports root-cause analysis when Amazon's margins deviate from the market trend.

This dashboard is particularly valuable for **Vendor Managers and AVS teams**, as it enables margin benchmarking across brands, geographies and market actors. Filters include country, category, subcategory, competitor and GL, providing flexibility to narrow the analysis to relevant segments.

The lower heat map highlights the BPS gap between Amazon's NetPPM% and the Industry NetPPM% by country and category. The color intensity visually signals profitability advantage (in green) or disadvantage (in red) for Amazon, allowing users to prioritize margin-improvement efforts at granular level.

4.8 Pricing Drivers

The *Pricing Drivers* dashboard provides a tabular view of the main operational and financial metrics associated with pricing influence factors for individual ASINs. Its primary

function is to allow users to investigate **which external competitors or market elements are driving Amazon's pricing decisions** and how these drivers affect profitability and performance.

Unlike the other dashboards, *Pricing Drivers* contains a single **standard table**, designed for high-density analysis rather than visual exploration. Each row corresponds to a unique ASIN-date-country combination, with the following columns:

- `calendar_day`
- `asin` and `asin name`
- `brand`, `country`, `competitor`
- `pricing driver 1` and `pricing driver 2`
- `revenue`
- `shipped units`
- `Amazon NetPPM%`
- **CP (Contribution Profit)**
- `CCOGS`
- **CM%**, calculated directly in QuickSight as:

$$\text{SUM}(\text{cp}) / \text{SUM}(\text{revenue})$$

This table enables granular filtering and direct access to pricing structure details. Users can filter by `calendar day`, `country`, `asin`, `brand`, `competitor`, or any driver dimension to isolate edge cases or investigate anomalies in funding, margin, or pricing attribution.

The dashboard is primarily used by **AVS Managers and Brand Specialists** during routine audits, vendor negotiations, or ASIN-level pricing reviews. It complements the more visual

dashboards by offering **high transparency** on how pricing logic translates into financial impact.

Chapter 5 – Strategic Impact and Business Value

This chapter presents the final output of the project, detailing the main features and functionalities of the developed dashboards. It illustrates how the tools support the daily activities of Brand Specialists, providing a deep dive into the filtering capabilities and the visualization of key pricing and profitability metrics across different EU marketplaces.

5.1 Strategic Context and Internal Need

Before the development of the Competitor Pricing Dashboard, the strategic management of pricing decisions in Amazon Retail EU suffered from fragmentation and inefficiency. Brand Specialists and Vendor Managers often relied on multiple internal sources—such as Turismo or static Excel dashboards—which lacked integration and required significant manual effort. Turismo only provided standard tabular data, with no graphical tools or pivoting capabilities. This made any analysis requiring historical tracking, cross-country or ASIN-level comparison particularly time-consuming.

The dashboards designed as part of this thesis project addressed this limitation by unifying data access into a single, interactive interface. All dashboards are powered by Redshift tables that refresh daily and are exposed through Amazon QuickSight. These new tools eliminate the need to switch between internal portals or to manually export data into Excel for post-processing. For instance, the legacy dashboards required manual refreshes, taking up to 20 minutes per team every week—time that could be redirected toward higher-value tasks like pricing alignment or negotiation.

Beyond improving efficiency, the dashboards also introduced views and metrics that were previously unavailable in any internal system. One of the most relevant examples is the Price Erosion dashboard, which enables long-term margin planning. This innovation helps VMs make strategic funding requests, identify margin gaps and simulate future erosion scenarios—capabilities not previously accessible in any Amazon Retail tool.

5.2 Understanding Amazon’s Profit & Loss Structure

To fully interpret the insights provided by the dashboards, it is essential to understand how profitability is calculated within Amazon Retail. The internal P&L (Profit & Loss) structure is the foundational lens through which all pricing decisions are evaluated. A screenshot of a real-world example is shown in [Figure 10](#).

| ASIN | |
|--|----------------------------------|
| P&L Item Definition | P&L Items |
| Price the customer paid for the shipment item. | QTY Shipped |
| Total price the customers paid for the shipped units | Product Revenue |
| Total item cost of the shipped units. | Product COGS |
| Pure Product Profit (Revenue - Product COGs) | Pure Product Profit |
| Pure Product Margin (Revenue / Product COGs) | Pure Profit Margin (PPM) |
| Contra-revenue related to CS-issued gift cards, employee discounts.. | Sales Discount |
| Vendor funded Contra-cogs (COOP + V.Allowance + Quick Pay Dis) | VFCC excl Display Ads |
| | Vendor Allowances |
| | Discretionary COOP |
| | Quick Pay Discounts |
| Procurement Profit (PPP - Sales Discounts + Contra-COGs) | Net Pure Product Profit |
| Procurement Margin (NetPPP / Revenue) | Net Pure Product Margin (NetPPM) |
| Revenue related to Display Advertising for vendors (AMS/AMG). | Display Adds VFCCs |
| Cost of sourcing the item from vendor to Amz FC and FCs transfers. | Freight In Total |
| | Liquidation and Vendor Returns |
| Total cost of recovery amount from items being liquidated. | Liquidation Revenue |
| Total item cost of an items being liquidated. | Liquidation Cost |
| Total cost of recovery amount from items being liquidated through WD Deals.. | WHD Revenue |
| Total item cost of an items being liquidated through WH Deals.. | WHD COGS |
| Vendor returns | Vendor Returns |
| | Vendor Recoveries |
| PPVs | PPVs |
| PQVs | PQVs |
| | COGS Adjustments |
| Vendor Profit (NetPPP + Display Ads + Freight In + Liq & V>Returns) | Vendor Profit |
| Vendor Margin (Vendor Profit / Revenue) | Vendor Margin (VM) |
| | Customer Returns and Free Reps |
| This is the estimated refunds revenue value for all shipment_items | C>Returns Revenue |
| This is the estimated refunds CCoGs value for all shipment_items | C>Returns COGS |
| Estimated cost of doing free replacements. | Free Reps |
| | Inventory Valuation |
| | Inventory Adjustments |
| | Input Price Variance |
| | Net Shipping incl. Prime |
| Estimated value of prime revenue recognized for all shipments. | Prime Subscription Revenue |
| Total shipment revenue. | Shipping Revenue |
| Total shipment costs. | Shipping Costs |
| | Services & Other |
| Giftwrap revenue associated with all shipment items. | Giftwrap Revenue |
| Giftwrap costs associated with all shipment items. | Giftwrap COGS |
| | Other Revenue |
| | Other Costs |
| | Gross Profit |
| Gross Margin (Gross Profit / Revenue) | Gross Margin (GM) |
| | Ops & CS Variable |
| Estimate of Customer service cost associated with all shipments. | CS Variable Costs |
| Est. FC cost (inbound, outbound, v-return, c-return, giftwrap cost..) | FC Variable Costs |
| Credit card fee that Amazon needs to pay to credit card firms. | Payment Fees |
| Estimated value of bad debt (fraud) cost. | Bad Debt |
| | Marketing and M&B |
| Estimated sponsored link cost that Amazon has to pay for all ship_items. | Sponsored Link Fees |
| Estimated associate fee that Amazon has to pay for all shipment_items. | Associate Fees |
| Contribution Profit | Contribution Profit |
| Contribution Margin (CP / Revenue) | Contribution Margin (CM) |
| CP per unit | CP per Unit (CPPU) |

Figure 10 - Internal Profit & Loss Structure (Amazon Retail EU)

This screenshot illustrates the internal P&L structure used by Amazon Retail EU to evaluate product-level profitability. The first margin, known as **Net Pure Product Margin (NetPPM%)**, reflects the impact of product cost (PCOGS), vendor-funded contributions (back and front terms) and sales discounts. The second margin, or **Contribution Profit (CP)**, is obtained after accounting for variable and fixed operational costs such as logistics, customer returns, liquidation and payment processing fees.

This layout is used by Brand Specialists and Vendor Managers to assess the health of vendor relationships, identify margin erosion and quantify funding needs. It also supports strategic decisions on price matching, funding negotiations and product lifecycle planning.

This Excel-based P&L breaks down profitability across several cumulative layers. At the top of the stack are **shipped units** multiplied by **ASP** (Average Selling Price), which determine revenue. This is followed by the **PO Cost** or **PCOGS**, representing the vendor purchase cost. Their difference yields the **Pure Product Profit (PPP)**.

From PPP, **Sales Discounts** are deducted. These include coupons or promotions that reduce margin but do not impact revenue directly. Next, vendor contributions are added through **Vendor Funded Contra COGS (VFCC)**, which is split into **Vendor Allowance** (annual back terms) and **Discretionary COOP** (front margin). This results in the **Net Pure Profit** and its ratio to revenue yields the **NetPPM%**, which is considered the **first margin layer** in Amazon's profitability analysis.

This structure is also a practical tool for Vendor Managers and Brand Specialists, especially during planning cycles or when justifying funding. If profitability projections—based on NetPPM or CP—fall below target, the dashboard insights tied to this P&L layout can be used to forecast funding gaps and proactively engage with vendors. For example, if expected NetPPM% drops below threshold due to increased price matching, the required funding can be back-calculated using expected revenue and the erosion delta. This supports long-term funding agreements and helps prevent unprofitable products from triggering stockout mechanisms in Amazon's ordering system.

Further contributions are added, such as **display ad funding**—marketing investments made by vendors that are recorded in Amazon's P&L. Logistics and operational costs are then subtracted, including **warehouse transfers**, **customer returns**, **liquidation costs** and various service fees (e.g., gifting, customer service, credit card fees). What remains is the **Contribution Profit (CP)**, also known as the **second margin layer**, which accounts for all direct and indirect costs.

Understanding the mechanics of this stack is fundamental, especially when interpreting dashboards like Pricing Map or Price Erosion, which rely on NetPPM and CP to evaluate the impact of price matching and discount strategies.

In the next section, we explore how this financial structure is applied in the **Pricing Map** dashboard to assess the profitability of individual match decisions with competitors.

5.3 Pricing Map – Match Impact and Competitive Exposure

One of the most impactful tools developed during this project is the **Pricing Map dashboard**. Its goal is to explain how Amazon’s internal price-matching algorithm affects revenue and profitability. Since Amazon automatically adjusts its prices to match the lowest offer in the market, Vendor Managers (VMs) and Brand Specialists (BSs) need a way to measure the consequences of these matches.

The dashboard provides a breakdown of Amazon’s weekly revenue by competitor match, showing how each competitor’s pricing behavior affects Amazon’s margins. The three main metrics—**Revenue Mix %**, **NetPPM%** and **Contribution Profit (CP)**—are visualized over a 13-week window, with full ASIN- and filter-level granularity. These indicators allow users to evaluate each match not only in terms of volume but also of financial sustainability.

For instance, if in Week 17, 66% of total revenue for a product line is generated while matching a specific competitor and NetPPM% drops to 6%, this may suggest that the competitor launched a short-term campaign or promotion. In such a case, Amazon may have absorbed a significant portion of the margin loss unless vendor-funded support was prearranged. This match may have led to short-term revenue gains, but at a long-term cost if CP turned negative.

What makes this dashboard particularly strategic is the ability to compare revenue gain with margin loss. Amazon teams can assess whether matching a certain competitor is a sound investment or a poor trade-off. If a competitor consistently brings in high revenue while keeping NetPPM and CP positive, matching it may be worth continuing. But if the match drives revenue at the expense of double-digit margin loss and negative profitability, it raises the question: *Is it still worth matching this retailer?*

These insights become crucial negotiation levers. Teams can use the data to escalate issues to vendors, request better funding terms, or deprioritize certain competitors altogether. For example, if one competitor is responsible for over 50% of revenue in multiple weeks but yields low NetPPM%, it may indicate a structural alignment between that competitor and the vendor—e.g., preferential deals—which penalizes Amazon’s profitability.

The strategic relevance of the Pricing Map also extends to forecasting and vendor planning. By aggregating match impact over several weeks, Vendor Managers can build **funding requests** backed by historical data, smoothing out volatility over the quarter. This helps avoid scenarios in which the automatic stock ordering system halts purchases due to insufficient margin (as determined by NetPPM thresholds). In this way, funding can be allocated in advance to ensure stock continuity and avoid lost sales.

| T13W Revenue, NetPPM% and CP at competitor level | | | | | | | | | | | | | | |
|--|------------------|-------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| Competitor | | Weeks | | | | | | | | | | | | |
| | | 2025 W16 | 2025 W17 | 2025 W18 | 2025 W19 | 2025 W20 | 2025 W21 | 2025 W22 | 2025 W23 | 2025 W24 | 2025 W25 | 2025 W26 | 2025 W27 | 2025 W28 |
| Competitor 1 | Amazon Rev Mix % | 6.52% | 9.26% | 14.95% | 17.44% | 22.45% | 20.66% | 20.78% | 24.88% | 25.64% | 14.75% | 10.09% | 11.64% | 26.51% |
| | Amazon NetPPM% | 10.52% | 11.05% | 10.03% | 11.87% | 10.63% | 10.26% | 10.9% | 9.63% | 10.22% | 11.71% | 12.53% | 13.56% | 13.03% |
| Competitor 2 | CP | €4,357.65 | €5,986.44 | €17,111.60 | €27,371.81 | €38,109.35 | €40,695.41 | €37,370.41 | €15,059.81 | €11,608.92 | €3,553.47 | €4,653.62 | €10,642.67 | €66,943.12 |
| | Amazon Rev Mix % | 5.07% | 6.93% | 13.76% | 10.1% | 15.19% | 20.8% | 18.24% | 20.06% | 18.05% | 50.42% | 44.23% | 38.57% | 29.2% |
| Competitor 3 | Amazon NetPPM% | 12.16% | 10.95% | 9.77% | 10.67% | 12.04% | 11.13% | 11.83% | 9.29% | 10.23% | 9.7% | 9.82% | 17.23% | 16.82% |
| | CP | €1,966.49 | €6,384.94 | €9,371.75 | €23,056.41 | €25,654.72 | €29,560.90 | €27,475.83 | €10,420.21 | €8,584.16 | €46,195.25 | €40,265.52 | €131,256.11 | €255,024.43 |
| Competitor 4 | Amazon Rev Mix % | 0.22% | 0.06% | 0.8% | 0.16% | 0.48% | 0.62% | 0% | 0% | 0.09% | 0.58% | 0.12% | 0.65% | 0.04% |
| | Amazon NetPPM% | 30.13% | 30.19% | 29.63% | 30.21% | 30.22% | 29.23% | 39.02% | 12.61% | 9.4% | 9.42% | 24.03% | 29.21% | |
| Competitor 4 | CP | €327.38 | €208.86 | €1,968.70 | €625.69 | €1,365.18 | €1,699.59 | €29.70 | -€17.78 | -€301.13 | -€1,303.69 | -€605.37 | €559.70 | €229.24 |
| | Amazon Rev Mix % | 70.15% | 58.1% | 36.54% | 41.11% | 21.51% | 18.14% | 18.41% | 17.79% | 13.92% | 6.37% | 23.17% | 32.2% | 12.85% |
| Competitor 4 | Amazon NetPPM% | 3.11% | 4.48% | 7.98% | 7.3% | 10.31% | 11.39% | 10.88% | 10.91% | 9.78% | 14% | 6.22% | 11.04% | 10.84% |
| | CP | -€50,109.53 | -€55,901.20 | €23,035.41 | €41,399.85 | €36,159.98 | €26,643.02 | €40,094.12 | €20,662.95 | €16,202.68 | €4,449.80 | -€20,295.61 | €49,197.14 | €37,759.81 |

Figure 11 – Pricing Map Table: Revenue Mix, NetPPM% and CP at Competitor Level

This visual shows how revenue and profitability vary across competitors and weeks. Each row reports Amazon’s revenue share (Rev Mix %), NetPPM% and CP when matching a given competitor, providing week-by-week insights into the trade-off between market exposure and margin erosion.

Thanks to its robust filters—by ASIN, country, GL, pricing driver, or even specific competitors—the dashboard also supports **root-cause analysis**. Managers can detect sudden drops in CP or NetPPM%, trace them to the triggering match and assess whether the erosion was structural or episodic (e.g., a no-VAT event or a liquidation campaign).

Strategically, this dashboard enables Amazon Retail to treat price matching not as a passive algorithmic decision, but as an **investment strategy**. It provides a foundation to:

- assess the **strategic ROI of price matches** —understood here in a qualitative sense as the trade-off between margin lost and revenue gained due to the match;
- optimize **vendor negotiations**;
- and enhance **long-term profitability**.

The insights gained from this tool are especially valuable when integrated with the financial lens provided by the internal P&L ([5.2 Understanding Amazon’s Profit & Loss Structure](#)), allowing teams to evaluate each match not just by revenue, but by **contribution to the business’s bottom line**.

5.4 Industry Pricing – Historical Price Tracking for Negotiation

The *Industry Pricing* dashboard enables users to visualize the historical trajectory of competitor prices for specific ASINs across Amazon marketplaces. While the visual representation—a time series line chart—may appear simple at first glance, its strategic depth is considerable.

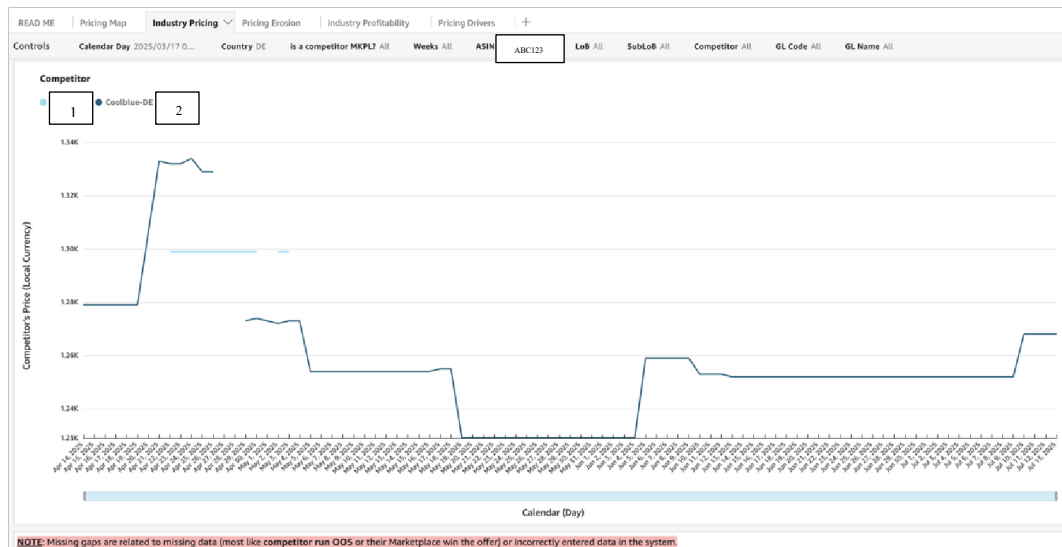


Figure 12 – Industry Pricing Timeline: Competitor Price Trends by ASIN

This visual presents the daily price trend for a selected ASIN and marketplace, plotting each competitor’s offer in local currency. It allows Amazon Retail to identify discount windows, OOS periods and liquidation pricing strategies—providing a solid foundation for negotiations and proactive vendor planning.

It provides a detailed, day-by-day view of competitor pricing behavior, shedding light on recurring patterns, anomalous drops and pricing events that can significantly impact Amazon’s profitability.

By selecting an ASIN and country (as shown in [Figure 12](#)), Vendor Managers can trace how each retailer priced the same product over weeks or even months. Missing values in the timeline often indicate that a competitor either ran out of stock (OOS), lost the BuyBox, or did not have a visible offer at that time. Steep price drops might suggest a vendorsponsored deal, an aggressive promotion, or an end-of-life liquidation campaign.

For example, in the visual shown, one competitor demonstrates a steep and sustained price reduction followed by a sharp drop to zero—an indication they likely cleared their inventory during a promotional window. Another competitor maintains a higher and relatively stable price, signaling a different pricing or procurement strategy. These insights are not just informative—they are actionable.

Amazon teams can leverage this data to:

- **Diagnose past performance issues.** If a significant drop in NetPPM occurred during a given period, this tool helps verify whether it was linked to external competitor pricing behavior.
- **Challenge vendor decisions.** When a vendor offers a deal to one competitor but not to Amazon, the dashboard provides evidence to raise the question: “*Why was this price provided to them but not to us?*”
- **Propose counteroffers.** Instead of reacting to lost opportunities, Amazon can build proactive proposals: “*If they sold 10,000 units in six weeks at this price, we can sell the same in three during Prime Day.*”

More broadly, this dashboard highlights whether a vendor may be prioritizing certain retail partners. Repeated low prices from the same competitor may indicate a structural alignment with the vendor, which Amazon can use to justify requests for parity or exclusive deals.

The tool also contributes to lifecycle pricing analysis. For instance, if a product consistently sees sharp drops a few months after launch, Amazon can forecast similar erosion for the next generation and plan funding requests accordingly.

5.5 Price Erosion – Long-Term Margin Forecasting

While the Pricing Map addresses short-term impacts of price matching, the Price Erosion dashboard focuses on long-term trends in profitability erosion. Specifically, it illustrates how Amazon’s selling price for a given product gradually decreases over time relative to the original list price (RRP). This decline—known as price erosion—can be visualized both in aggregate and at ASIN level, offering crucial insight for forecasting margins and funding requirements.

The dashboard features a time series line graph displaying three key metrics over a rolling 13-week window:

- **Price Erosion %** (orange line): the percentage difference between the RRP and Amazon’s price (excluding VAT), showing the depth of pricing discounts applied.
- **CCOGS as % of Price** (light blue line): the amount of vendor-funded cost support—such as discretionary COOP or allowances—expressed as a share of Amazon’s price.
- **Opportunity Line** (dark blue line): the sum of CCOGS and Price Erosion; it estimates how far Amazon is from breaking even on a product. When this line reaches **1**, Amazon is theoretically at breakeven—where the support received fully compensates for the price discount.

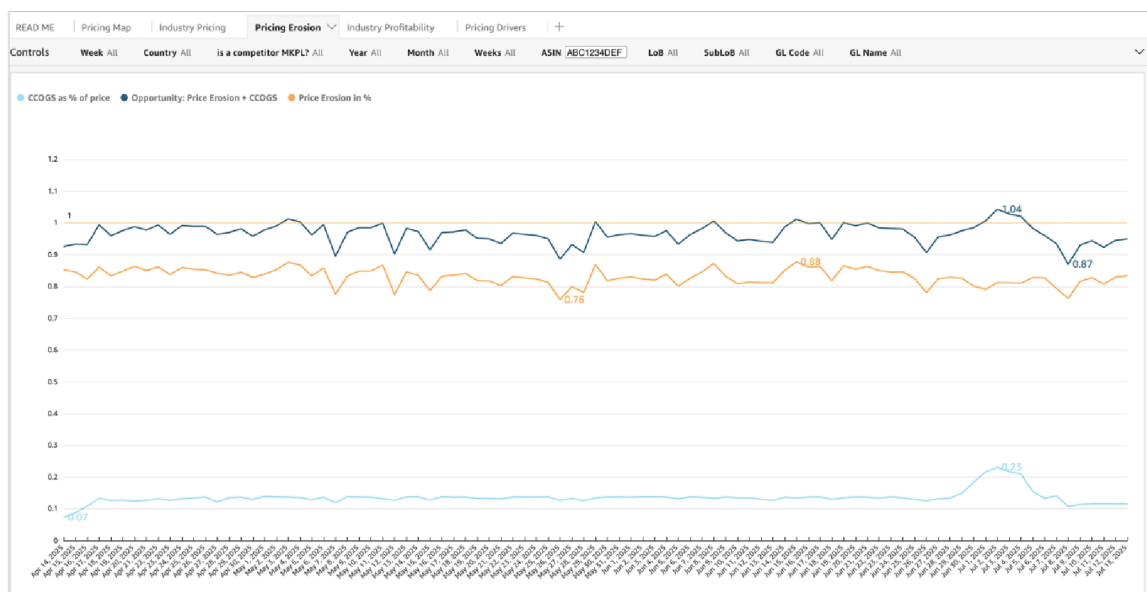


Figure 13 – Price Erosion Dashboard: Long-Term Margin Gap Visualization

The visual illustrates the relationship between price erosion (orange), vendor-funded support (light blue) and total margin gap (dark blue). The closer the dark blue line is to 1.0, the closer Amazon is to breakeven. Persistent gaps highlight the need for vendor funding.

The dashboard supports detailed filtering by time period (month, week, year), market (country), category and ASIN, allowing Vendor Managers (VMs) to analyze performance across different product lines and identify specific funding gaps.

A practical example makes this clearer. In the visual shown in [Figure 13](#), the **Price Erosion %** remains around **0.76**, implying that Amazon’s price is 24% below RRP. The **CCOGS**

coverage hovers between **0.10 and 0.23**, meaning that vendor support only offsets a small portion of the discount. Consequently, the **Opportunity Line** stabilizes around **0.87**, indicating a 13pp shortfall before breakeven.

Assuming an initial margin stack of 13% front terms and 10% annual back terms (23% in total), the 24% erosion would wipe out all profitability unless additional funding is secured. VMs can then quantify the need: for instance, if expected revenue is €100 million and the Opportunity Line is at 0.87, the gap to reach break-even is **13pp**, translating to **€13 million in funding** required to restore margin to target.

This dashboard transforms trend observation into proactive financial strategy. It helps anticipate margin pressure, simulate NetPPM evolution and structure **vendor funding requests well in advance**. By supporting a lifecycle view—aggregated or per-ASIN—it ensures that critical products remain continuously replenished, avoiding the risk that Amazon’s automated ordering system halts replenishment due to unprofitability thresholds.

Ultimately, the Price Erosion dashboard equips Vendor Managers with the foresight to maintain healthy margins, even in competitive pricing environments and facilitates stronger, data-backed negotiation with vendors.

5.6 Industry Profitability – Cross-Category Margin Comparison

While the previous dashboards focus on Amazon’s internal performance, the Industry Profitability dashboard offers an external benchmark. It compares Amazon’s NetPPM% against the estimated NetPPM% of the overall market and individual competitors, enabling Vendor Managers to assess whether Amazon’s pricing strategy is aligned with industry profitability levels.

This dashboard aggregates data across four visual components: Amazon’s NetPPM% per subcategory and country, the estimated industry NetPPM% using a standardized cost

assumption, individual competitor NetPPM% and a color-coded heat map that highlights profitability deltas. Among these, the heat map is particularly effective in summarizing the structural profitability gap between Amazon and its competitors.

The figure [Figure 14](#) illustrates this view:

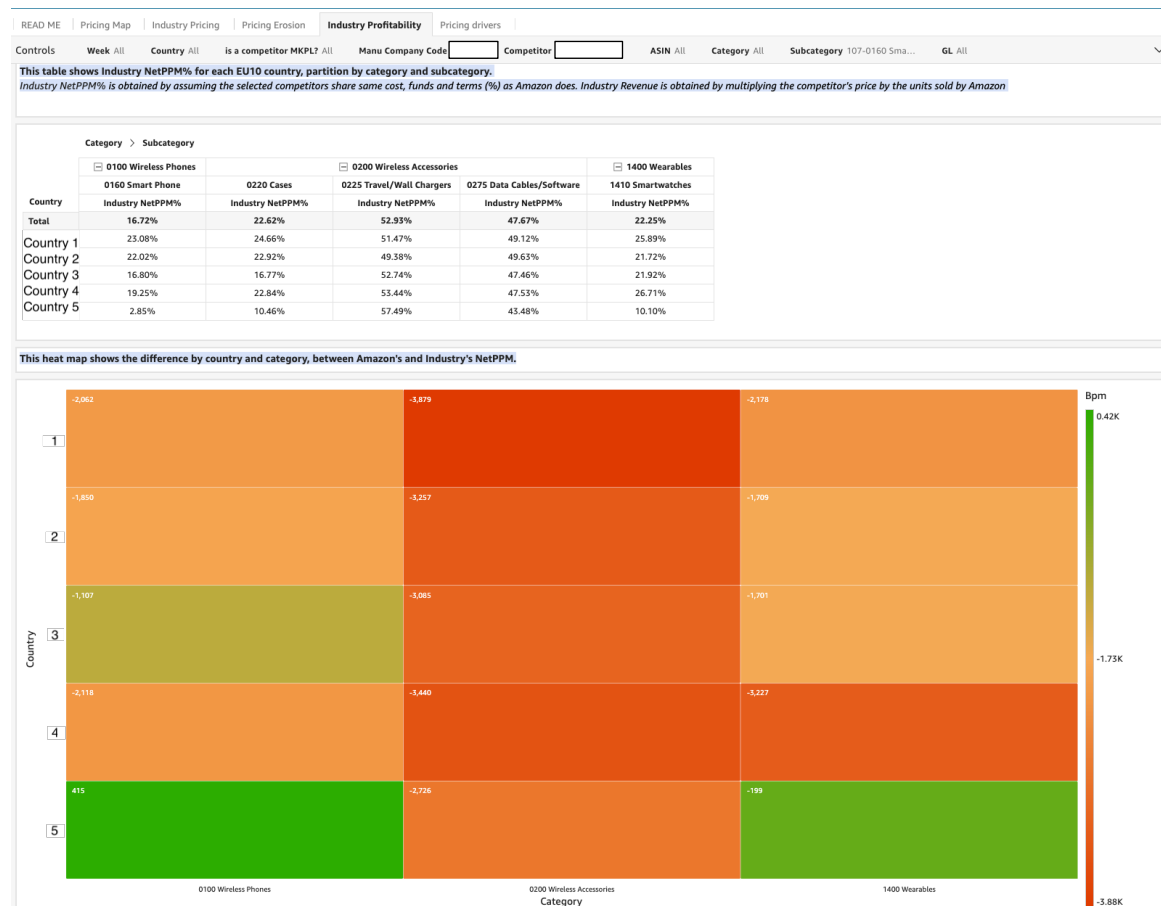


Figure 14 – Heat Map of Profitability Gap: Amazon vs. Industry

This heat map displays the difference in basis points (bps) between Amazon's NetPPM% and the estimated Industry NetPPM%, by country and product category. Positive values (green) indicate stronger Amazon margins compared to the industry, while negative values (orange to red) suggest areas where Amazon is underperforming relative to competitors.

This visual makes it immediately evident where Amazon may be sacrificing margin due to its pricing position. For instance, in Country 4, wireless accessories show a gap of –3440 bps, suggesting that Amazon's aggressive pricing strategy in that category significantly

undercuts industry margins. Conversely, in Country 5's wireless phones segment, Amazon's margin exceeds the industry benchmark by 415 bps, highlighting a profitable and strategically defensible position.

These insights are not merely descriptive—they guide action. When Amazon consistently underperforms in profitability in a given segment or geography, it may be due to systematic match behavior against sharper-priced competitors. In such cases, Vendor Managers may escalate to vendors, renegotiate funding, or adjust match rules to prevent excessive margin erosion.

The dashboard also supports portfolio optimization. If a GL or brand consistently achieves below-market margins in specific categories, teams can choose to shift focus toward more profitable product mixes. For example, instead of relying solely on smartphones—which may yield only a 3% NetPPM on high ASPs—teams might increase share in accessories with 20% margins, adjusting the blend to optimize total contribution.

Finally, this view helps illustrate a core structural constraint: Amazon's price-follower policy. Unlike many competitors who act as price-setters and preserve margin leadership, Amazon must react to market prices, often leading to reduced control over profitability. The dashboard visualizes the cost of this reactive model and helps teams decide when and where it may be strategic to soften match intensity.

In summary, the Industry Profitability dashboard translates complex performance differentials into a single, interpretable visual. It enables strategic planning at country, category and subcategory level, and is especially useful during annual vendor negotiations and long-term portfolio planning.

5.7 Pricing Drivers – Root-Cause Insights at Daily Granularity

The Pricing Drivers dashboard serves as a tactical complement to the other tools in the suite, offering fine-grained visibility into **daily performance metrics at the ASIN level**. Designed primarily for **Brand Specialists**, it supports real-time issue detection, escalation management and vendor communication—key functions in Amazon’s operational pricing workflow.

Where other dashboards aggregate metrics across weeks or categories, this dashboard is uniquely positioned to capture **day-level anomalies** and **match-level profitability**. Each row in the table represents a single ASIN on a specific day, showing top-line indicators such as **revenue** and **shipped units**, alongside bottom-line metrics such as:

- **Amazon NetPPM%**: the net margin after accounting for all funding and discounts,
- **Contribution Profit (CP)** and **Contribution Margin (CM%)**,
- **Total CCOGS**: the cost component funded by vendors (e.g., via allowances or discretionary co-op),
- and the **Pricing Drivers** responsible for the price match, such as *External Match*, *Buy Box Loss*, *Markdowns*, or *Price Discount*.

This level of granularity enables Brand Specialists to **diagnose profitability issues with precision**. For instance, a drop in CP observed in the Pricing Map may lead the user to drill down into this dashboard to identify the exact calendar day and competitor match that triggered the erosion. Similarly, by inspecting the CCOGS and pricing drivers, users can assess whether funding was sufficient or if the match resulted in a net loss for Amazon.

The operational relevance of this dashboard lies in its **root-cause analysis capability**. It empowers users to:

- monitor funding compliance at the ASIN level,

- distinguish between structural and episodic margin losses,
- and support funding escalations with exact transaction-level evidence.

This tool also plays a critical role in preparing **funding requests and business cases**, allowing specialists to quantify losses attributable to individual competitors and justify the need for vendor support. It shifts the approach from anecdotal evidence to structured, databacked negotiation.

Given its high dimensionality and volume, the dashboard is not intended for strategic overview or senior leadership reporting. Instead, it acts as the **operational backbone** of daily pricing management. A representative example of this tool is included in **Appendix B**, showcasing its detailed structure and filtering capabilities.

5.8 Strategic Outcomes and Scalability

Together, the five dashboards presented in this chapter deliver substantial operational and strategic value. They reduce manual workload, eliminate dependency on disconnected internal tools and consolidate all critical pricing insights into a single, user-friendly interface. Vendor Managers and Brand Specialists can now access real-time, filterable analytics that support margin diagnostics, campaign planning and funding negotiations.

Beyond their immediate impact, these dashboards serve as a **scalable blueprint** for expansion to additional GLs and business units. Thanks to a modular data model and reusable visual components, the system can be easily replicated across brands, geographies, or product families—without requiring major redesign.

Most importantly, this solution marks a shift in how Amazon Retail teams manage competitive pricing: from a reactive, fragmented process to a **proactive, data-driven strategy**. The integration of pricing logic, financial metrics and market visibility into a unified dashboard ecosystem significantly enhances both decision-making speed and accuracy.

Chapter 6 – Conclusion and Outlook

6.1 Data Quality and Technical Constraints

One of the primary challenges encountered during the development of the Competitor Pricing Dashboard was the inconsistency and unreliability of certain source tables. Several attributes, such as `BrandName`, `CompetitorName`, `PricingDriver`, or `ListPrice`, often contained null or incorrect values. In some cases, fields expected to be unique identifiers or consistent labels revealed duplication, formatting anomalies, or country-specific variations. These issues directly impacted the integrity of calculated metrics, especially when relying on aggregation or join conditions.

Moreover, the lack of centralized metadata documentation made it difficult to determine which table or field held the most reliable version of a particular attribute. This led to extended troubleshooting phases, where the source of inconsistency was isolated through exclusion, comparative testing and validation against known business logic.

These data issues not only introduced development delays but also posed a risk to stakeholder trust. Inaccurate metrics—especially when exposed in vendor negotiations—could compromise strategic decisions or misrepresent pricing performance.

To mitigate these issues, **I implemented a layer of custom SQL logic** designed to standardize inconsistent attributes and filter out anomalies before the data reached the

visualization stage. This proactive approach ensured that, despite the source data constraints, the final dashboards provide a reliable and 'clean' output for the business users.

6.2 Functional Scope and System Constraints

At the time of writing, the Competitor Pricing Dashboard was implemented exclusively for the GL Wireless segment. While the underlying data models are designed with flexibility in mind, expanding the system to other GLs requires additional validation steps. Not all product lines share the same cost structure, vendor funding logic, or pricing sensitivity. Therefore, before enabling broader usage, each GL would need to confirm the alignment of metrics like NetPPM%, Contribution Profit and pricing drivers with their respective business processes.

Another current limitation is the lack of integration of third-party (3P) seller data. While first-party (1P) transactions are fully covered through Redshift-based reporting tables, 3P data remains fragmented across different pipelines and may require distinct handling. Incorporating 3P visibility could significantly enhance competitive benchmarking and expand the dashboard's relevance for marketplace-specific strategies.

Finally, the system does not yet include mechanisms for automated anomaly detection. At present, margin anomalies or price outliers must be identified manually through visual inspection and filtering.

6.3 Future Enhancements and Scalability

Several opportunities exist to enhance the analytical capabilities and strategic impact of the dashboards presented in this thesis. Among the most promising developments are:

- **Full GL expansion:** The system should be extended to support all Amazon Retail GLs, providing uniform access to margin intelligence across the organization.

- **Inventory-based dashboards:** Tools that visualize out-of-stock events, sell through rates and lost conversions due to availability gaps would provide valuable context for price optimization.
- **Returns and refund analytics:** Dashboards tracking customer returns and associated costs could help assess post-sale performance, detect quality issues, or re-attribute margin erosion beyond pricing alone.
- **Vendor and campaign-level insights:** Enhancements that group metrics by vendor, rather than ASIN or subcategory, could facilitate funding negotiations and lifecycle planning.
- **Data governance tools:** The development of automated checks for data completeness and reliability, as well as clearer documentation of each table's schema and logic, would significantly accelerate future development cycles.

6.4 Practical Impact on Business Operations

The implementation of the dashboard suite has generated immediate operational benefits for the Wireless team, significantly improving overall process efficiency. Firstly, the automation of data flows has allowed for a drastic reduction in manual workload, freeing Brand Specialists from the time-consuming tasks of data extraction and aggregation previously performed through static and fragmented internal tools. Beyond time savings, the project has fostered data democratization within the organization; by providing a centralized 'single version of the truth,' it has ensured that all stakeholders—from Brand Specialists to Vendor Managers—operate based on the same KPIs, eliminating discrepancies in strategic analyses and discussions. Finally, the ability to visualize real-time trends across ten different marketplaces has granted the team greater strategic agility, allowing them to identify and react to competitive threats or margin erosion significantly faster than with traditional reporting systems.

In conclusion, this project successfully bridged the gap between raw, fragmented data and strategic business insights. While the current system provides a robust foundation, its primary achievement lies in transforming complex competitive dynamics into a clear, actionable interface. The positive feedback from the Wireless team confirms that the

dashboard has become an essential tool for daily operations, proving that well-structured Business Intelligence is a key driver for retail excellence in the Amazon EU ecosystem.

If implemented, these extensions would further help transform Amazon Retail's decision making processes from reactive to proactive, strengthening the connection between data visibility and strategic action.

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Appendix A

A.1 – Competitors_Price Table Creation

Home > Datasets > Create

Create a New Table

Content Type Info
PARQUET

You are no longer allowed to create TSV datasets. Please continue to create your datasets in Parquet. [Learn more](#)

Import Schema Optional

Partial Schema

Define schema with ParTiQL DDL

ParTiQL DDL

```
define schema for WirelessEU10.Competitors_price
1 "timestamp" TIME(TIMESTAMP) NOT NULL,
2 "week" VARCHAR(5),
3 "city" VARCHAR(20) NOT NULL,
4 "marketplace_id" DECIMAL(38,4) NOT NULL,
5 "region_id" DECIMAL(38,4) NOT NULL,
6 "country_code" VARCHAR(3),
7 "net" VARCHAR(20),
8 "supplier_company_code" VARCHAR(30),
9 "category_description" VARCHAR(255),
10 "subcategory_description" VARCHAR(255),
11 "competitor_name" VARCHAR(100),
12 "is_mpl" CHAR(2),
13 "competitor_price" DECIMAL(38,4),
14 "list_price_with_tax" DECIMAL(38,4)
```

ParTiQL Ln 1, Col 1

< Previous Next >

A.2 – Competitors_Price Table Schema

Competitors_price - v1 info Version 1 - ACTIVE (Recommended) [Manage Dataset](#)

This table contains GL Wireless data on the competitor's price and list price for each asin and day in a 13 weeks window.

Overview **Schema** Subscriptions Lineage [Data](#) Health Relationships Permissions Controls History Settings

Schema Attributes info [Copy](#) [Visual](#) [PartiQL](#) [SDL](#)

Search [Edit](#) [Edit Description](#) [Classify Data](#)

| Name | Nulla... | Type | Constraints | Description | Tags |
|-------------------------|----------|-----------|-------------|-------------------------------------|--------------------|
| snapshot_day | False | Timestamp | Primary | yyyy-MM-ddTHH:mm:ss | |
| asin | False | String | Primary | max length (20) | Amazon Standard... |
| marketplace_id | False | Decimal | Primary | max precision (38) max scale (5) | Marketplace ID |
| week | True | String | | max length (15) | |
| region_id | False | Decimal | | max precision (38) max scale (5) | |
| country_code | True | String | | max length (8) | |
| vat | True | Decimal | | max precision (38) max scale (2) | |
| unprefixed_company_code | True | String | | max length (20) | |
| category_description | True | String | | max length (255) | |
| subcategory_description | True | String | | max length (255) | |
| competitor_name | True | String | | max length (1200) | |
| is_MKPL | True | String | | min length (2) max length (2) | |
| competitor_price | True | Decimal | | max precision (38) max scale (5) | |
| list_price_with_tax | True | Decimal | | max precision (38) max scale (5) | |

Schema Attributes 1 to 14 of 14 Page 1 of 1 Results per page 50

B.1 – Pricing Drivers

READ ME | Pricing Map | Industry Pricing | Pricing Erosion | Industry Profitability **Pricing drivers**

Controls **Calendar Day** 2025/05/02 0... **Country** All **ASIN** All **Manu Company Code** **Pricing Driver 1** All **Competitor** All

PRICING DRIVERS
DEFAULT VALUES: Calendar Day between 2025/05/19 and 2025/05/22, Country: ES, Manu Company Code Pricing Driver 1: External Match
TIP: select your Brand or ASINs to evaluate

This table shows in detail the Pricing Driver information each selected ASIN/Brand's ASINs at day level. We display here topline (Revenue, Shipped Units) nad bottomline (NetPPM%, CP, CM% and Total CCOGS flowing) metrics.

| Calendar Day | ASIN | Short Name | Manu Company Code | Country | Pricing Driver 1 | Pricing Driver 2 | Competitor | Revenue | Shipped Units | Amazon NetPPM% | CP | CM% | CCOGS |
|--------------|------|------------|-------------------|---------|------------------|------------------|------------|---------|---------------|----------------|----------|----------|--------|
| Jul 14, 2025 | | | | DE | External Match | Exact Match | | €14.86 | 1 | 19.51% | (€2.24) | -15.07% | €0.00 |
| Jul 14, 2025 | | | | IT | External Match | Exact Match | | €109.80 | 4 | 22.71% | €0.30 | 0.27% | €4.66 |
| Jul 14, 2025 | | | | BE | External Match | Exact Match | | €28.95 | 1 | 25.06% | (€0.06) | -0.21% | €1.26 |
| Jul 14, 2025 | | | | FR | External Match | Exact Match | | €29.17 | 1 | 26.88% | €1.79 | 6.13% | €1.24 |
| Jul 14, 2025 | | | | DE | External Match | Exact Match | | €351.82 | 15 | 14.23% | (€19.24) | -5.46% | €17.56 |
| Jul 14, 2025 | | | | UK | External Match | Exact Match | | €29.21 | 1 | 26.3% | €1.93 | 6.61% | €1.25 |
| Jul 14, 2025 | | | | UK | External Match | Exact Match | | €233.69 | 8 | 26.3% | €16.82 | 7.19% | €10.02 |
| Jul 14, 2025 | | | | ES | External Match | Exact Match | | €45.45 | 1 | 26% | €3.70 | 8.14% | €1.96 |
| Jul 14, 2025 | | | | FR | External Match | Exact Match | | €49.16 | 1 | 29.45% | €5.26 | 10.69% | €0.62 |
| Jul 14, 2025 | | | | IT | External Match | Exact Match | | €36.88 | 2 | 5.95% | (€5.25) | -14.22% | €0.62 |
| Jul 14, 2025 | | | | IT | External Match | Exact Match | | €110.64 | 3 | 5.95% | (€17.93) | -16.2% | €1.85 |
| Jul 14, 2025 | | | | DE | External Match | Exact Match | | €419.30 | 11 | 19.78% | €24.42 | 5.82% | €19.57 |
| Jul 14, 2025 | | | | SE | External Match | Exact Match | | €42.26 | 1 | 24.44% | €2.37 | 5.6% | €1.92 |
| Jul 14, 2025 | | | | IE | Buy Box ... | Price Discount | | €47.97 | 1 | 29.88% | €11.37 | 23.71% | €1.96 |
| Jul 14, 2025 | | | | DE | Comp Match ... | EU Cost Floor | | €21.20 | 5 | -66.69% | (€29.28) | -138.12% | €3.71 |
| Jul 14, 2025 | | | | DE | Markdowns | Markdown ... | | €5.72 | 2 | 70.27% | (€1.91) | -33.45% | €0.00 |
| Jul 14, 2025 | | | | IT | External Match | Exact Match | | €85.80 | 13 | 32.81% | (€30.73) | -35.81% | €6.05 |
| Jul 14, 2025 | | | | DE | Buy Box ... | Best Deal | | €19.35 | 1 | 4.42% | (€3.74) | -19.37% | €1.02 |
| Jul 14, 2025 | | | | DE | Buy Box ... | Best Deal | | €18.36 | 1 | -0.62% | (€6.23) | -33.91% | €1.02 |
| Jul 14, 2025 | | | | DE | Buy Box ... | Best Deal | | €110.16 | 6 | -0.62% | (€38.57) | -35.01% | €6.09 |
| Jul 14, 2025 | | | | DE | External Match | Exact Match | | €23.45 | 1 | 21.21% | €0.85 | 3.64% | €1.02 |
| Jul 14, 2025 | | | | ES | External Match | Exact Match | | €84.24 | 6 | 29.51% | €3.32 | 3.94% | €5.94 |
| Jul 14, 2025 | | | | ES | External Match | Exact Match | | €14.04 | 1 | 32.83% | (€0.09) | -0.65% | €0.99 |
| Jul 14, 2025 | | | | IT | External Match | Exact Match | | €138.90 | 10 | 32.1% | (€1.48) | -1.06% | €9.90 |
| Jul 14, 2025 | | | | NI | External Match | Exact Match | | €76.56 | 7 | 76.46% | (€10.71) | -18.74% | €1.08 |