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Evaluating and Enhancing Power BI Reporting for Operational Efficiency and Decision-Making in Material Management

A Case Study

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ABSTRACT:
Today, data collection and storage have grown rapidly, which is why the ability of organizations to utilize and use it correctly is important. Mastering data analytics plays a crucial role in maintaining the competitive advantage, which is why it is necessary to invest in its practice and development.

Material Management is one part of an organization's Supply Chain, where there are many possible processes that can utilize Data Analytics and Business Intelligence reporting. Data management and measurement of important processes can help organizations make data-driven operational and strategic decisions, which reduces manual errors and makes the decision-making process more efficient.

For these reasons, this study examines the current reporting situation of one Case company and examines the challenges it faces and develops extensive guidelines for improving these practices. Using a mixed method research approach, employees of the Case company were interviewed, and a questionnaire was prepared for them, which aimed to find how current reporting affects the decision-making, whether the reports are perceived to be effective, and to define areas for development. The results showed that the Case company uses extensively data analytics and reporting in its current processes, but challenges and areas for development were identified in reporting structure, distribution and content.

This study proposes changes to the operations of the Case company, recommending improvements to the challenges identified in current reporting. These enhancement suggestions are intended to support the existing reporting process so that the Case company can achieve the full benefit from reporting. The guidelines developed based on the research results can also be utilized in the reporting practises of other company functions and external organizations, modifying them to support each need. In summary, it can be stated that this thesis offers guidelines for organizations whose processes already widely include various reporting practices, but whose full potential is not considered to have been achieved yet.

KEYWORDS: Business Intelligence, Data Analytics, Data Systems, Decision-making, Material Handling

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TIIVISTELMÄ:
Nykypäivänä datan keräys ja varastointi on kasvanut vauhdikkaasti, minkä vuoksi organisaatioiden kyky hyödyntää ja käyttää sitä oikein on tärkeää. Data-analytiikan hallitseminen pelaa ratkaisevaa roolia organisaatioiden kilpailukyvyn ylläpitämisessä, minkä vuoksi sen harjoittamiseen ja kehittämiseen on panostettava.

Materiaalin hallinta on yksi organisaation toimitusketjun osa, jossa on monia mahdollisia prosesseja, joissa voidaan hyödyntää data-analytiikkaa sekä tietojohtamisen raportointia. Datan hallinta ja tärkeiden prosessien mittarointi voi auttaa organisaatioita tekemään dataohjattuja operatiivisia sekä strategisia päätöksiä, mikä vähentää manuaalisia virheitä sekä tehostaa päätöksentekoprosessia.

Näistä syistä tämä tutkimus tarkastelee yhden tutkimusyritysen tämänhetkistä raportointitilannetta ja tutkii siinä esiintyviä haasteita ja kehittää laajan ohjeistuksen näiden käytäntöjen parantamiseksi. Käyttäen monimenetelmällistä tutkimustapaa, tutkimusyrityksen työntekijöitä haastateltiin ja heille laadittiin kysely, joilla pyrittiin selvittämään kuinka raportointi vaikuttaa päätöksentekoon, koetaanko ne riittävän tehokkaiksi sekä määrittelemään kehityskohteita. Tulokset osoittivat tutkimusyrityksen hyödyntävän data-analytiikkaa ja raportointia laajasti nykyisissä prosesseissaan, mutta niiden rakenteessa, jakamisessa sekä sisällössä tunnistettiin haasteita sekä kehityskohteita.

Tämä tutkimus ehdottaa muutoksia tapausyrityksen toimintaan, suositellen parannuksia raportoinnissa havaittuihin haasteisiin. Kyseiset parannusehdotukset ovat tarkoitettu tukemaan jo olemassa olevaa raportointiprosessia, jotta tapausyritys saavuttaisi raportoinnin käytöstä mahdollisimman suuren hyödyn. Tutkimustulosten pohjalta laadittua ohjeistusta on mahdollista hyödyntää myös muiden yrityksen toimintojen sekä ulkopuolisten organisaatioiden raportointimenetelmissä muokaten niitä tukemaan kunkin tarpeen mukaan. Yhteenvetona voidaan todeta, että tämä diplomityö tarjoaa ohjeistusta organisaatioille, joiden prosesseissa on jo laajasti käytössä erilaisia raportointikäytäntöjä, mutta niiden täyden potentiaalin ei katsota olevan vielä saavutettu.

AVAINSANAT: Data-analytiikka, Materiaalinkäsittely, Päätöksenteko, Tietojohtaminen, Tietojärjestelmät

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Abbreviations

AI	Artificial Intelligence
AS/RS	Automated Storage and Retrieval Systems
BI	Business Intelligence
ERP	Enterprise Recourse Planning
EWM	Extended Warehouse Management
IoT	Internet of Things
KPI	Key Performance Indicator
MDM	Master Data Management
ROI	Return on Investment
SQA	Supplier Quality Assurance

1 Introduction

As the amount of data collected and stored has grown exponentially today, companies are faced with significant amounts of information that can be transformed into insights to implement business strategy (Tiwari, 2024). Implementing data-analytics in company's decision-making plays a key strategic role in achieving competitive advantage and increase growth in today's dynamic and complex business environment (Tiwari, 2024). Data-analytics enable company to collect, analyze and interpret massive data which help in data-driven decision-making (Tiwari, 2024). Data analytics allows companies for instance to identify inefficient processes and analyze customer and market trends, help companies drive business growth and innovation, and develop targeted marketing campaigns (Tiwari, 2024). Additionally, it helps companies with risk management and strategic planning (Tiwari, 2024).

By managing the flow of materials and goods, Material Management plays a crucial role in global supply chain achieving to maximize customer value and business efficiency while minimizing costs (Jenkins, 2024). According to Jenkins (2024) Material Management includes five key functions which are material requirements planning (MRP), procurement management, inventory management, warehouse management, and transportation management. With effective Material Management company benefit in several ways for instance reduced material waste, improved inventory accuracy, cost reduction, improved productivity, and enhanced decision-making (Jenkins, 2024).

As a part of Material Management, warehouse management plays a crucial role in global supply chain ensuring that goods are stored, handled and distributed efficiently which is why companies search solutions to streamline their warehouse workflow management (Dulub, 2024). Dulub (2024) describes that Artificial Intelligence and Data Analytics have great potential in warehouse management to help companies to tackle their challenges by optimizing workflows, addressing key issues, and enhancing the overall efficiency of the processes. With Data Analytics, companies utilize more accurate demand forecasting and improve their operations by examining past data (Dulub, 2024). When companies

integrate Data Analytics into warehouse management, they need to identify targeted areas that would benefit the most, review and update analytics strategies regularly, implement comprehensive training for employees, ensure data quality and security, and consider scalability in the future (Dulub, 2024).

Within this context, this study explores the current usage of data-analytics more specifically Power BI reporting in the studied Case company. By examining the current state, identifying challenges and gaps in the reporting this thesis aims to discover and suggest improvements to increase the operative efficiency and improve strategic decision-making process to be more data driven. With the results of this thesis a comprehensive framework is created for companies who want to improve their reporting practises.

1.1 Research problem and research gaps

As in today's companies, data-analytics is an integral part of operations and decision-making processes, which is why companies need to find solutions for their correct and effective use in order to benefit from it as much as possible.

In the studied Case company Power BI is widely used for data analysis but there are challenges on how to make the user experience better and increase the efficiency of the reporting. Additionally, the reports might not be used in a way that maximizes the benefit of the reports, both for operational tasks and to support strategic decision-making at a management level. There might also be misalignments of the reports with critical KPIs or strategic objectives.

The research gaps for the study can be divided into four categories:

Data analysis and reporting practices: There is currently no clear strategy or guidance available on how to develop reports and how to improve their distribution, usage, and user experience in a company that already has significant experience with data analysis

and reporting practises. This is crucial to determine for companies to reach the full potential of data analysis and reporting. This study will explore practises of one Case company to create concrete suggestions around these themes. These suggestions can be later used as framework for other companies who have similar challenges and want to explore options that suit best for them.

Data Automation and ERP Integration: Effectiveness of Power BI reporting depends on the master data quality which is generated and stored in SAP. There could be challenges related to how well the data is integrated and interpreted by Power BI. This study will not explore in detail how the data is integrated into the Power BI reports or try to find mistakes in the Queries. However, this study will explore the ways reports are conducted and find ways to improve the reports to answer the needs of user experience and decision-making processes.

Difference between Operational and Strategic Reporting: Power BI reporting in Material Management related reports must support real-time operational efficiency and long-term strategy to be effective and useful. This study will explore how current reports differ in their focus on operational and strategic view and study if there is a need for additional data, metrics, or visualization methods to help with strategic decision-making within Material Management.

Improving Strategic Relevance of Reports: Reports may lack key performance indicators or relevance metrics that can lead to ineffective reports towards company's strategic decision-making. This study tries to identify and propose improvement ideas to company's Power BI reports that could enhance strategic decision-making and planning.

1.2 Research questions

The research aims to evaluate the effectiveness of current Power BI reporting practices within Material Management processes in the Case company. Additionally, identify gaps in reporting, and propose improvements that align with both operational needs and

strategic goals. The study will explore how Power BI reports are currently used to track crucial metrics such as inventory levels, order fulfillment, material flow, and labor efficiency, and assess whether these reports provide sufficient information for continuous improvement and decision-making. Four research question are selected for which the study aims to answer:

1. How effective are current Power BI reports in supporting operational efficiency and strategic decision-making in material management?
2. Are metrics tracked through Power BI in Material Management operations aligned with industry best practices?
3. What gaps exist in the current Power BI reporting framework that hinder the ability of material management teams to make informed decisions?
4. How can Power BI reports be enhanced to better align with the operational and strategic needs of material management functions?

1.3 Research scope and limitations

The study is implemented for a specific Case company which limits the results, and they can only be applied to the needs of the Case company. However, the results provide a comprehensive picture of what other companies should consider when using Data Analytics and Power BI in their reporting and strategic decision-making processes in the field of Material Management.

As the effectiveness of Power BI reporting is mostly dependent on the quality and structure gathered from ERP system, in this case SAP, the accuracy, completion and structure of the data affect the reliability of the reports. This limitation might affect on drawing accurate conclusions from the reports and may require additional work to improve data management.

Since strategic decision-making often entails long-term planning and subjective judgement that is not always readily measurable, evaluating it can be challenging. The

definition of “strategic” may vary depending on the company’s unique objectives, competitive strategies, and market conditions. Due to this, it might be challenging for one to draw precise, broadly applicable findings on how Power BI reporting affects these processes.

Although Power BI offers good and wide reporting features and capabilities, its usefulness depends on how well the employees engage with the reports and take actions based on them. For these reasons, training current employees and finding a skilled workforce is crucial, but can be found challenging. Human factors that might affect the efficacy of the reporting, such as reluctance to change, data misunderstanding, or differing degrees of data literacy, may not be fully taken into consideration in this study.

These limitations set realistic expectations for this study and guide future research in the field. Despite the limitations, the study can still offer valuable insights into the potential improvements in Power BI reporting in the studied Case company.

1.4 Confidentiality

This Master’s Thesis is done as a case study for a global company operating in the field of marine and energy technology. No confidential information or data is shared in this thesis, and some information is anonymized. Additionally, the name of the company or the business sector is not shared, and it will be referred as “Case company” in the text.

2 Literature Review

This chapter includes a comprehensive literature review which is used to determine and describe the main processes included in Material Management. This helps to determine what components each process contain and what decisions companies need to make to maintain their operational capability and efficiency. To have a descriptive view of each process, it is possible to further analyze in the empirical part, which processes are found most suitable for data analysis and reporting purposes, and which are found the most challenging. Additionally, a deeper insight into how each process works will help to understand later which parts of the processes each enhancement proposal would affect.

2.1 Material Management in supply chains

Material Management is a core part of supply chains that companies use to plan overall material needs which then are communicated between different departments and functions of the company (Putra et al., 2021). Material Management is used as a coordination system for planning and controlling the quantity and timing of materials through the warehousing and distribution processes (Putra et al., 2021). Zijm et al. (2019) argues that logistics and warehousing play a central role in today's global supply chains, which is why location and capacity planning should be considered at the strategic level and transportation and warehouse management at the operational level when designing the supply chains and operations. Transportation logistics connects the different parts of supply chain and according to Zijm et al. (2019) a typical transportation process includes the steps of loading, pre-carriage, main haul, on-carriage, and unloading.

Supplier Quality Assurance (SQA) is a crucial part of supply chain management and is usually included in Material Management operations. It is focusing on ensuring the quality of products, services, and materials supplied by external suppliers or vendors (Overvest, 2025). According to Overvest (2025) an effective SQA process involves several components that concentrate on supplier management, production efficiency, equipment efficiency, product quality compliance and customer satisfaction.

This chapter reviews the existing literature on the components and processes involved in Material Management in today's Supply Chain Management, what are the key measurements and what kind of role data-analytics has in the industry.

2.1.1 Inbound logistics

Optimizing inbound transportation is mandatory, especially when companies have large production volumes and receivables, to minimize costs and achieve efficient logistics operations. Zijm et al. (2019) describes that strategic and operational level decisions may affect on the efficiency of logistics operations. At a strategic level, company must decide on a supply concept which includes both supplier and parts segmentation. Additionally, at an operational level, good scheduling and sequencing ensure smooth use of capacity and helps to avoid queues and waiting times (Zijm et al., 2019). When designing inbound logistics operations, the company focuses on efficient operations, flexibility, and reactiveness. With steady and reliable operations, the company is able to respond to challenges in inbound logistics performance resulting from various environmental changes (Zijm et al., 2019).

According to Zijm et al. (2019), inbound logistics includes all activities from order placement and order allocation to decided delivery and transportation concept for the receiver and warehouse. Many-to-many logistics systems are considered to be a situation where there are several plants or warehouses involved with multiple suppliers. Additionally, many-to-one system is described as a situation where multiple suppliers deliver to single warehouse (Zijm et al., 2019).

When company has large amount and high variety of incoming goods per warehouse one needs to consider and evaluate different delivery and transportation concepts which is typically done based on the following key performance indicators (KPIs): transportation costs, handling costs, inventory costs and service level agreements (Zijm et al., 2019).

2.1.2 Warehousing

Since it is nearly impossible for the supply of manufactured items and their consumption to occur simultaneously, warehousing is mandatory. Additionally, as usually the production and demand consumption do not occur in the same location and due to economies of scale in production, the warehouse must be located either in the same location as production, the point of consumption, or an intermediate location (Zijm et al., 2019).

Figure 1 illustrates a typical warehouse which Zijm et al. (2019) describes to consist of an outside shell, storage racks, and materials-handling equipment. Outside shell protects the goods from weather conditions and is used also for security reasons. When planning the warehouse one must take into consideration the warehouse throughput and storage capacity. Building size, material handling equipment, and storage racks are all influenced by the warehouse's storage capacity. Additionally, the maximum number of pallets that can be storaged in the warehouse is indicated by storage capacity. Zijm et al. (2019) describes different factors including item's size, shape, weight, and shelf life that influence the rate which the items are received in the warehouse. Additionally, the factors that rate at which products are delivered from the warehouse are the products in orders, order sizes, and order frequences. It is good to know that the ideal frequency of receiving goods is at the same rate as they are requested from the warehouse, but in most cases this is not possible, so the goods must be stored in the warehouse until they are requested (Zijm et al. 2019). The size of warehouse, level of automation and type of storage media used depend on several variables that Zijm et al. (2019) describes to be characteristics of goods, imbalance between the supply and demand of goods, and the desired throughput of the warehouse.

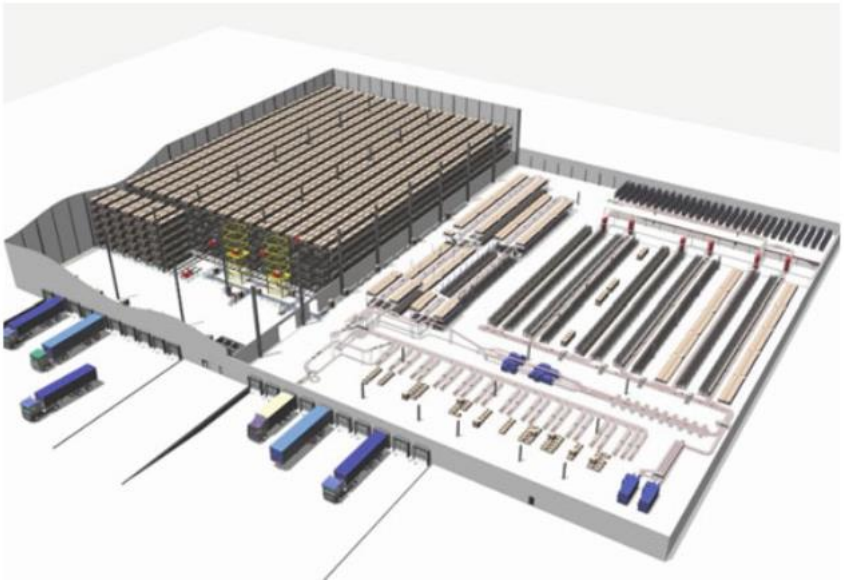


Figure 1. Cross-section of a warehouse (Adapted from Zijm et al. 2019)

2.1.3 Storage and material handling systems

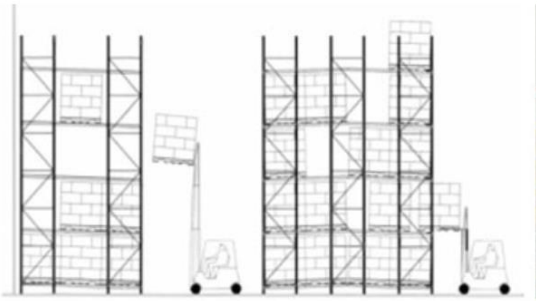
Zijm et al. (2019) divides the materials-handling systems used in warehouses into two categories: Person (or equipment) to item and item to person (or equipment). The automation level of the warehouse depends on which extend humans are involved the order picking. Zijm et al. (2019) describe the differences in the level of automation in warehouses found between the United States, Europe and Japan. In the United States, warehouse heights tend to be lower, and footprint is wider than in Europe and Japan, which is why the level of automation is lower. Automated warehouse equipment require high capital but ensures safe order picking in taller warehouses, improves accuracy, decreases the level of damaged goods and improves the efficiency of operations (Zijm et al., (2019).

The equipment used in the warehouse depends on whether the warehouse is manual, semi-automated or fully automated. Zijm et al. (2019) have collected the different types of equipment in their book and describe how each of them works. In figure 2a one can see a traditional forklift that allows for storing of retrieving pallet loads from the shelves. In some cases, the pallets on the shelves are pushed back and allow loading from the

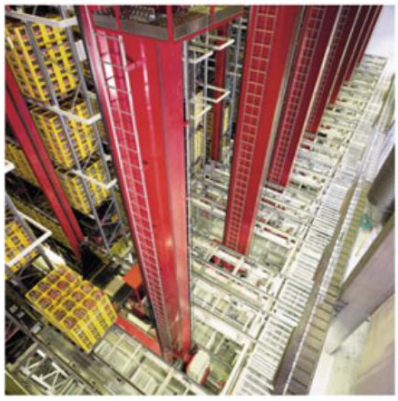
front, which allows for a last-in, first-out (LIFO) warehouse policy. Warehousing methods will be studied later in chapter 1.1.4. Typically, the traditional forklifts cannot operate more than three levels as there stability and safety concerns related handling heavy unit loads (Zijm et al. 2019).

In the figure 2c and 2d illustrates two different types of automated storage and retrieval systems (AS/RS). In the system there is a platform that is mounted to a mast which allows the operator to travel up and down using an electric motor. Additionally, another motor allows the operator to travel forward and reverse between the shelves (Zijm et al., 2019).

In the figure 2e and 2f one illustrates two fully automated AS/RS. The figure 2e shows case where autonomous vehicles use motors to move in orthogonal directions, pick up an incoming pallet from the staging area, use elevator to reach the desired storage level if needed, and then use forks to either store the pallet or retrieve an outgoing pallet, reversing the previously described travel steps (Zijm et al., 2019). In figure 2f one shows a case where mini robots retrieve or deposit totes in storage columns, elevate them up or down to deposit them in another column determined for outbound totes (Zijm et al., 2019).

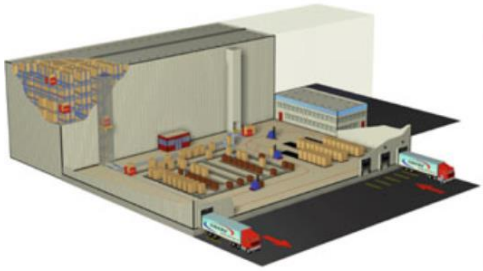


(a) Fork-lifts used for storage and retrieval (MHI)



(c) Top view of a person-on-board automated storage and retrieval system (AS/RS)(Vanderlande Industries)

(d) Person-on-board AS/RS for pallet storage (Vanderlande Industries)



(e) Fully automated warehouse using autonomous vehicles for pallet storage and retrieval (Savoye Logistics).

(f) Fully automated warehouse using autonomous vehicles for tote storage and retrieval (Swisslog).

Figure 2. Warehouse material-handling systems (Adapted from Zijm et al. 2019)

2.1.4 Warehousing methods

Efficient inventory management is a crucial component of strategic management for companies; thus companies need to determine their warehouse management method do decide in which order to take goods from the shelves (Kapiszka, 2025 & Roser, 2019). Additionally, determing the inventory management method plays a crucial role when

implementing automated warehouse systems as the systems uses the chosen logic when picking orders and adjusting the shelves.

First in, first out (FIFO) method is the most used and best known with industries where the expiry date of the goods is crucial, for instance in the food, pharmaceutical or chemical industries (Kapiszka, 2025). In FIFO method the first item received in the warehouse will be the first one issued out, which means that the item with longest shelf time will be taken out first (Roser, 2019). Company benefits from FIFO method in that the goods maintain the order of arrival, which has several advantages. For instance, if there are changes in the goods, the non-changed goods will be issued first (Roser, 2019).

In last in, first out (LIFO) method the newest goods are issued before the older ones in the shelves (Kapiszka, 2025). This method can be especially helpful for goods that hold their worth well over time in storage or when one wants to have fast access to new items (Kapiszka, 2025). LIFO is used only in cases where the storage structure do not allow one to access the oldest item without removing the others first (Roser, 2019). Commonly LIFO is used for instance with bulk materials like coal or sand or stacked materials where is hard or impossible for access the oldest item first (Roser, 2019). With LIFO storages it is common to periodically empty the storages completely to avoid the aging of the goods (Roser, 2019).

In first expiry, first out (FEFO) method one needs to track the expiration date of the goods, thus the material with earliest expiration date is always removed first (Roser, 2019). FEFO method is crucial for instance in grocery shops where the method helps to avoid throwing away spoiled items (Kapiszka, 2025).

First expiry minimum available lifetime (FEMAL) is another method where the goods are issued based on the expiration date, but with the difference that the expiration date of the goods delivered to the customer must be as big as determined by the customer (Roser, 2019).

In highest in, first out (HIFO) strategy one issues the most expensive item from the identical alternatives first. HIFO method is rarely used because of its minimal advantages but still sometimes used for bookkeeping reasons (Roser, 2019). With HIFO method the value of the inventory may be lower on the paper which may affect on the taxes pointed for the company (Roser, 2019).

Lowest in, first out (LOFO) is the opposite strategy of HIFO where the goods with lowest values are used first (Roser, 2019). LOFO is barely used in real life but is described as an one possibility even if it is not a beneficial alternative.

2.1.5 Outbound Logistics and Distribution Management

Distribution requires delivering the required amount, quality, and kind of goods to a value chain customer in accordance with their order. Because customer satisfaction, quality, service appeal, and brand quality are ultimately decided here, this function in the operations, logistics, and supply chain area is crucial (Zijm et al., 2019). Distribution management is a broad, strategic concept that encompasses a number of tasks and procedures like inventory, warehousing, transportation, and packaging (Zijm et al., 2019).

Outbound logistics includes processes of storing, transporting, and delivering goods to end customer (Quijano, 2024). According to Quijano (2024) many factors, for instance inventory and order management, packaging procedures and distribution networks affect on successful outbound logistics. Ensuring on time and full preparation and delivery is crucial for business success and customer satisfaction (Quijano, 2024). Key activities included in outbound logistics include processing customer orders, picking and packing, shipping and delivering goods to final destination, monitoring efficient delivery through various distribution channels, and return delivery process (Overvest, 2025).

2.1.6 Supplier Quality Assurance

Supplier Quality Assurance (SQA) is used to guarantee the necessary quality standards are met with the goods or services received from the supplier (Overvest, 2025). With SQA a company ensures that the suppliers fulfill their contractual obligations. Maintaining these processes company strives to maintain the overall quality of the finished products manufactured or delivered to its customers. Overvest (2025) lists the main components of SQA that are used by most companies, the most essential of which are reviewed below.

Supplier selections and qualification is a process where a company selects suppliers who satisfy specific criteria (Overvest, 2025). Additionally, suppliers are evaluated in audits on regular basis and continuous evaluation of supplier performance is tracked (Overvest, 2025). With quality agreements company specifies the requirements, procedures, expectations, and standards to give both parties a clear framework (Overvest, 2025). Company performs regular inspections on materials or products received from suppliers, if supplied goods are disqualified, the parties should solve problems collaboratively (Overvest, 2025).

2.2 Performance Measurement

Performance measurement is the process of evaluating the efficacy and efficiency of initiatives, programs, and projects (Ontario, 2024). It is a methodical process for gathering, examining, and assessing how “on track” a project or program is to meet its intended results, goals, and objectives (Ontario, 2024). One must remember that organizations need to find and develop their own performance measures based on their project plans and strategy. With performance measurement framework one can identify the indicators needed to track and evaluate process’ performance (Ontario, 2024). Its goals include identifying metrics, connection and analytic methods, roles and duties, and reporting using a logic model (Ontario, 2024).

Key Performance Indicators (KPIs) measure the organization's long-term performance (Twin, 2024). KPIs aid in assessing a business's operational, financial, and strategic accomplishments, particularly when contrasted with those of other companies in the same industry (Twin, 2024). KPIs can also be used to compare accomplishments or development to a set of standards or historical results (Twin, 2024). Mecalux (2022) and Jenkins (2023) reviewed common KPIs used in warehousing and logistics that are part of material management. These metrics included for instance efficiency in goods receipt, loading dock occupancy, stock turnover rate, stockout rate, picking accuracy, lead time, backorder rate, and delivery in full on time (Jenkins, 2023 & Mecalux 2022). These KPIs could be used as the industry best practices and a guideline what KPIs are considered key metrics to follow.

By identifying and adopting the best practices for effective Material Management companies can optimize their operations, reduce costs and improve the productivity (ABL Group, 2023). Optimizing inventory management is seen as one of the top best practices of material management (ABL Group, 2023). Monitoring warehouse movements and real-time visibility of inventory levels, regular physical inventory audits and the use of an inventory tracking system are all contributors to effective inventory management (ABL Group, 2023).

From the review by ABL Group (2023) it can be concluded that having a competitive operations today, the company must utilize technological solutions in their operations inside warehouse management. There are multiple different technological products and services helping companies to improve their processes and efficiency for instance barcoding, IoT devices and other warehouse management systems (ABL Group, 2023).

ABL Group (2023) considers data analysis and forecasting as one of the best practices to increase operational efficiency. Ensuring accurate data and forecasting can provide valuable insights that support decision-making, highlight key trends and patterns, and identify inefficiencies in processes (ABL Group, 2023). Additionally, another crucial part

of efficient material management is quality control, which ensures that the materials received fulfill the requirements (ABL Group, 2023). ABL Group (2023) argues that by prioritizing quality control companies prevent many risks and problems related to poor quality materials. Finally, the fifth best practice includes implementing a consistent process across all teams, which allows smoother and more streamlined workflow, reduces the chances of mistakes, and makes it easier to train new employees (ABL Group, 2023).

2.3 Strategic Decision-Making in Material Management

Strategic decision-making is an approach where the decisions are made based on company's long-term objectives, internal and external variables, market conditions, and other considerations (Quantive, n.d.). The key characteristics of Strategic decision-making include long-term impact, significant resource allocation, involvement of higher management levels, goal alignment and influence on competitive advantage (Vizologi, 2023). In the article (Vizologi, 2023) one describes these characters as follows: Long-term impact is crucial to strategic decisions, which extend beyond immediate ad- vantages and form an organization's future (Vizologi, 2023).

Recourse allocation includes analysis how and where company should allocate the resources, and it is one of the most important aspects in strategic planning (Vizologi, 2023). Vizologi (2023) also believes that involving the higher management is crucial because it guarantees alignment with the organizational goals. Their direct participation on the decision-making process frequently gives the decisions a strategic edge, utilizing their knowledge to guide the decisions in the best possible direction (Vizologi, 2023).

One can consider the decisions effective when they align with the organization's overall goals (Vizologi, 2023). The congruence efficiently directs efforts and resources towards accomplishing the main goals by guiding initiatives in a single direction (Vizologi, 2023).

With successful strategic decisions company can reinforce its competitive advantage significantly, according to Vizologi (2023). It is stated that through innovations and strategically placed market entrants' company can distinguish itself from the competitors (Vizologi, 2023).

2.4 Data Analytics and Reporting in Supply Chain Management

The term "data-driven decision-making process" involves collecting data, identifying trends and facts inside the data, and using those facts to draw conclusions that affect decision-making (Joubert, 2024). With this process organizational decisions are based on factual data rather than just intuition or observation (Joubert, 2024). It is obvious that without data the biases and false assumptions can impair judgement and result in poor decision-making (Joubert, 2024). Joubert (2024) considers identifying data sources, organizing the data, performing statistical analysis and drawing conclusions based on the findings as the key principles in Data-Driven decision-making process.

2.4.1 Role of Data Analytics and reporting tool in operational efficiency and strategic decision-making

Riipa (2025) describes operational efficiency as a critical factor in an organization's success which encompasses the optimization of internal processes to maximize productivity and minimize costs. Additionally, Riipa (2025) states that by utilizing Data Analytics, organizations can strengthen their competitive position in the market to generate notable gains in cost-effectiveness, agility, and efficiency.

Data Analytics plays a key role in this area, identifying inefficiencies, streamlining workflows, and improving supply chain management. With advanced data an organization can analyze production data for instance to detect bottlenecks in manufacturing processes which enables the implementation of lean methodologies to the processes (Riipa, 2025). In addition, real-time data derived from IoT sensors allows organizations to reduce downtime and maintenance costs by preparing equipment

failures and schedule timely maintenance more efficiently. In warehousing, data-driven insights ease the optimization of inventory levels which ensures the business to maintain adequate stock without overloading the capacity. In logistics, analytics improve route optimization and delivery scheduling which speeds up response times and reduces transportation costs (Riipa, 2025). Furthermore, workforce analytics help optimize resource allocation and employee performance, which raises overall operational resilience and agility (Riipa, 2025).

Riipa (2025) discovered in her research that Data Analytics significantly improved the decision-making accuracy, indicating that Data Analytics offers a strong empirical basis for strategic decisions. Additionally, organizations may eliminate biases, move past subjective judgements, and improve the dependability of their decisions by utilizing data-driven insights. Since the choices are based on measurable facts rather than personal intuition the culture of accountability and transparency is seen to grow (Riipa, 2025).

The found positive correlation between analytics maturity and profitability shows that organizations are better positioned to use data as a strategic asset, resulting in long-term profitability and a competitive advantage when they invest in Data Analytics talent and infrastructure (Riipa, 2025).

According to the study by Riipa (2025) effective data visualization eases the communication of the insights which helps the stakeholders to understand complicated information fast and make informed decisions. Additionally, real-time data processing allows organizations to respond to operational difficulties and market changes faster keeping them agile and competitive (Riipa, 2025).

Riipa (2025) found that one major obstacle to the efficient application of Data Analytics is the lack of qualified data experts. To attract top personnel and create internal analytics competencies, organizations need to engage in training and development initiatives

(Riipa, 2025). Having a strong analytics team guarantees that companies can use and manage Data Analytics tools efficiently, optimizing their operational and strategic advantages (Riipa, 2025).

To implement data analytics successfully in the organization, the strategic alignment of analytics initiatives with business objectives is important (Riipa, 2025). In order to increase the significance and effect of data driven insights, analytics initiatives need to be directly related to an organization's strategic objectives (Riipa, 2025). This helps to prioritize the analytics initiatives that yield the most value, optimizes resource allocation and maximizes return on investment (Riipa, 2025).

Riipa's (2025) research findings provide comprehensive evidence of how Data Analytics and reporting tools are found to improve the decision-making processes. This thesis try to study what are the concrete practices that companies could implement to achieve these similar improvements.

2.4.2 Overview of Power BI and its features

Power BI is a collection of software services, applications, and connectors made by Microsoft which helps to coherent unrelated sources of data into visually immersive and interactive insights (Microsoft, 2024). The data can be derived from Excel spreadsheet, or cloud-based and on-premises hybrid data warehouses. Power BI consists of different elements that are made to work together: Power BI Desktop, Service, Mobile applications, Report Builder, and Report Server (Microsoft, 2024). From figure 3 one can find the elements of Power BI and have an overview how Power BI looks like.

Figure 3. Power BI elements (Adapted from Microsoft, 2024)

Power BI contains various features that allows the user to create and share business insights in different ways (Hashemi-Pour et al., 2024). Power Query is a data mixing and transforming tool integrated data from multiple sources (Hashemi-Pour et al., 2024). Power Pivot is a data modelling tool in memory table format (Hashemi-Pour et al., 2024). Power View allows users to create and interact with the data visualizations (Hashemi-Pour et al., 2024). Power Map allows to visualize 3D geospatial data that allows predictive analytics (Hashemi-Pour et al., 2024).

Additionally, Power BI has different Data Analytics features from which the most important ones according to Hashemi-Pour et al. (2024) are AI functions, built-in connectors, Quick Insigts, standardized and extensible data schemas, customization possibilities, APIs to help integration between dashboards in other software products, Self service data preparation and Modeling view.

2.5 ERP systems and Master Data Management

Enterprise Resource Planning (ERP) systems are used to integrate the core business functions for instance procurement, manufacturing, supply chain and finance across

departments into one platform (Fathima, 2024). Master Data Management (MDM) is considered as a central hub of ERP system where all the essential business data is stored, managed and shared across teams (Fathima, 2024). The centralization of the data promotes data accuracy and transparency and helps the company in data-driven decision-making (Fathima, 2024). ERP systems consolidate and secure the data gathered from different departments and create a unified, accessible source of data for the company (Fathima, 2024). Advanced ERP systems offer real-time data integration within MDM which provides the latest and most accurate data for use (Fathima, 2024).

ERP systems bring various benefits within the company that increase the effectiveness of MDM (Fathima, 2024). Fathima (2024) describes that ERP systems ensures the data quality by validating the entered data to mitigate the anomalies before processing. Additionally, ERP systems support data standardization which is crucial in MDM by implementing catalogs and structured templates for data entries. Some ERP systems are equipped with different tools, for instance AI or digital twins which allows predictive maintenance, enhanced tracking, and timely equipment repairs (Fathima, 2024). ERP systems ensure transparency by centralizing and documenting all relevant data which helps companies for instance to comply with regulatory requirements (Fathima, 2024). Finally, ERP systems minimize the risk of human error by reducing manual interventions and automating processes (Fathima, 2024).

By integrating company’s ERP systems to reporting tools such as Power BI, company can combine data from different data sources for accessible, summarized and readable forms.

3 Methodology

3.1 Research Design

The research is conducted as a case study, and the goal is to explore the current reporting practices within the Case company and study how reporting affects the decision-making process. Additionally, the study maps the current reporting challenges and tried to find suggestions for improvement. A case study is a research model usually used to study specific subject such as organizations and generally includes qualitative methods as data collection (McCombes, 2019). As Data Analytics and reporting tools are widely used in the Case company it is chosen to use semi-structured interviews and employee survey to conduct the case study. Semi-structured interviews are used to explore the interviewee's thoughts and beliefs on a specific topic and to give the interviewee the opportunity to ask open-ended questions and generate other ideas related to the topic being discussed (Ho & Limpaecher, 2022). This approach was chosen for a broad and open description of the issue under study.

This study aims to provide the company a broad picture of the current state of Power BI reporting and to provide development suggestions that it can implement to increase the efficiency of reporting and decision-making process. The current state of reporting is assessed by reviewing available reports and documentation and interviewing employees to get comprehensive picture on how the reporting is used in decision-making currently. Current practices are compared with industry best practices, which can be utilized to assess development needs and improve reporting.

3.2 Data Collection

The semi-structured interviews were used as one primary data for the research and were conducted with nine participants with target group on the employees who are part of unit’s strategic planning and decision-making. The interviews were conducted either in person or remotely through Microsoft Teams Meeting which allowed efficient data

collection. The interviewees received a semi-structured interview questionnaire before the interview to be able to prepare themselves the preferred way. The semi-structured interviews were conducted using predefined questionnaire which was used as framework for the interview conversations. In Appendix 1 one can find the questionnaire which included a set of open-ended questions to explore the topic studied. The questions allowed for a consistent focus on the topic being discussed but also offered flexibility for the discussion and possibility for interviewees to elaborate their answers. Interviews were audio-recorded and transcribed by the researcher afterwards. Transcribing the audio allowed study the answers comprehensively and to form a unified whole. In Table 1 is displayed the interviewee data, including the interviewee job title and the duration of the interview.

Interviewee job title	**Interview duration**
Manager, Material Management	23min 48sec
Manager, Material Supply & Logistics	31min 22sec
Quality Manager, SQA	28min 11sec
Site Manager	30min 52sec
Development Manager	17min 30sec
Transport Manager	26min 50sec
Manager, Warehousing	24min 14sec
Manager, Material Supply & Logistics	13min 2sec
General Manager	23min 56sec

Table 1. Interviewee data

The second primary data source was a survey targeting employees who use Power BI reports in their work. The survey was conducted anonymously through Microsoft Forms, and it included 19 both multiple choice and open-ended questions. The questions were conducted around themes that were related to the usage of Power BI reports and their user experiences. In Appendix 2 is one can find the survey questionnaire which was

distributed to the target group by sending a link to the form via email. The survey was open for 2 weeks and got 17 responses in total. In Table 1 is presented the respondents' job title and in Figure 4 is shown how long respondents have been using Power BI reports in their current role.

Respondents' job title
Manager, material management development
Logistics Expert
Development Engineer
Logistics Expert
External Export Coordinator
Quality Manager SQA
Super User
Development Engineer
Material Coordinator
Summer Trainee
Automation & Inventory Supervisor
Process Coordinator
Summer trainee
Development Engineer
Quality Engineer
Order management / key user
Order management / key user

Table 2. Survey respondents' job title.

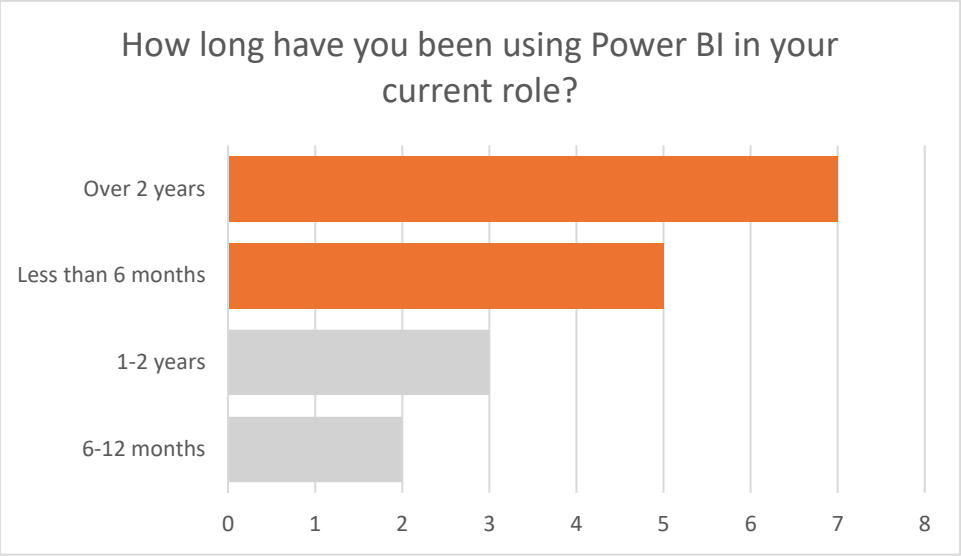


Figure 4. Survey question 2 answer ratio

In addition to interviews and a survey, a review of existing Power BI and SAP Analytics Cloud reports and reporting practices was used as secondary data collection. A review of current reports and practices was conducted to gain an understanding of the current state of reporting content and to identify potential reporting gaps. Table 2 presents the data collection methods and data analysis methods used.

Data collection	Method	Type	Note
Literature review	Qualitative	Content analysis	Theory on data-driven decision-making and data-analytics and reporting in Supply Chain Management
Semi-structured interviews	Qualitative	Thematic analysis	Interviews with employees who participate in decision-making
Survey	Qualitative	Thematic analysis	Survey for employees who use Power BI reports in their work
Data provided by the Case company	Qualitative	Content analysis	Review of current Power BI and Sap Analytics Cloud reports

Table 3. Data collection methods used in the research

As secondary data in the research one reviewed the existing Power BI and SAP Analytics Cloud reports to get a complete understanding of what reports are available in the unit and how their content align with the industry best practices. Additionally, the accessibility and easiness of use was studied to get a picture on how well user experience is taken into account in the reporting.

3.3 Data Analysis

The research data analysis was carried out as mixed-methods analysis as it used both quantitative and qualitative approaches. As data analysis method, the study used content analysis and descriptive statistics. These methods allowed one to analyze the interviews and find patterns and themes and to present survey results in a readable form. The interviews included both inductive and deductive approaches as some categories were predefined in the questionnaire to ensure the research questions and objectives were addressed. This method helped to connect the theoretical and data as it made the analysis process more systematic and linear.

The interview audios were first transcribed into text where it was possible to analyze the themes and patterns of each interviewee's answers. Survey responses were transferred to Excel for deeper analyzing including chart creation and qualitative calculations. Furthermore, both interviewee and survey answers were compared to existing literature to examine how what are the best practices in the field and what are the suggestions for the future improvements according to literature.

3.4 Data validity and reliability

The study was done as a case study approach to provide in-depth understanding of the research subject and to research the topic based on real company practices and enable the utilization of research results in practice. The data validity was ensured by reviewing the existing content that is available for the employees so that the data used and the observations made on it are derived from data that is available to the employees

themselves. The semi-structured interviews were conducted using an interview questionnaire to ensure that research questions and relevant information were addressed. The interviewees were selected based on their expertise and relevance on the research topic to ensure they had the necessary resources and ability to respond to the topics. Additionally, the survey was conducted using a carefully designed questionnaire to ensure the data validity through both closed and open-ended questions. The respondents were selected based on the knowledge on who are using reports in their work tasks to ensure that they were able to answer the questions and give input on the research topic.

The data privacy and ethical considerations were carried out carefully throughout the process. The interviews were recorded with the consent of interviewee, and the participants of the interviews and survey were anonymous and only the job title was collected. Additionally, the company name and details are not visible in the thesis, and all the internal information are cut out from the figures and documentation visible in this study.

The reliability of the data collected was done through consistent procedures. To ensure a standardized approach on all interview and survey participants the data was collected following questionnaires. The questionnaires were conducted to facilitate consistency in the data collection process and to ensure all the participants had the same base to where the answers were built. All the interviews were recorded and transcribed to ensure minimizing the risk of information loss and misinterpretation. Transparency of the data collection methods and procedures allows for reproducibility of the study, as it is possible to replicate the process.

4 Current State Analysis

This chapter includes a comprehensive current state analysis of the Case company and its reporting practices within Material Management unit. This is done to create an overview of the current state to be used as secondary data collection method on top of interviews and survey. This chapter will go over the overview of the case study organization, current reporting practices, and identified research gaps. With this analysis the second research question “Are metrics tracked through Power BI in Material Management operations aligned with industry best practices?” will be answered.

4.1 Overview of the Case Study Organization

The Case company is a Finnish technology company with over 18 000 employees and operates in over 70 countries. The organization operates in three different business divisions each divided into different segments and units. The organizational chart is illustrated in Figure 5 and focused part of the organization is marked as yellow. This thesis focuses on the Material Management unit which is part of the Delivery Centre function. Material Management includes warehousing, logistics and SQA operations, the Data Analytics and reporting which are studied in this work. The unit has its own responsible employees that focus on Power BI and other data-analytics tools which highlight the company’s focus data-analytics and that it is seen as a crucial part of the operations and their functions. As there are already professionals in the field and the know-how is

already available, adapting the findings and development suggestions made based on the research results for the organization's use can be relatively easy.

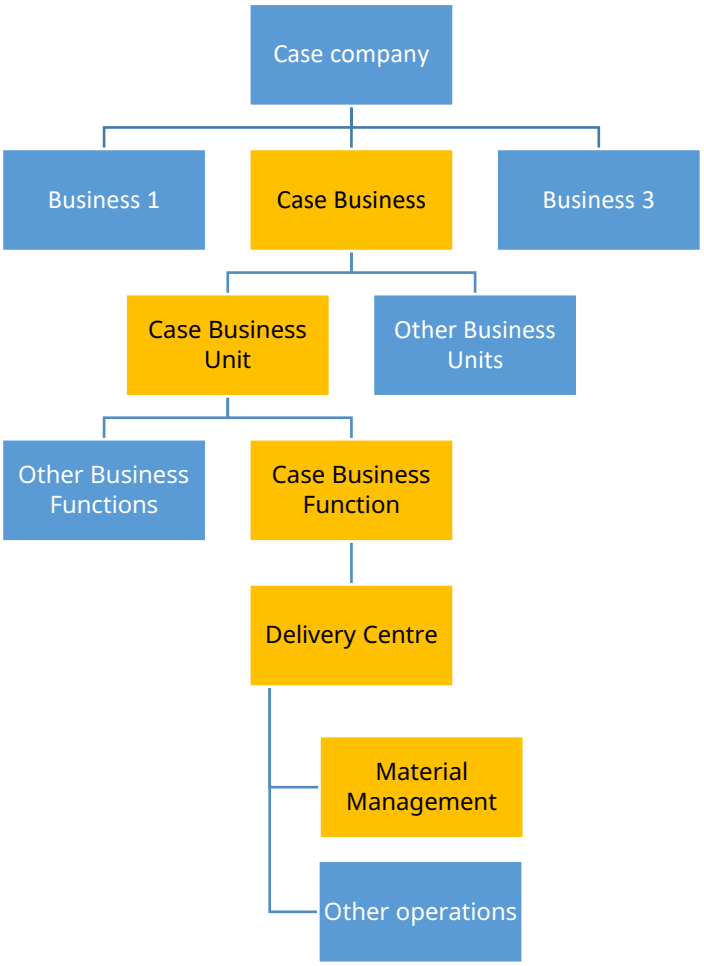


Figure 5. Simplified organization chart of Case company

4.2 Current Reporting Practices

Power BI is currently widely used in both operational and strategic work within Material Management, which is also reflected in the number of reports available. From Figure 6 one can find that currently the reports are not completely structured or divided, so

employees must scroll through a long list of different reports to get a proper picture of which processes or areas have reports available.

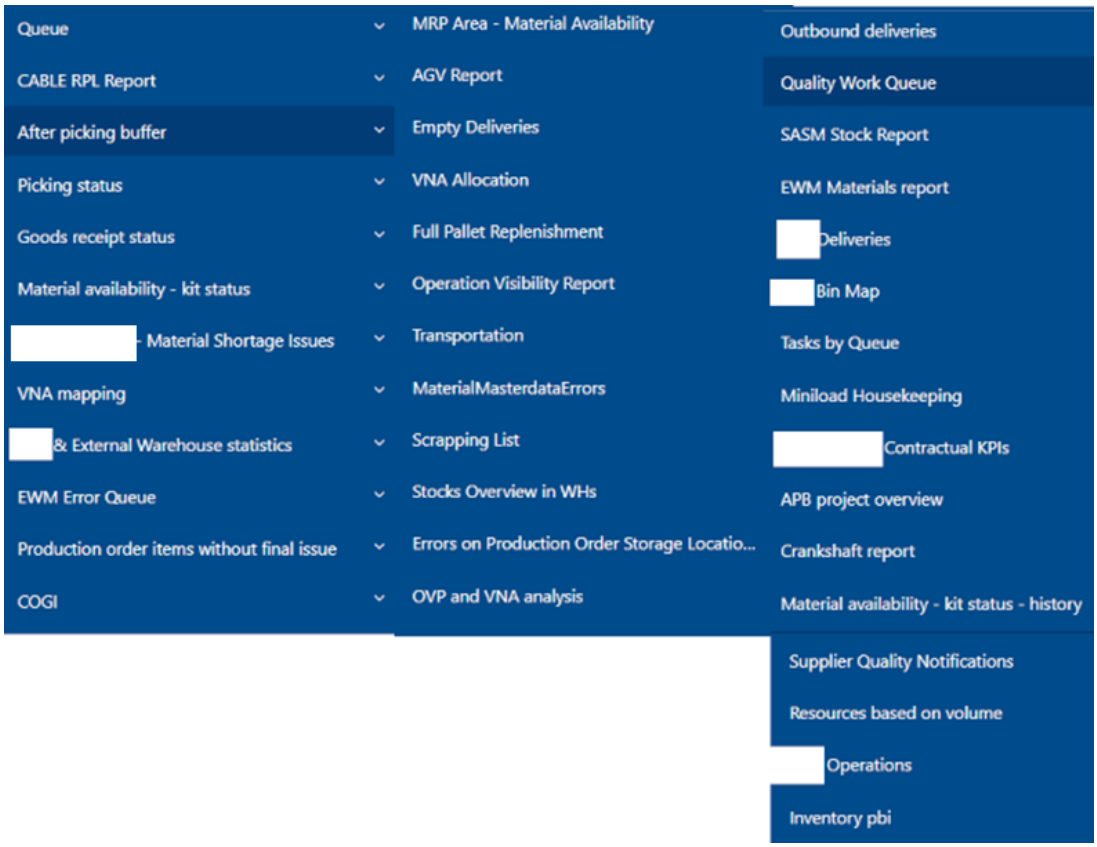
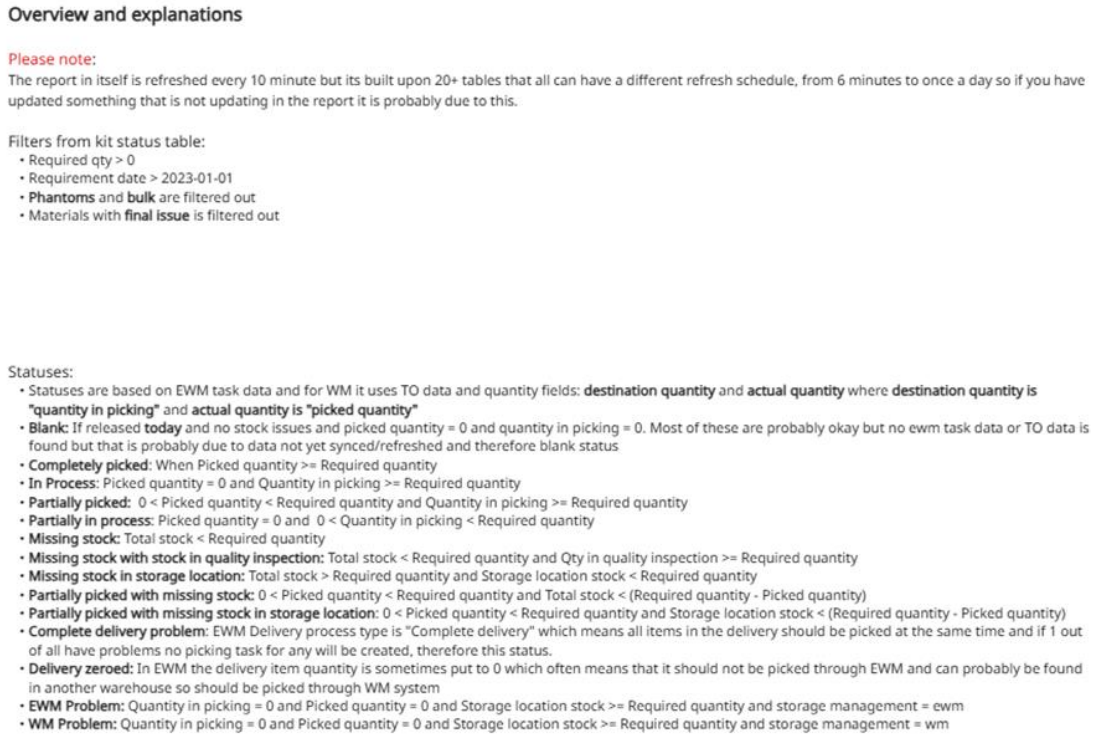


Figure 6. Majority of the current Power BI reports available in Material Management

Current reports provide wide range of different reports with different purposes, some are used to visualize data, while others are used to reduce or help manual work in operational tasks. Latter include for instance CABLE RPL Report which is used to track consumptions of specific materials and help keep material available. Additionally, several reports are used to provide data in more accessible and readable form than trying to conduct all data needed from SAP. The current reports seem to cover crucial KPIs and provide information about the unit's performance efficiently which is in line with the industry best practises. This shows that Power BI reporting has important role inside Material Management. However, it is important to examine how reports cover the

strategic needs of Materials Management and whether reports are currently being used and utilized in the best and most efficient way.

Some reports include a page that provides instructions and explanations on how the report was built and what each visualization and filter means. This is done to improve the user experience and guide the proper use of the report. Additionally, some reports such as CABLE-RPL report, have separate written instructions for using the report which aims to provide instructions on how to use the report and ensure its correct use.



Overview and explanations

Please note:
The report in itself is refreshed every 10 minute but its built upon 20+ tables that all can have a different refresh schedule, from 6 minutes to once a day so if you have updated something that is not updating in the report it is probably due to this.

Filters from kit status table:
- Required qty > 0
- Requirement date > 2023-01-01
- **Phantoms** and **bulk** are filtered out
- Materials with **final issue** is filtered out

Statuses:
- Statuses are based on EWM task data and for WM it uses TO data and quantity fields: **destination quantity** and **actual quantity** where **destination quantity is "quantity in picking"** and **actual quantity is "picked quantity"**
- **Blank:** If released **today** and no stock issues and picked quantity = 0 and quantity in picking = 0. Most of these are probably okay but no ewm task data or TO data is found but that is probably due to data not yet synced/refreshed and therefore blank status
- **Completely picked**: When Picked quantity >= Required quantity
- **In Process**: Picked quantity = 0 and Quantity in picking >= Required quantity
- **Partially picked:** 0 < Picked quantity < Required quantity and Quantity in picking >= Required quantity
- **Partially in process**: Picked quantity = 0 and 0 < Quantity in picking < Required quantity
- **Missing stock:** Total stock < Required quantity
- **Missing stock with stock in quality inspection:** Total stock < Required quantity and Qty in quality inspection >= Required quantity
- **Missing stock in storage location:** Total stock > Required quantity and Storage location stock < Required quantity
- **Partially picked with missing stock:** 0 < Picked quantity < Required quantity and Total stock < (Required quantity - Picked quantity)
- **Partially picked with missing stock in storage location**: 0 < Picked quantity < Required quantity and Storage location stock < (Required quantity - Picked quantity)
- **Complete delivery problem**: EWM Delivery process type is "Complete delivery" which means all items in the delivery should be picked at the same time and if 1 out of all have problems no picking task for any will be created, therefore this status.
- **Delivery zeroed:** In EWM the delivery item quantity is sometimes put to 0 which often means that it should not be picked through EWM and can probably be found in another warehouse so should be picked through WM system
- **EWM Problem:** Quantity in picking = 0 and Picked quantity = 0 and Storage location stock >= Required quantity and storage management = ewm
- **WM Problem:** Quantity in picking = 0 and Picked quantity = 0 and Storage location stock >= Required quantity and storage management = wm

Figure 7. Report content overview and explanations page

Majority of data in reports are sourced from SAP S/4HANA or SAP EWM. The company uses currently two data warehouses to store the existing data, Data Platform in Amazon Redshift and Enterprise Data Warehouse in Oracle Cloud. This allows the company to construct reports more efficiently, securely and easier than sourcing data manually from

SAP. Additionally, data accuracy is secured when data is sourced from data warehouses rather than manually using, for instance Excel between SAP and Power BI.

Company uses currently both Power BI and SAP Analytics Cloud as reporting tools. SAP Analytics Cloud was originally implemented in logistics and warehousing to improve overall efficiency and improve data updates, as the system is connected to SAP EWM directly and not through any data warehouse. Reports in SAP Analytics Cloud are constructed and maintained by 3rd party company which restricts reporting flexibility to some extent which is why Power BI is currently in wider use.

As discussed in literature review, the common KPIs to follow in Material Management are efficiency in goods receipt, loading dock occupancy, stock turnover rate, stockout rate, picking accuracy, backorder rate, and delivery in full on time. Currently, these and other KPIs for instance resource requirement levels, and material handling error levels can be found in the reports, so it can be stated that the reporting follows the industry best practices. However, even reporting contents cover the KPIs but are not necessarily easy to find or easily interpret. Additionally, as some of the crucial reports are in SAP Analytics Cloud, one must follow both platforms to see the whole picture of the operations.

4.3 Identified Gaps in Reporting

Through the current state analysis, one can identify some gaps in the reporting. Even though important KPIs are available in the current reports the employees might benefit from easier and clearer format. Additionally, the current report division and layout do not fully serve user friendliness as the report division does not have proper structure. Interactivity is taken into account in some reports but might have some development potential to improve user experience. Additionally, reports do not have a unified theme or template in report developers' use. By creating a template for the entire unit to use, it would help developers create a consistent starting point for new report layouts, data models, and queries, and standardize report creation (Microsoft, 2025).

5 Results and discussion

In this chapter one presents the results of the research and includes analysis of the data collected through semi instructed interviews and a survey. The results are reviewed and discussed by themes which help to conduct a comprehensive and coherent picture of the research results. Additionally, one reviews how the theoretical perspectives of the topics are aligned with the results and possible practical implementations of proposed improvements. This chapter will cover the first and third research questions: “How effective are current Power BI reports in supporting operational efficiency and strategic decision-making in material management?” and “How can Power BI reports be enhanced to better align with the operational and strategic needs of material management functions?”

5.1 Reporting content and role in decision-making

Through interviews and a survey, extensive information was obtained about the content of reporting and its role in decision-making. This chapter is divided into three different themes that were part of the interview and survey questions: reporting usage, reporting content experience, and data integration.

5.1.1 Reporting usage in Material Management

In Figure 8 is presented the answer ratio of survey question on how relevant the current reports are perceived on employees’ daily work tasks. Both survey and interview answers highlight that the reports are currently widely used in daily work tasks and found critical and relevant for operational efficiency. From the answers one can find that most of the critical KPIs that are needed in operational usage can be found from the current reports and thus the reporting contents meet the needs of employees quite well. Additionally, every interviewed manager considers the reports critical for strategic decision-making process, but the reports seem to have development potential.

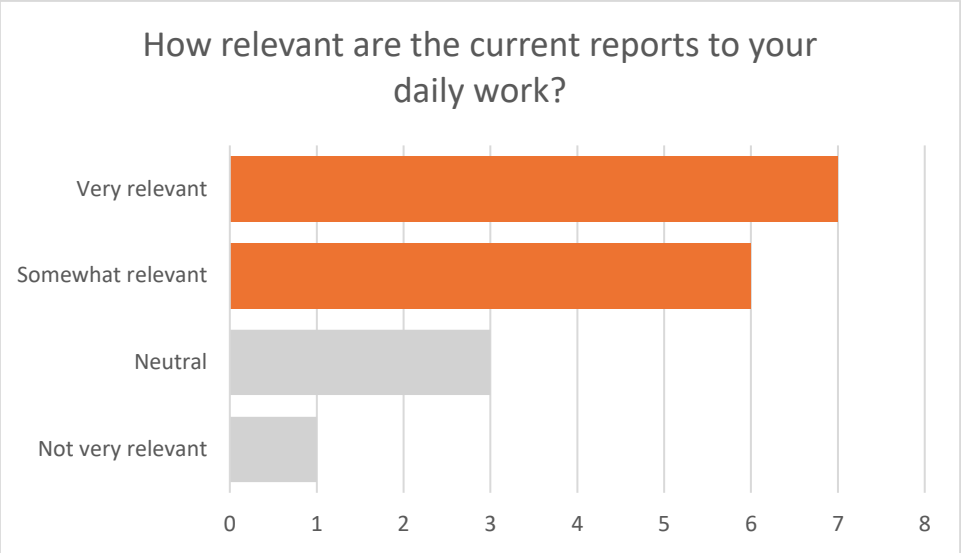


Figure 8. Survey response rate on question 11.

Currently Power BI reports are widely used for monitoring the targets set in the unit and the contractual agreements on the performance of material handling and logistics, which help with strategic decision-making. Additionally, the current reports help to monitor the overall performance of the unit, which affects for instance the annual budget assessment. It was emphasized that current reports provide excellent operational visibility in performance and KPIs, which in turn helps to see agreed efficiency and service targets.

One interviewee believes that the unit would benefit from an automation equipment impact analysis that could better illustrate the cost-benefits. If this kind of report was created it would be crucial to first determine what information is needed to be effective and supportive report for decision-making. Cost-Benefit Analysis for warehouse Automated Storage and Retrieval System (AS/RS) includes wide range of criteria according to MH Equipment (2025). The criteria include investment, operational, performance and organizational elements (MH Equipment, 2025). Usually, the Cost-Benefit Analysis is done assessing the value of implementing of a new AS/RS (MH Equipment, 2025), but it could be investigated if some part of the analysis could be added in the report. Additionally, calculating the Return of Investment (ROI) would be

one part of the report to illustrate how the automation equipment meets the expected values. According to IPEC Group (2026) almost 40% of warehouse automation projects fail to meet the expected ROI. Even though labor cost minimization has a major role in automation equipment investment, it is also crucial to review whether the investment increases the throughput, reduces errors, and increases operational agility (IPEC Group, 2026). IPEC Group (2026) divides ROI calculation into indirect and indirect cost factors that include four categories: operational expenses, implementation costs, maintenance needs, and productivity benefits. These categories include for instance labour costs, inventory accuracy, error calculations, storage usage efficiency, energy usage, implementation expenses, and maintenance (IPEC Group, 2026). These considerations would provide good ways to explore the impacts of warehouse automation and the possibilities of implementing cost-benefit analysis in Power BI within Material Management.

Couple interviewees commented that inventory tracking has been seen as an important and useful reporting item, as it would increase visibility and significantly reduce manual work. During the writing work, the inventory tracking Power BI report has been implemented to the extent possible and has met expectations and needs in that respect.

Supplier Quality Assurance is currently seen as challenging area to cover in reporting and especially how the reporting could enhance the strategic decision-making process there. It was highlighted that there is a need for reports that illustrate amount of Supplier Quality Notifications to be able to see the trends and react accordingly. Additionally, one sees that the target setting in the team would be easier if the current and upcoming state of SQA would be visible. There are many ways to analyze the SQA operations, and it would be good to review which of them would be beneficial to include in reporting within Material Management. During the writing work there are new reports taken into use within the SQA, for instance a report tracking the upcoming orders to illustrate the future workload which also shows upcoming orders with incorrect delivery information, allowing for systematic corrections before deliveries arrive. Additionally, there are

reports to illustrate the current workload and tasks open in SQA which help to monitor their number and progress through the process. These additions are exactly what the interviewees have been hoping for, and which are expected to improve both operational and strategic decision-making. One possible addition to SQA reporting would include illustration on the downtime caused by defective materials and how are the materials are managed by comparing downtime, total defect quantities and defect types (Microsoft, 2025).

Transport unit is currently using Power BI reporting very little as it is seen that the work tasks include much manual work and tasks that do not output any measurable data. Currently, there is one report in use for tracking deliveries if someone is missing shipping information and the delivery has not been made. In addition, statistics for the current and previous years, such as quantities and delivery countries, can be viewed but it is not used in strategic decision-making. Additionally, it is considered that the team's work tasks are currently mainly operational and thus do not necessarily benefit from more extensive reporting. For future development opportunities, it would be crucial to identify whether current processes allow for the creation of reports or whether there are changes that could be implemented that would benefit reporting for that segment.

5.1.2 Reporting content experience

Overall, it was considered that the current reports show the right data, but they don't necessarily illustrate or highlight the real problems needed to make strategic decisions based on the data. Additionally, interviewee mentions that the current reports do not offer proper help for root cause analysis. Thus, the reports are not found to fully support proactive planning for example to help identify bottlenecks, enhance facility optimization and reduce costs. MegaMinds Technologies (2025) describes that with Power BI companies could find inefficiencies, improve delivery timeliness, and achieve operational cost savings through different data visualizations, predictive analytics, and artificial intelligence. These are all areas where interviewees see potential for developing Power BI reporting in Material Management. Areas where one could identify bottlenecks

and improve the supply chain that would concern specifically Material Management are for instance space utilization, picking and packing process optimization, and workforce management insight(MegaMinds Technologies, 2025). Additionally, Abbacus Technologies (n.d.) mentions Power Bi's drill-down and drill-through features to improve organization's root cause analysis by allowing users to move from high-level KPIs into more detailed data with minimal effort (Abbacus Technologies, n.d.). These features and their possibilities will be discussed in more detail later in the thesis.

It was stated that forward-looking reporting is missing in many areas, which could help with decision-making, for instance workforce or equipment performance and proactive planning. Interviewees show interest and need towards more predictive and trend-based analysis to support the strategic decision-making process. It was described that currently some predictive analysis related to for instance equipment resource planning is done manually based on production volume forecasts. However, deeper predictive analysis is currently seen as challenging topic inside Material Management as it is dependent on many variables that are not possible to determine in current processes. Additionally, the accuracy of possible predictive data is seen as a challenge since in real-life predefined process might face unexpected events. Interviewees see that collaboration with other units regarding reporting is currently relatively limited, and it would be useful to examine their impact on processes and reporting accuracy. Power BI offers different built-in models to use in predictive analysis for instance Binary Prediction and Regression model (Dossier Analysis, 2024). Additionally, it is possible to train the model in Power BI to learn the patterns and relationships based on the data used which helps to minimize the errors and adjust the parameters (Dossier Analysis, 2024). However, testing and validation with sample data portion is in crucial role ensuring that the model is reliable enough for wider use (Dossier Analysis, 2024). Material Management could review whether this feature would be beneficial addition to manual calculations.

5.1.3 Data integration

Both interviewees and survey respondents highlighted that the current data updates have too low frequency and multiple tables and queries are running in parallel. As the data update capacity is low compared to what is needed it can lead to update failures. Possible failures are seen as major challenges affecting for instance the possibility to react changes on time or to completely trust the data shown in the reports. Interviewees see that more accurate data updates would be useful in workforce allocation so that changes can be made at the right time. As the update capacity is limited, interviewees and some of the survey respondents highlight that there is a need for review which reports are in use and are there reports that are not needed anymore. Additionally, one could investigate if it is possible to merge some reports that use the same data sources to enhance the efficiency.

There are multiple ways to improve the data update performance and report efficiency. For instance, appending queries in Power BI helps to improve performance and optimize queries as well as enhance data analysis and visualization (Atif, 2025). Microsoft (2025) lists best practices on efficient and reliable data refresh processes, which include for instance checking the refresh schedule to have a broader refresh window, checking whether the refresh limit is not full, optimizing the queries to only have the tables and columns that are needed for the reports, limiting the number of visuals on the dashboard, and checking whether enterprise data gateway is overloaded and there is a need for additional gateways. These practices could be good to implement in Material Management reporting to review if they would potentially improve the data update reliability.

As reviewed before, the company uses currently both Power BI and SAP Analytics Cloud as reporting tools which leads to overlapping and a bit fragmented reporting. As the data used in strategic decision-making is currently collected from multiple reports and channels some of the interviewees found it a bit laborious. It was emphasized that currently Power BI is seen more flexible and efficient for the needs as the SAP Analytics

Cloud reports are maintained by third party and the development possibilities are quite limited. One suggestion could be connecting SAP Analytics Cloud to Power BI or another way around. However, the integration can be found challenging due to data handling capabilities (Thomsen, 2024). Thomsen (2024) introduces one way to connect SAP Analytics Cloud to Power BI using Azure Data Factory (ADF) which is said to ensure minimal compute usage and cost efficiency. This could be one option to investigate whether it would benefit strategic decision-making as the data could be available in one platform.

5.2 Organizational impact and reporting culture

All the interviewees consider reports affecting their decision-making processes majorly. Data is used to support decision-making because it provides reliability and certainty compared to handling matters based solely on gut feelings. It was emphasized that one of the most important things is that decision-makers and employees who may be affected by the decisions follow the same reports and have access to the data used which creates transparency and enables decisions to be made in agreement.

Majority of the interviewed managers see improvement opportunities in sharing the insights across the unit as they are currently shared mainly only across the teams. Additionally, even though the reports are widely available for the employees, the strategic decisions made using the data are not usually clearly shared across the unit. According to Parry (2024), sharing the insights of Power BI reports shared across the team is the most crucial part of reporting. When the insights are shared effectively it enhances the decision-making as the decisions are based on a unified understanding of data (Parry, 2024). Parry (2024) highlights that it increases team engagement as employees are able to interact with data, ask questions, and give their value on insights. Additionally, sharing the content and insights increases efficiency and consistency as it prevents employees from duplicating the efforts and ensures that everybody is working with the same content (Parry, 2024).

From figure 9 one can see that majority of the survey respondents answered that they did not receive any or received only some training or guidance on the usage of the Power BI reports. In the other hand, from figure 10 one can see that majority of the users can find the information needed most of the time quickly and easily. However, better training/guidance was a recurring theme on the improvement suggestions. The current reports do not have a unified theme or template in use which might affect how easy and clear the reports are perceived to be.

Figure 9. Survey response rate on question 6.

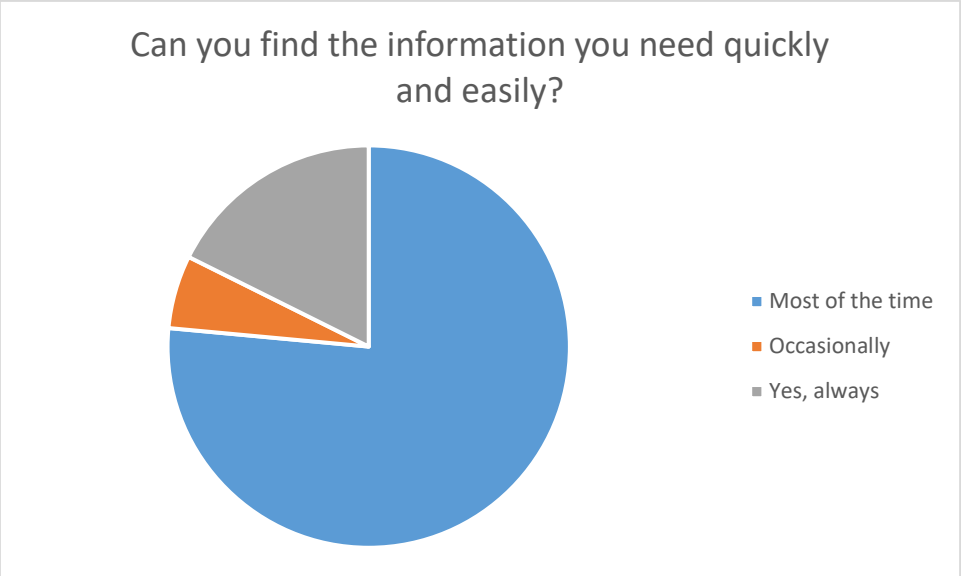


Figure 10. Survey response rate on question 10.

Jacobs (2025) describes that the top reasons why Power BI adoption fails are usually too complex report folder structures, too many reports without clear relevance, too little onboarding, and giving and receiving feedback do not coincide. With sharing the reports in correct ways organization enables collaboration and conversations between employees (Jacobs, 2025).

Microsoft offers a feature that allows organizations to embed Power BI reports in Microsoft Teams, to allow employees to find the reports more easily and interact with the reporting content (Microsoft, 2025). With this feature it is possible to for instance add the reports to Teams channels and chat to discuss about the content, create a link with preview of the shared report, dashboard, and app, start a conversation in Microsoft Teams with filtered view of the report, and use Power BI in mobile version through Teams mobile (Microsoft, 2025). Figures 11 and 12 show how sharing to Microsoft Teams is done via Power BI Service. When sharing, recipients are selected and text can be added into an optional message field.

Along the Microsoft Teams there are other sharing methods to use with Power BI. The email subscription feature, illustrated in Figure 13, makes it possible to send scheduled

and automated Power BI report messages directly to recipients' emails (Jacobs, 2025). This could include for instance a weekly snapshot of the most crucial KPIs to keep employees informed with minimal effort (Jacobs, 2025). Additionally, Jacobs (2025) introduced Power BI comment feature, illustrated in Figure 14, that allows users to start conversations directly on report visuals which could help with gathering feedback and other interactions between the users and report developers. Lastly, Jacobs (2025) mentioned Alerts that are used to notify users via email or Microsoft Teams when a specific predefined single value for instance targets reached or thresholds passed is reached. With these features Material Management could potentially streamline the way reports are distributed, improve the user experience, and facilitate user integration into reporting.

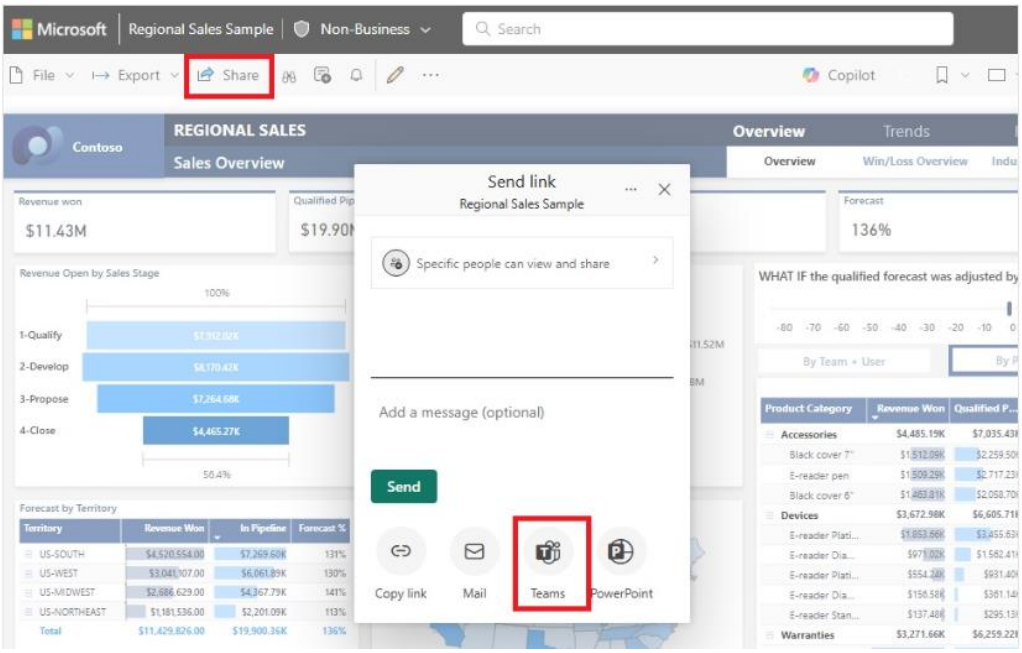


Figure 11. Sharing Power BI content in Microsoft Teams (Adapted from Microsoft, Chat in Microsoft Teams directly from the Power BI service, 2025)

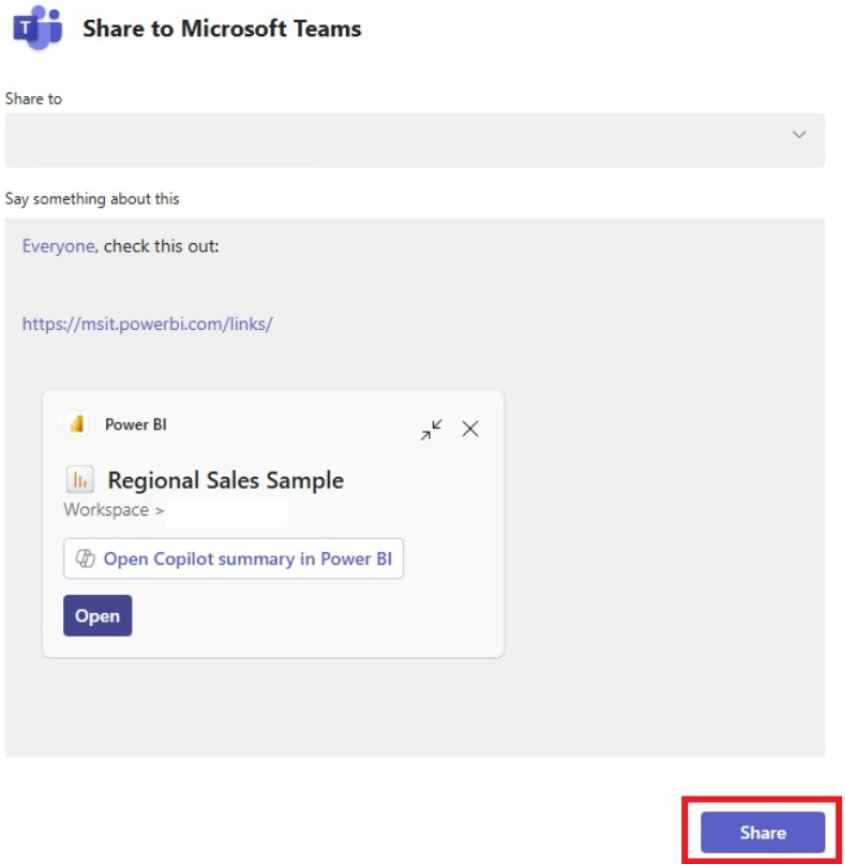


Figure 12. Sharing Power BI content in Microsoft Teams (Adapted from Microsoft, Chat in Microsoft Teams directly from the Power BI service, 2025)

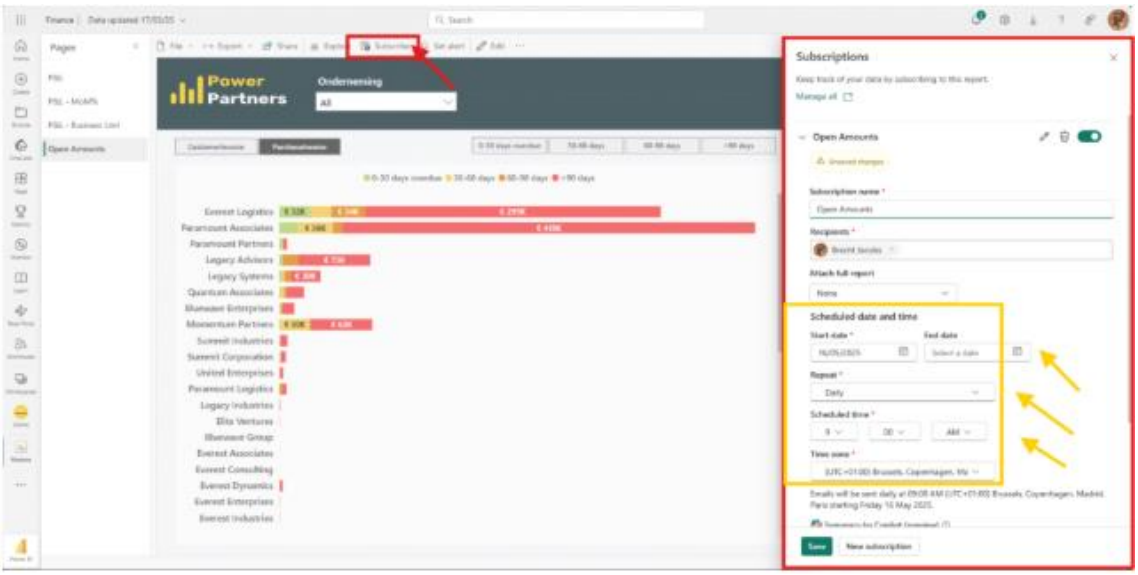


Figure 13. Power BI email subscription feature (Adapted from Jacobs, 2025)

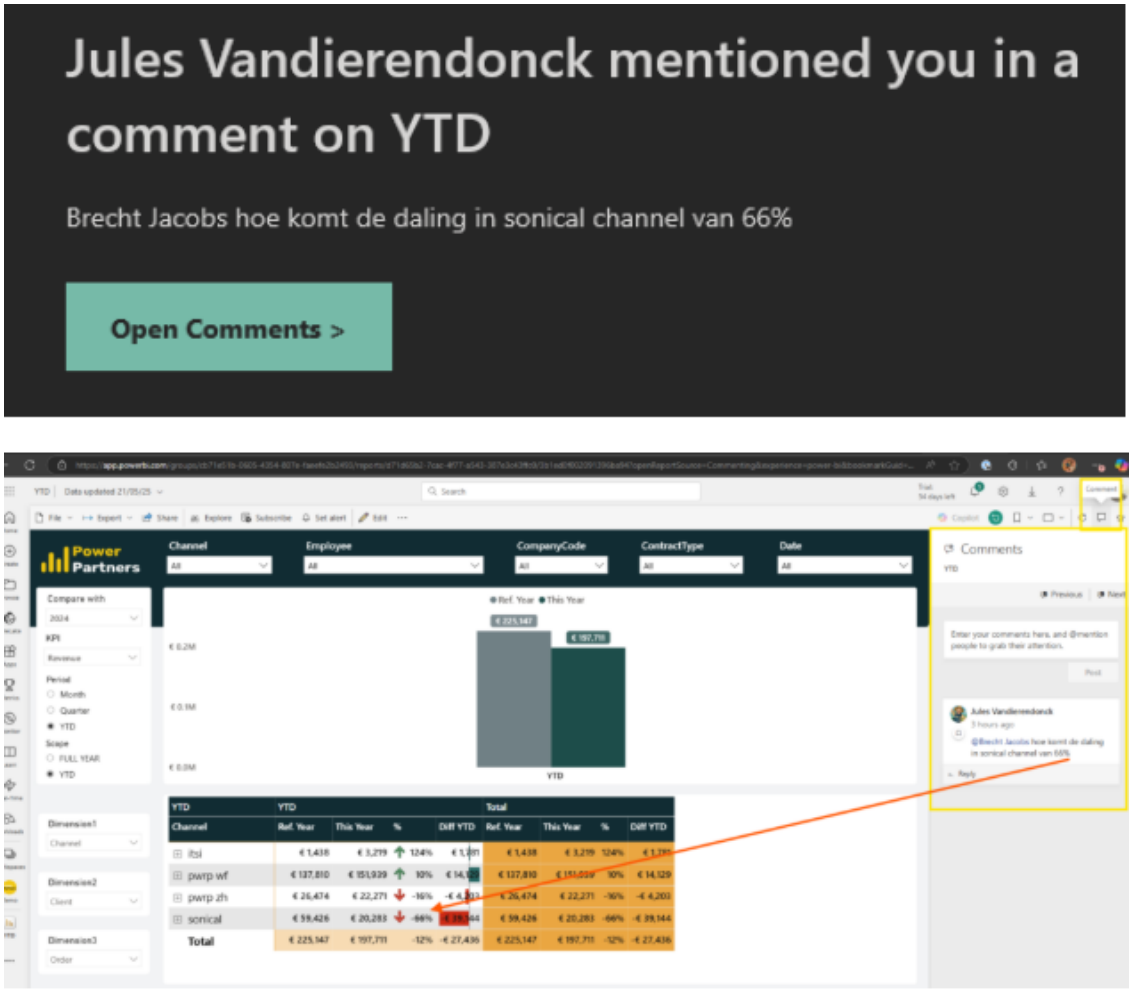


Figure 14. Power BI comments feature (Adapted from Jacobs, 2025)

5.3 Improvement opportunities

The interviewees and survey respondents had several improvement ideas on how reporting would be more effective and help operational efficiency and decision-making processes.

As the forward-looking reporting is currently missing one could investigate the possibilities for how to include predictive analysis in some reports. Interviewees indicate many areas where predictive reports could be utilized: to support the resource planning by analyzing for instance how the volumes affect the workload, what materials are

needed in the upcoming days or weeks to adjust the warehouse shelves, which materials are coming to SQA scope to adjust the needed workforce and measure equipment. It was mentioned that one would consider it possible to investigate the use of AI analytics to support Power BI usage for instance in predictive analysis using AI tools to help with forecasting. One option could be previously reviewed built-in Power BI predictive models that can be trained to learn the patterns and relationships of data used. Additionally, other option could be Microsoft Fabric which is an analytics platform that offers built-in AI capabilities to assist with data preparation, analysis, and development (Microsoft, 2025). It integrates with Microsoft Foundry which offers built-in models and tools for using Machine Learning and AI in model development, deployment, and inference (Microsoft, 2025). The system allows data imports from various different sources (Microsoft, 2025) which is needed as the Case company already has its own data warehouses in use.

Interviewees indicate that strategic decision-making would benefit from an overall Material Management performance dashboard. They describe that the dashboard could include a page where one could see the overall performance of the processes and all crucial KPIs in one glance. This could be done using Power BI dashboards, where it is possible to pin different tiles from key reports to a dashboard, where the tiles update at the same time as the underlying data (Microsoft, 2025). With dashboards, company can see all crucial metrics in one page without having to go through each report separately (Microsoft, 2025). Example of Power BI dashboard is illustrated in Figure 15.

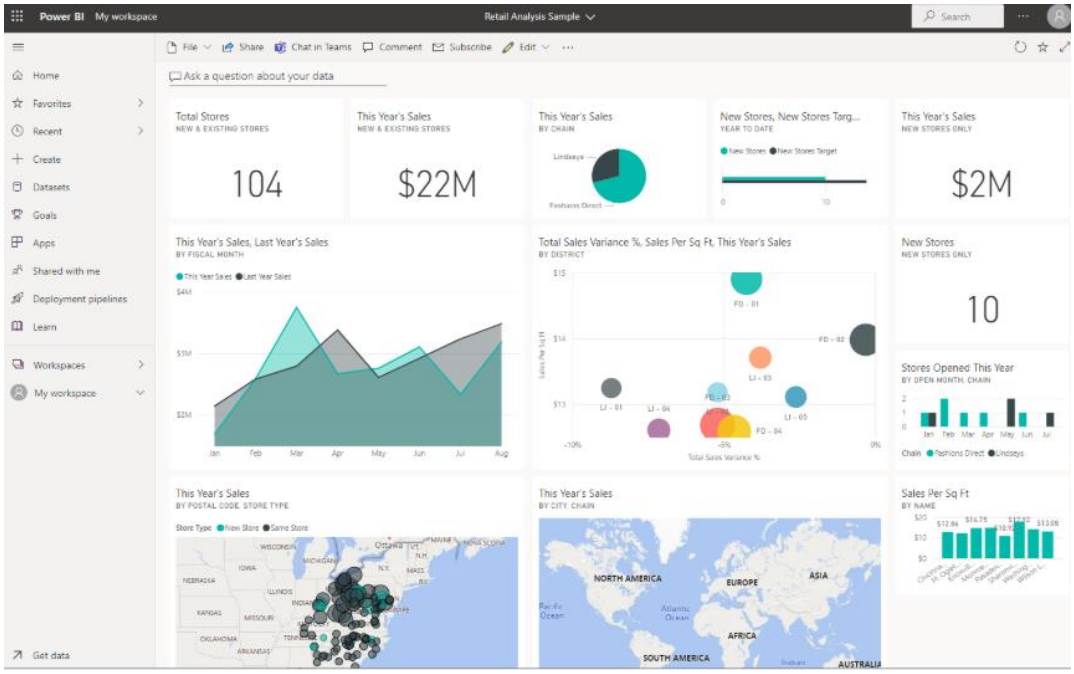


Figure 15. Power BI Dashboard (Adapted from Microsoft, Introduction to dashboards for Power BI designers, 2025)

Interviewees see that dividing reports by process and/or reporting model would improve user experience and clarity of the current Power BI application. Jacobs (2025) mentions this same topic when discussing about reasons why Power BI adoption fails which is why Material Management should focus on clarifying the report and folder division. One interviewee considers that reports could be divided into categories where the top level would be reporting for the main process, from which one could select reports for sub-processes. Power BI's Drill Through feature which is seen to enhance the interactivity of the reports and give crucial impact on data-driven decision-making process (Amachree, 2024). Along Drill Through feature, Power BI offers also Drill Down and Drill Up features to enable user to change visual's view to one level below or up (Zoomcharts, 2023). According to Zoomcharts (2023) using a Drill Down Visuals and its' built-in cross-chart filtering it is possible to improve the user-friendliness of the report as interacting with one Drill Down Visual, it will automatically affect all the other visuals. With these features user can zoom-in and out at desired data to have additional insights (Zoomcharts, 2023). Instances of drill-down and drill-up usage in the Power BI visuals include data from

department, team, and employee levels or year, quarter, month, and day levels (Zoomcharts, 2023).

From Figure 16 one can see the survey response rate on what improvements the employees would see beneficial in their work. The responses shows that employees would benefit from more rich custom filters and views in report dashboards. Zoomcharts (2023) considers Power BI filters very important, especially on reports that include a lot of data that can be confusing to handle all at once. There are different kind of levels how the filters affect the report: report level, page level, and visual level filters (Zoomcharts, 2023). Material Management should review what kind of filters would be beneficial additions for the existing reports and how they would affect the user experience.

Some of interviewees would add more data to already existing dashboards as they would benefit from more precise data. It is believed that at least logistics reporting would benefit from some smaller data additions, such as determining the status of outbound deliveries and improving the data view, for example, regarding the country of shipment. This would reduce manual work as currently employees need to open the data in SAP even the report exists.

It was mentioned that one would see developing and enhancing the mobile versions of the reports beneficial as logistics and warehousing involve a lot of work on the floor without a laptop. Power BI offers developers to create customized mobile device friendly view of a dashboard in Power BI service (Microsoft, 2025). This could be done both for existing and future reports relatively low effort as the mobile version is created automatically and the existing visuals can be adjusted to fit mobile version (Microsoft, 2025).

Better training and guidance was a second common survey answer. Additionally, simpler visualizations are seen as an improvement target which could benefit the users. Even some reports already have a guidance page but from the answers one can assume there

is a need to improve them or provide instructions and onboarding in different form. As reviewed previously, onboarding to report usage is a critical part of how well the reports are adopted in the organization. Documenting the developed report helps users to understand the report content and logic behind it, streamlines reports' maintenance and troubleshooting, ensures consistency across different reports, improves collaboration and handover, and finally, empower the users on how to use and interact with the report (Lanoue, 2025). With effective documentation technical users are able to maintain the report and business users are able to understand the content better (Lanoue, 2025). The key elements that documentation should include and that make documentation effective are high-level overview, data source information, data model explanations, and report and visualization descriptions (Lanoue, 2025). Material management could use these instances to create a documentation template for report developers, which could improve documentation consistency and thereby user experience.

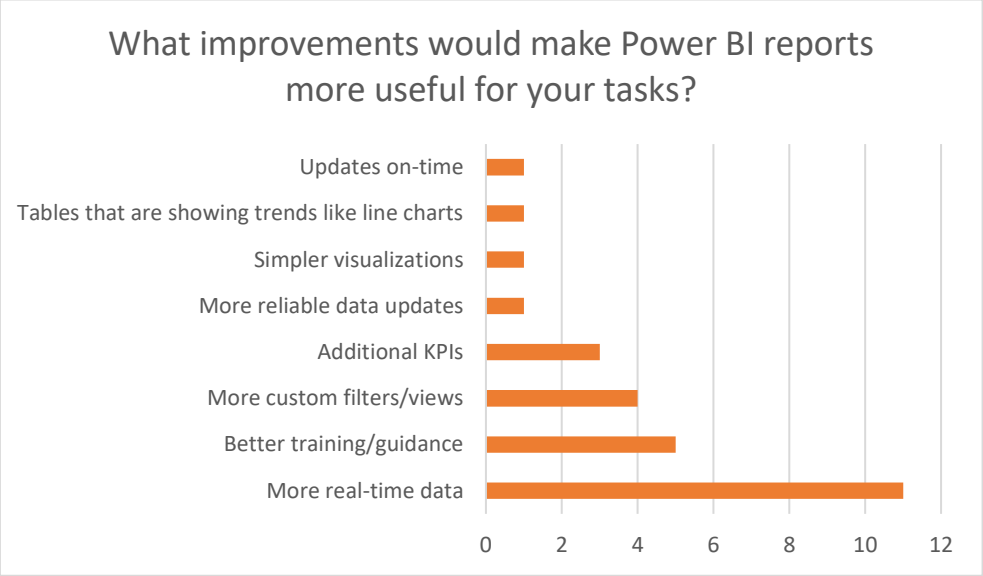


Figure 16. Survey response rate on question 17.

6 Proposed Enhancements

This chapter focuses on turning the theoretical and empirical results of the study into a concrete and actionable guidance for managers. By providing real-life implications of the research the organization can improve their operations, overcome challenges, and data-analytics practises and increase their benefits. This chapter includes summarization of key findings and specific recommendations which are divided into three categories that were the findings on the empirical study: report designs, reporting content, data integration and automation, and reporting adoption and training strategies. With these, the fourth research question “How can Power BI reports be enhanced to better align with the operational and strategic needs of material management functions?” will be covered.

Additionally, the challenges and opportunities section includes the potential scenarios that may arise when implementing the recommendations into real life as well as strategies how address them. Last section includes discussion on generalization of the findings and exploration of the extent to which the research results can be applied in different organizations and industries.

6.1 Summary of key findings

The research results show that Power BI is widely used within Material Managements operational and strategic work tasks, and it is considered a crucial part of decision-making processes. Majority of the interviewed managers and survey respondents are satisfied with the content and quantity of the reports but see development potential in their interactivity, report structures, report sharing methods, data update reliability, and training. Interactivity and custom filters were seen as a crucial aspect to help identify bottlenecks, wider root cause analysis, enhance facility optimization and reduce costs. Additionally, the respondents stressed the significance of forward-looking reports that would be found beneficial within the strategic decision-making. Majority of the

interviewees brought up the need for a Power BI dashboard where all the crucial metrics for decision-making would be available with one glance.

With the interviews and survey, it was possible to get employees to review current reporting practices and consider what is specifically missing or what challenges they face. This was a major milestone in reporting development and with the research results it is possible to create concrete recommendations for the unit to improve the reporting even further.

6.2 Recommendations

Based on the research results and discussion, one can provide concrete recommendations for improving report content, visualization, and usability. This chapter looks at future enhancements to Power BI reporting for Material Management to provide the organization with a relevant and concrete picture of how to improve reporting practises and implementation. With gap analysis one can review the specific areas where improvements can be made and see the concrete action to fill the existing gap.

6.2.1 Gap analysis

Gap analysis is done to identify the gaps between the current practises and the potential future state to be able to see what concrete actions can be made. Gap analysis provides relevant tool when reviewing what future actions could be implemented into real-life scenarios and are they able to fill the gap. In Table 4 the current state, desired state and the fap are illustrated.

Current state	Future state	Gap
Reports are not divided or structured clearly in Power BI App.	Reports are divided and have clear structure in Power BI App to enhance user experience and clarity.	Reporting practise does not have proper strategy on how the reports are divided in the Power BI App.
Reports do not provide enough interactivity and custom filters to enable proactive planning.	Reports are rich in interactivity and provide custom filters to allow users to dive into more detail in the data.	Interactivity features and custom filters are not used in their full potential.
Reports do not fully support mobile version usage.	Reports can be used also in mobile versions to enable the access when computer is not available.	Mobile versions are not created or have limited availability
Predictive analysis is not available in the reports.	Reports include forecasts to support strategic decision-making.	Predictive analysis is not done so that it could be added to reports.
Automation equipment and system impact analysis is not available in reports.	Reporting includes a section that illustrates how the automation equipment and systems meet the expected values.	Automation impact analysis is not done, or it is not available for closer monitoring.
Data updates and update capacity has reliability challenges.	Data update reliability and update capacity is improved.	System is overloaded as too many reports are updating in parallel.
Two different platforms are used for reporting.	Information is gathered easily either from integrated systems or user-friendly dashboards.	Information is gathered from two different platforms which lead in fragmented reporting.

Reporting adoption and user engagement strategy is not fully in use	New reports and insights are shared with different methods, allowing users to engage with the developers.	Reports and the insights are not shared efficiently across the unit
Documentation of the reports and training are not enough for the needs	Report documentation is in use and users are offered extensive training for the report usage	Report documentation and proper training is missing

Table 4. Gap analysis

6.2.2 Redesigning Power BI reports and app

As reviewed previously, the research results broadly demonstrate how Material Management would benefit from improving the visualization and usability of Power BI reports as well as the content itself.

First suggested improvement is to clarify the report and folder division within Material Management Power BI reporting. One option could be dividing the reports into categories where the top level would be reporting for the main process, from which one could select reports for sub-processes. Another way could be to divide reports according to processes, which would clarify which reports have been created for that process. Additionally, unified theme or template is suggested to take into use to ease the development of new reports and improve the user experience.

As reviewed previously, to enhance the interactivity of the reports as well as decision-making processes drill through, drill-down and drill-up features are available in Power BI that could be implemented at least into reports that contain a large amount of data and visuals. With these features the users can dive in in more detailed data just by clicking the visuals and thus keep the main report clean and readable form as it is not completely filled with information. Additionally, based on the interview answers, Material Management could benefit from adding Dashboards alongside normal reports. Power BI

Dashboards allow one to pin different key metrics from reports into tiles where users can view all important metrics at a glance, improving decision-making and user experience. Lastly, creating mobile versions of Power BI reports could improve the user-friendliness by providing an easy-to-use format for, for instance, warehouse workers who do not have access to a computer for all their work tasks.

6.2.3 Aligning Reporting content with Operational and Strategic needs

According to research results Material Management's current reports fulfill the crucial KPIs that are needed in both operational and strategic decision-making. However, there are few improvement suggestions that could enhance the transparency and decision-making processes overall. Based on the interviews Material Management could develop reporting on Cost-Benefit Analysis for warehouse Automated Storage and Retrieval System (AS/RS) to explore how the adopted systems impact on labor costs, throughput, errors, and operational agility. The report could include different information about Cost-Benefit Analysis and Return on Investment (ROI) to illustrate how the automation equipment and systems meet the expected values.

Predictive analysis had a major part in interview answers which is why Material Management should review the possibilities how predictive analysis could be implemented into reports in the future. One option is to review whether the built-in Power BI predictive models provide any significant assistance in creating forecasts. Additionally, reviewing Microsoft Fabric platform which also offers built-in Artificial Intelligence capabilities to assist with data preparation, analysis, and development. Material Management could start with reviewing and training these built-in models and then moving into testing and validating the data retrieved from the models.

6.2.4 Integration with SAP and Data Automation

Research results show that currently Material Management has challenges with data updates and the update capacity as the system is overloaded. To improve the data

integration one can suggest the organization to review the refresh schedule to possibly make it broader, check whether the refresh limit is full, cleaning the queries to have only the necessary data loaded into the report, checking the number of visuals used and if they can be reduced, and checking whether the enterprise data gateway is overloaded and if there is a need for additional gateway. Additionally, it is suggested to review whether all the current reports are needed and in use and if some could be combined.
As previously reviewed, Material Management collects data from multiple sources and reports from Power BI and Sap Analytics Cloud. To improve the decision-making process, it is suggested to review whether it is possible to connect SAP Analytics Cloud to Power BI or another way around to enable reporting to be found on one platform. One option could be using the Azure Data Factory (ADF), which is said to ensure minimal computing and cost efficiency.

6.2.5 Reporting adoption and training Strategies

Reporting adoption and training had a major part in the research results. Based on the results it is suggested that Material Management would improve the strategy on how the Power BI reports and the insights retrieved from them are shared across the unit and how to improve the training and guidance on the usage of the reports. With these it is possible to get the most out of the reports, improve the user engagement, and enhance the collaboration between the report developers and end users. Documenting the reports has a crucial role in improving the user experience and it helps with troubleshooting and possible handover as the information about how the report is constructed is available to others than the developer. It is suggested that Material Management creates a documentation template that could include all the key elements needed to make the documentation effective: high-level overview, data source information, data model explanations, and report and visualization descriptions. Additionally, it is suggested that developers would include a guide on how to use the report and possibly add go-through video or explanations for users.

Another aspect to consider is how reports and the insights are shared within the unit. There are multiple ways to enhance the sharing and Material Management could try which of them would benefit their needs. Power BI reports can be embedded into Microsoft Teams to allow users to get notified about new reports and start own conversation about each report. Additionally, Power BI has a comment feature which allows users to comment, for instance reporting content or sending improvement ideas directly in the application. This could possibly improve the user engagement and allow for feedback and questions to be received collectively within one platform, rather than only through private messages or face-to-face. Power BI offers an email subscription feature which is an easy and low effort way to share insights and information about reports to chosen recipients. Additionally, it is possible to send notifications to users via email or Microsoft Teams about specific predefined values which is good option when there are for instance targets that users want to follow.

6.3 Limitations

There might occur several challenges when implementing the suggested enhancements. Material Management should try to prepare for these and develop alternative plans in case some of the recommended actions are not possible to implement in their operations. As always, changes require resources, most significantly personnel, time and money. Additionally, changes may generate differing opinions among users, which is why it is important to test different options and find ways that are right for the organization in question. Overcoming these challenges, it is crucial to be transparent about the change process, the reasons behind the changes, and their effects on the users.

As the company already has professionals working on the topic of Data Analytics and Power BI, the necessary expertise is likely already available, which increases the likelihood of successful implementation of the changes. However, it would be wise to review whether some of the changes need help or vision from third party providers. Overall, it is good to collaborate with different units and teams to ensure that all aspects, such as related data security, are taken into account.

6.4 Generalization

Even the study was made for a Case company, and the research results are conducted according to the specific company's situation, the results offer valuable insights generally on the topic of data-analytics and reporting and their part in decision-making processes. The recommended methods and strategies to improve the report development, distribution and content can be generally applied to different organizations and industries. However, it is important to remember that this study focuses on developing Data Analytics reporting in a company that already have extensive expertise in the field, which limits the results to covering the basics of reporting practices and how to get started with them. Overall, this study can be considered as a comprehensive framework that can help Case company and similar organizations to enhance the data-analytics and reporting practices to reach their full potential.

7 Conclusion

This chapter provides a summary of the research, focusing on its main topic, namely Power BI reporting practices for Material Management. This study aimed to investigate the impact of Material Management's current Power BI reporting practices on decision-making and to find ways to develop them in order to achieve the most efficient methods possible in the future. The study included both current state analysis and interviewing the users and managers to create a comprehensive picture of the reporting practices. Research results revealed gaps between the current and desired states which allowed us to create a comprehensive managerial guide and recommendations of changes. The suggestions were designed to fit the needs of this specific Case company to improve the efficiency and usability of Power BI reporting in its operations. However, the findings can be standardized in some extend and can be used as general guidance for improving the reporting within different organizations and industries.

7.1 Summary of the study objectives

Four research questions were defined to create a framework for the study and to examine and assess the research topic within Material Management. By addressing these questions, one tried to create a holistic and comprehensive understanding of the factors, challenges, practises that are experienced within Material Management. First research question was attempting to identify how the current reporting practises are obtained to be in Material Management and are they found to be effective enough for the needs to support decision-making. This research question was covered with a comprehensive literature review on the industry best practises following with current state analysis following with interviewing the decision-makers and creating a survey for report users. With the results of these methods, it was possible to answer the first research question to have a board understanding on how effective the current reporting is experienced inside Material Management. Second research question was covered by comparing the interviews and survey answers to existing literature to obtain information about do the reports cover all the crucial metrics needed for effective decision-making.

Third research question was possible to cover with analysing the current state and what are the desired changes decision-makers and other users want to achieve. This allowed one to make a board gap analysis to follow with improvement suggestions that can be adopted into the Case company's reporting practices. With the fourth research question the aim was to investigate how the gaps can be addressed and to create a comprehensive guide for Material Management managerial use to improve the efficiency of the reporting practices.

7.2 Limitations

There are a few limitations that should be considered when interpreting the research. As the research was conducted only with Material Management unit the results apply only to the operations inside this specific unit and do not take into account for instance production sides reporting related to logistics and warehousing. Therefore, one should recognize that some parts may not be fully covered in the research, which led the research results to be a bit narrowed. Additionally, deeper analysis of data integration between the ERP system and reporting tools was not covered in this research which narrowed the improvement suggestions related to enhancing the connections with the databases. Regardless of these limitations, the research results and further analysis offered a board enough guide for improvement suggestions and future planning.

7.3 Recommendations for Future Research

The findings from this thesis offer good basis for future investigations and explorations. In the future one could investigate how the suggested improvements are affecting Material Management's reporting practices and decision-making processes to explore if the implemented changes have been found effective. Additionally, it is possible to extend the research for other units and offer them guidelines for implementing the same practices into their processes. More research is needed for deeper understanding on the data connections between the ERP system and reporting tools and what are the options to improve them. This is usually company-specific information thus it is not possible to

generalize, which is why it is suggested that the organizations try to investigate the matter internally and implement the methods that suit them best.

References

Abbacus Technologies. (n.d.). *Power BI Dashboards for Distribution & Supply Chain Analytics.* Retrieved from Abbacus Technologies: https://www.abbacustechnologies.com/power-bi-dashboards-for-distribution-supply-chain-analytics/

ABL Group. (2023, 6 9). *5 best practices of effective materials management*. Retrieved from https://abl-group.com/abl/all-media/blog/5-best-practices-of-effective-materials-management/

Amachree, B. (2024, February 9). *How To Drill Through in Power B.* Retrieved from Medium: https://medium.com/@amachreevictorb/how-to-drill-through-in-power-bi-6a56536f320e

Atif, M. (2025, February 28). *Power BI Merge & Append: A Step-by-Step Guide to Combining Data.* Retrieved from Medium: https://medium.com/@matif2k13/power-bi-merge-append-a-step-by-step-guide-to-combining-data-ef17d54d5e00

Dossier Analysis. (2024, March 26). *Predictive Analysis with Power BI: A Comprehensive Guide.* Retrieved from Medium: https://medium.com/@dossieranalysis/predictive-analysis-with-power-bi-a-comprehensive-guide-05568c4d41ec

Dulub, A. (2024, 8 12). *How To Leverage AI And Data Analytics To Automate Warehouse Operations And Workflows.* Retrieved from Forbes: https://www.forbes.com/councils/forbestechcouncil/2024/08/12/how-to-leverage-ai-and-data-analytics-to-automate-warehouse-operations-and-workflows/

Fathima. (2024, 11 5). *How ERP Systems Transform Master Data Management (MDM)*. Retrieved from CODA Technology Solutions: https://www.codasol.com/erp-systems-master-data-management/

Hashemi-Pour, C., Scardina, J., & Horwitz, L. (2024, 03). *What is Microsoft Power BI? Uses, features and guide.* Retrieved from TechTarget:

https://www.techtarget.com/searchcontentmanagement/definition/Microsoft-Power-BI

Ho, L., & Limpaecher, A. (2022, April 6). *Semi Structured Interviews*. Retrieved from Delve: https://delvetool.com/blog/semi-structured

IPEC Group. (2026, January 29). *The Complete Guide to Warehouse Automation ROI: Strategies for Implementation and Financial Impact.* Retrieved from IPEC Group: https://ipec-group.com/the-complete-guide-to-warehouse-automation-roi-strategies-for-implementation-and-financial-impact/

Jacobs, B. (2025, May 28). *Sharing is Caring: How to strategically drive Power BI adoption.* Retrieved from Power Partners: https://powerpartners.pro/en/sharing-is-caring-how-to-strategically-drive-power-bi-adoption/

Jenkins, A. (2023, October 24). *The Essential Logistics KPIs & Metrics You Need to Track.* Retrieved from Oracle NetSuite: https://www.netsuite.com/portal/resource/articles/inventory-management/logistics-kpis-metrics.shtml

Jenkins, A. (2024, 12 3). *What Is Materials Management?* Retrieved from NetSuite: https://www.netsuite.com/portal/resource/articles/inventory-management/materials-management.shtml#:~:text=The%205%20R's%2C%20or%20“rights,%2C%20efficiency%2C%20and%20customer%20satisfaction.

Kapiszka, A. (2025, 1 27). *The LIFO principle: How to optimise warehouse management?* Retrieved from Foodcom S.A.: https://foodcom.pl/en/the-lifo-principle-how-to-optimise-warehouse-management/#:~:text=The%20LIFO%20principle%20means%20issuing,%2Dof%2Ddate%20older%20goods.

Lanoue, S. (2025, April 15). *How to Document Power BI Reports.* Retrieved from The Bricks: https://www.thebricks.com/resources/guide-how-to-document-power-bi-reports

McCombes, S. (2019, May 8). *What Is a Case Study? | Definition, Examples & Methods.* Retrieved from Scribbr: https://www.scribbr.com/methodology/case-study/

MegaMinds Technologies. (2025, March 10). *How Power BI helps logistics companies identify and eliminate bottlenecks?* Retrieved from Megaminds Technologies: https://megamindstechnologies.com/blog/power-bi-helps-logistics-companies-identify-and-eliminate-bottlenecks/

MH Equipment. (2025, August 27). *A Cost-Benefit Analysis of Warehouse AS/RS Solutions.* Retrieved from MH Equipment: https://www.mhequipment.com/blog/a-cost-benefit-analysis-of-warehouse-as-rs-solutions/

Microsoft. (2024, 03 22). *What is Power BI?* Retrieved from Microsoft: https://learn.microsoft.com/en-us/power-bi/fundamentals/power-bi-overview

Microsoft. (2025, June 26). *Chat in Microsoft Teams directly from the Power BI service.* Retrieved from Microsoft: https://learn.microsoft.com/en-us/power-bi/collaborate-share/service-share-report-teams

Microsoft. (2025, 12 12). *Collaborate with Power BI in Teams.* Retrieved from Microsoft: https://learn.microsoft.com/en-us/power-bi/collaborate-share/service-collaborate-microsoft-teams

Microsoft. (2025, 10 22). *Create and use report templates in Power BI Desktop*. Retrieved from Microsoft: https://learn.microsoft.com/en-us/power-bi/create-reports/desktop-templates

Microsoft. (2025, January 12). *Introduction to dashboards for Power BI designers.* Retrieved from Microsoft: https://learn.microsoft.com/en-us/power-bi/create-reports/service-dashboards

Microsoft. (2025, January 11). *Optimize a dashboard for mobile phones with Power BI.* Retrieved from Microsoft: https://learn.microsoft.com/en-us/power-bi/create-reports/service-create-dashboard-mobile-phone-view

Microsoft. (2025, 11 9). *Supplier Quality Analysis sample for Power BI: Take a tour.* Retrieved from Microsoft: https://learn.microsoft.com/en-us/power-bi/create-reports/sample-supplier-quality

Microsoft. (2025, 12 20). *What is Microsoft Fabric?* Retrieved from Microsoft: https://learn.microsoft.com/en-us/fabric/fundamentals/microsoft-fabric-overview

Microsoft. (n. d.). Kuvatekstin lisääminen kuvaan. *Microsoft Tuki*. Retrieved from https://support.microsoft.com/fi-fi/office/kuvatekstin-lis%C3%A4%C3%A4minen-kuvaan-bb74994c-7f8b-457c-be85-92233177a356

Overvest, M. (2025, 4 24). *Supplier Quality Assurance — Key Components Explained*. Retrieved from Procurement Tactics: https://procurementtactics.com/supplier-quality-assurance/#:~:text=Supplier%20Quality%20Assurance%20(SQA)%20is,with%20the%20necessary%20quality%20standards.

Parry, A. (2024, December 9). *Unleashing Business Insights with Power BI: Collaborating, Sharing, and the Future of BI.* Retrieved from Medium: https://medium.com/learning-data/unleashing-business-insights-with-power-bi-collaborating-sharing-and-the-future-of-bi-65986e894320

Putra, K. B., Dachi, V. N., & Muda, I. (2021). Management material as a core of supply chain management. *International Journal of Multidisciplinary Research and Growth Evaluation*, 322-324.

Quijano, J. (2024, 7 29). *What is Outbound Logistics and How Does it Work?* Retrieved from Transvirtual: https://www.transvirtual.com/blog/outbound-logistics/

Riipa, M. B. (2025). Role of Data Analytics in Enhancing Business Decision- Making and Operational Efficiency . *International Journal of Communication Networks and Information*.

Roser, C. (2019, February 19). *Delivery Sequences: FIFO, LIFO, and Others.* Retrieved from AALean: https://www.allaboutlean.com/fifo-lifo-etc/

Thomsen, M. (2024, June 19). *Connecting SAP Analytics Cloud to Power BI Using Azure Data Factory.* Retrieved from SAP Community: https://community.sap.com/t5/technology-blog-posts-by-members/connecting-sap-analytics-cloud-to-power-bi-using-azure-data-factory/ba-p/13726747

Tiwari, V. (2024). Role of Data Analytics in Business Decision Making. *Knowledgeable Research A Multidisciplinary Journal* , 18-27.

Zijm, H., Klumpp, M., Regattieri, A., & Heragu, S. (2019). *Operations, Logistics and Supply Chain Management.* Springer.

Zoomcharts. (2023, February 22). *Filters in Power BI: Everything You Need to Know.* Retrieved from Zoomcharts: https://zoomcharts.com/en/microsoft-power-bi-custom-visuals/blog/filters-in-power-bi-everything-you-need-to-know

Joubert, S. (2024, October 21). Data-Driven Decision Making: A Primer for Beginners. Retrieved from Northeastern University: https://graduate.northeastern.edu/resources/data-driven-decision-making/

Twin, A. (2024, August 22). KPIs: What Are Key Performance Indicators? Types and Examples. Retrieved from Investopedia: https://www.investopedia.com/terms/k/kpi.asp

Mecalux. (2022, February 25). 9 warehouse KPIs to measure logistics management . Retrieved from Mecalux: https://www.mecalux.com/blog/warehouse-kpis

Quantive. (n.d.). What Is Strategic Decision Making? Why Strategic Decisions Can Make Or Break Your Business. Retrieved from https://quantive.com/resources/articles/strategic-decision-making

Vizologi. (2023, December 13). Exploring the 5 Key Characteristics of a Strategic Decision. Retrieved from https://vizologi.com/exploring-key-characteristics-of-strategic-decision/

Appendices

Appendix 1. Interview guide

Target group: Managers who use Power BI for strategic planning and decision making

Purpose: Explore how Power BI supports high-level decisions, identify gaps, and understand improvement opportunities from a managerial point of view

Background information:

1. What is your current role or job title?
2. What is your area of responsibility in the unit's decision-making?

Section 1: Role of reporting in your strategic decisions

1. What strategic decisions do you support with Power BI reports?
2. How critical are current Power BI reports for strategic planning in the department?
3. Are there reports you rely on regularly? Which ones? Why?

Section 2: Reporting content and alignment with strategy

1. Do the current reports reflect our key strategic goals?
2. Are any essential metrics or KPIs missing from the current dashboards?
3. Do you find that operational reports (used on daily tasks) align well the strategic overview you need?

Section 3: Improvement opportunities

1. What changes or additions would make the reports more useful for strategic decision-making?
2. Do you see a need for different levels of reporting (e.g. Tactical vs strategic vs operational)?
3. Would you benefit from more predictive or trend-based analytics in reports?
    - Which ones and how would you benefit?

Section 4: Organizational impact and reporting culture

1. How do Power BI reports influence decision-making process at the management level?
2. Are the insights shared across teams or departments? How could this be improved?
3. Do you feel that current reports support proactive planning and process optimization?

Final thoughts:

1. What future capabilities or improvements would you like to see in Power BI reporting at your organization

Appendix 2. Survey questionnaire

Section 1: Background information

1. What is your current role or job title
2. How long have you been using Power BI in your current role?
    - Less than 6 months
    - 6-12 months
    - 1-2 years
    - Over 2 years

Section 2: Usage and Frequency

1. How often do you use Power BI reports?
    - Multiple times a day
    - Daily
    - Weekly
    - Rarely
2. Which reports do you use in your work tasks? (List the names of reports)
3. What types of tasks you use Power BI for? (for instance Order picking/processing or Inbound/Outbound delivery follow-up)

Section 3: Usability and Accessibility

1. Did you get any training/guidance on the usage of the reports?
    - Yes
    - Some
    - No
2. Do you think the training/guidance is available when needed?
    - Yes, always
    - Usually
    - Sometimes
    - Rarely
    - Never
3. How would you rate the overall usability of Power BI reports?
    - Very easy to use

- Somewhat easy
- Neutral
- Difficult
- Very Difficult

4. Are the reports updated frequently enough for your needs?
    - Always
    - Usually
    - Sometimes
    - Rarely
    - Never
5. Can you find the information you need quickly and easily?
    - Yes, always
    - Most of the time
    - Occasionally
    - Rarely
    - No, never

Section 4: Report Content and Relevance

1. How relevant are the current reports to your daily work?
    - Very relevant
    - Somewhat relevant
    - Neutral
    - Not very relevant
    - Not relevant at all
2. Which key performance indicators (KPIs) are most useful for your work? (for instance, goods receipt status, picking accuracy, backorder rate, or delivery in full on time etc.)
3. Are there any important metrics missing from the current reports you use?
    - Yes, please specify in the next question
    - No
4. If you selected yes in previous question please specify here

5. Are the visualizations (charts, tables, filters, etc.) easy to interpret?
    - Yes
    - Somewhat
    - No, please explain in next question
6. If you selected no in previous question please specify here

Section 5: Improvement Areas

1. What improvements would make Power BI reports more useful for your tasks? (You can choose multiple)
    - Simpler visualizations
    - More real-time data
    - Additional KPIs
    - More custom filters/views
    - Better training/guidance
    - Other
2. If you selected Other in previous question please specify here
3. Any other suggestions for improvements?