Reports and dashboards for technical helpdesk

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Some refer to data as the backbone of society. Even though data is present everywhere, in its unprocessed form it can be quite meaningless. Data analysis is necessary, to transform data into information and to gain knowledge.

Reports and data visualizations are examples of data analysis, that aim to deliver information. Both are beneficial in transforming data into understandable and efficient formats. Dashboards collect visualizations to one interface and allow presentation of numerous metrics at once, for instant monitoring.

This thesis was commissioned by Verifone Finland Oy. Within the organization, the technical helpdesk agents had several needs for reports and accessible support data. Thus, reports and dashboards were designed, produced and implemented for their use with Salesforce, a customer relationship management (CRM) system.

Production was completed according to agile principles, with aspects of scrum and lean frameworks. The final product consisted of two parts, the 11 reports and 1 dashboard, where each report was visualized as a graph.

The reports and dashboard scored favorable feedback from the agents (users), as evidenced by the results of the user feedback survey. Users rated the product highly on all metrics of accuracy, efficiency, understandability and ease of use.

Key words
Data, reporting, dashboards, data visualizations, Salesforce

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1 Introduction

Data has become a very important tool in the modern world, some referring to it as the “backbone of today’s digital economy” (Martinez, 2024). With the ever-increasing capabilities for data collection, storage and processing, the use of reported and visualized data for data-driven decision making has increased as well (Engebretsen & Kennedy 2020, 19).

At Verifone Finland Oy, technical helpdesk agents had no access to data about support requests or customer activities. This needed to change, because of how important data is for decision-making in the modern world. Having easy access to customer support data was needed to increase team responsivity to rising problems, notice emerging trendlines and help with predictive analysis.

One low-cost tool to do that is Salesforce. Salesforce is a customer relations management (CRM) system, that was already in use at Verifone Finland Oy. The CRM system can be used to note down and track all customer activities in one place. Salesforce has many internal tools to create reporting and visualizations of customer data, such as Salesforce Reports and Salesforce Dashboards.

Dashboards are visual representations of data collected to one page. Within Salesforce, visualizations such as charts or figures are based upon reports that are made up of both user input and system data.

Therefore, Salesforce was used to create reports based on team and individual level data and these reports were visualized as figures in the dashboard tool. The aim of this thesis was to research principles and practices applicable to quality reporting and dashboards. The reporting and data visualizations produced needed to be accurate and usable, and most of all, enhance helpdesk agent’s toolkit.

1.1 Salesforce glossary

As the outcome was completed solely with one system, explanations for system-specific terms used throughout the thesis are quite necessary.

Salesforce is a customer relationship management (CRM) system (Salesforce s.a. a.). Salesforce, at its core, is a system to store and manage structured data in an Oracle powered relational database (Grax 21 October 2024). A relational database stores data in a table format, as columns and rows (Google cloud s.a.). In Salesforce terms, the tables of a relational database are called ‘objects’, rows are ‘records’, and columns are referred to as ‘fields’ (Grax 21 October 2024).

Salesforce consists of multiple different applications. One of these is the Salesforce Service Cloud, that is dedicated to customer service and support. Within the Service Cloud, the Service Console is the interface through which agents work. Cases, reports and dashboards are some of the console apps within the Service Cloud. (Awati October 2024)

A case in Salesforce is a standard object, created to store information about a particular support request. It's one of the core tools within Salesforce's service cloud (Salesforce Help s.a. a.). Every time a new support request is received through email, the system creates a new case record with its own case data. Support agents can also manually create new case records.

A case record type determines the case layout, data fields and the possible picklist values (O'Leary 11 January 2023). A data field can ask for freely written user input or to urge the user to choose a value from a pre-defined set of values, within Salesforce referred to as a picklist (Sonar s.a.). For Verifone support team, there are two case record types, differentiated based on product line. When manually creating a new case, choosing the case record type is the first step, as this defines the available data fields and values within the case. When the system creates a new case, a record type is chosen based on pre-set settings (Salesforce Help 2024).

Case ownership means a case can be owned by a user (an agent) or a queue. Typically, a case that is owned by a user means it is or has been worked on. A case owned by a queue either has not received agent attention yet or has been shared for an another agent to pick up. A queue is essentially a holding space, listing open cases requiring user action. (Mazalon 27 August 2022). If case ownership needs to be changed, from user to another user, user to queue or vice versa, it can be done through assigning case ownership (Salesforce Help s.a. b.).

1.2 Presenting Verifone Finland Oy

This thesis was commissioned by Verifone Finland Oy. Verifone Finland Oy is the Finnish branch of Verifone, Inc. that is a global organization providing merchants with payment terminals, eCommerce payment solutions, acquiring services and reporting tools (Verifone s.a.).

Verifone was founded in Hawaii in 1981. The name of the organization derives from its first product, the verification telephone. Since the beginning, Verifone has operated in the card payments industry. (Funding Universe s.a.) In 2025, Verifone operates in 165 countries around the world, processing over 8 trillion USD in annual transaction volumes (Verifone s.a.)

In Finland, Verifone employs around 87 people (Asiakastieto s.a.). Different departments based in Finland include sales, order processing, terminal maintenance and acquiring services. Technical support agents work together with all of these departments to solve support requests. In addition to the Finnish branch, agents work together with multiple global teams.

Technical support team in Finland currently consists of 13 agents, 10 first level agents and 3 second level agents. Technical support is given either by phone or email. For phone support, the support team uses a separate call service, but all customer contact and activities are recorded into Salesforce. Due to the wide variety of products provided by the organization, support requests are of a wide variety as well as complexity.

1.3 Thesis objectives

This thesis aims to research quality reporting and the best design choices with data visualization. The produced outcome will be designed, produced and implemented according to the best practices in the industry. The aim of the product, i.e. reports and dashboard for the technical helpdesk, is to support technical helpdesk agents in their work and decision-making.

With this thesis, the aim is to research and find the best way to include dashboards in an agent's toolkit. A visual representation of data should broaden the agent's access to team and personal performance statistics, but also to view trends with support requests and assist data-driven support actions. Dashboards should not misrepresent data or burden the agent with an overload of information.

For my personal growth as a student, I aim to gain deeper understanding about service management with Salesforce. I aim to attain theoretical knowledge on quality data, visual reporting of data, service management and performance metrics. I aim to learn how to construct practical Salesforce solutions, and the overall process of implementing real, successful and beneficial IT changes.

1.4 Qualitative factors

The aim for this thesis was to build reporting and dashboard to be implemented into practice. With this aim, the developed product first needs to be usable. For this thesis, the standard for usability is defined as: product fulfills its intended aim, it's finished and deployed, and users report satisfactory use. Usability and user satisfaction can be tested with a user survey and by collecting user feedback.

Accuracy is another standard for product quality. Reports need to collect and portray data correctly. Accuracy will be judged whether there are errors within reported data or in the methods used to construct reports.

Dashboard quality will be judged based on the efficiency and interpretability of the data visualizations. Visual representations shouldn't misrepresent data, overwhelm users or display unnecessary metrics. This will also be scouted from user surveys, whether users find visualizations difficult to understand or to draw conclusions from.

Product needs to be easily modified if needs arise. In instances where helpdesk procedures, personnel or systems undergo changes, the product should be easily modified or scaled for these changes. Modifiability within this thesis refers to the methods used to build the product, and whether they support modifications or further processing.

1.5 Demarcation

The scope of this thesis is limited by Verifone Finland Oy practices and needs and the produced reporting and dashboard is not necessarily applicable to other organizations. Practices taken regarding Salesforce can in general be applied to any Salesforce instance. The product may be technically replicated in another organization, but the created value or benefits may not be replicable.

This thesis is limited to only exploring data reporting and not data collection. As great amounts of data are user input, limitations exist regarding organizational and individual agent practices. For example, practices in how agents log cases cannot be changed or affected for the purposes of this thesis. Collected data is the available data, and for these reasons, focus is solely on data reporting and delivery.

Limitations also exist with author's user access rights. The author was granted access to create reports and dashboards, but no access to further modification tools within Salesforce. Due to this, custom data fields or reporting rules could not be created. All restrictions were worked around by interpreting needed metrics through available system functions. Discussion into further processing, for example through more access rights, has been explored, although limited.

Research into reporting and data visualization is limited to what is relevant for technical support and the type of data available in commissioning organization. Reporting and data visualization is a broad topic and therefore, theoretical background discussed is limited.

1.6 Process description

Thesis was completed according to project management principles explored below.

1.6.1 Project management

According to Project Management Institute (PMBOK) (2017, part 2, chapter 1.1) a project is defined as "a temporary endeavor undertaken to create a unique product, service, or result". This

definition describes this thesis and thus, thesis product was created with project management principles in mind.

A project typically entails certain phases and constraints. Standard phases are initiating, planning, executing, monitoring and controlling, and lastly, closing (PMBOK, 2017, part 1, chapter 1). These phases can also be referred to as the project life cycle. A project begins with an initiation phase to define the project idea, needs and goals. The phases of planning, executing and monitoring and controlling follow, each containing their own tasks to ensure project progression, stakeholder engagement and quality of deliverables. (Good 28 February 2024). The closing phase may sometimes be confused with the stage when the project deliverable is finished, although the main objective for closing phase is to evaluate the project and prepare insights for future use (Carroll 9 February 2024). In a sense, a project doesn't end when the deliverable is completed, but when it is formally closed.

For project constraints, the traditional concept is the "iron triangle", typically represented in a triangular model of time, cost and scope, although other constraints exist as well. Project Management Institute (2017) states quality, resources and risk as additional constraints.

Silvius & Schipper (2024) propose an alternative idea of sustainable project management and its constraints of social, environmental and economic value creation. Although these seem to be broad concepts for a small project, they allow for the mind shift from considering project management as task management to considering one's own responsibility in sustainable development. Sustainability within this project can be considered as the social, environmental and economic value created. Anything that wasn't needed wasn't created and no resources were wasted, as the product was created with an existing system.

Project management is important for a variety of reasons. Having a structured approach, clear goals and allocated resources, several benefits can be realized. Efficiency can be improved, as tasks are outlined beforehand and scope limits what tasks time and money are spent on. With clear scope, tracking and measuring success also becomes easier. Especially with the agile methodology, task completion is the primary factor to determine progress. Although rigid planning that rejects change can in extremes be detrimental, having structured organization facilitates progress as energy is conserved but also no component is forgotten about. Project management strategies that account for changes also help reduce risk impact. Change can be intended or unintended, and in both situations early risk assessment can help with responsivity and again, project completion and quality. (Atlassian, s.a.)

1.6.2 Agile methodology

Production was completed with an agile methodology. Agile methodology refers to a software development methodology, where production is completed in iterations, also called sprints (Microsoft, 2022). Agile project management can also be referred to as a project management philosophy or a mindset where early return on investment (ROI) is prioritized (Joubert 2024).

The aims of the agile approach are further outlined within the 12 principles of the agile manifesto, that were created by the developers of the method to communicate their ideology. These principles highlight efficient teamwork, customer involvement and regular delivery of a working product. Additionally, within the agile principles change is welcomed, as opposed to other methodologies, where initial plans may restrain possibilities to change product qualities later. (Agile alliance s.a. a.)

A way to achieve all these practices is with the aforementioned sprints, that can be implemented with an agile framework called Scrum (Schwaber & Sutherland, 2020). With sprints, complex problems are broken down into small, manageable tasks (Rehkopf s.a.). Within these development iterations, small pieces of the product are created. A sprint is finalized with a sprint review, evaluating the work done, requirements and objectives for the next iteration.

One practical framework for agile is lean software development (LSD). Lean methodology can sometimes be called the minimum viable product (MVP) strategy, which means to create and release the simplest version of a product to be tested by users (Geeks for geeks, 2024). Thanks to early access to user feedback and testing, developers can gauge the further processing needs for the product better (Raj s.a.). However, with this method, the first released version of the product does need to be usable and fulfill the pre-defined requirements (Agile Alliance s.a. b.).

Some of the benefits of agile include increased adaptability and faster product delivery. As production is segmented into smaller tasks and sprints, changing needs can be incorporated into production better. Frequent sprint reviews allow for feedback evaluations and adjustments to address whether the next sprint task load should be modified. Segmentation into smaller tasks also helps with faster delivery, especially with lean methodology. Valuable or viable functionalities can be prioritized, and thus delivery is guaranteed. (Buzea 19 July 2023)

Production was completed within 3 sprints. Within each sprint, reports and dashboard were produced, tested with an agent, and reviewed with the helpdesk manager. After each sprint, according to feedback or changing needs, the product was modified accordingly in the next sprint.

Each sprint began with a meeting with the helpdesk manager to discuss project requirements and progression towards goals. Within the first sprint, the minimum viable product was completed, which included both reporting and a dashboard. This product was then released to be tested by the “guinea pigs”, i.e. a small group of users. The following sprints focused on improving the product, according to feedback received from users and the helpdesk manager. This review period closed a sprint and launched the planning phase of the subsequent sprint.

2 Reports

2.1 Prior research

Reporting aims to provide information, through collection and representation of data (Glöckner, 2022). In other words, a report consists of two parts, the data it is based upon and design by which it is represented.

According to a dictionary, data is defined as: “factual information (such as measurements or statistics) used as a basis for reasoning, discussion, or calculation” (Merriam-Webster, s.a.). Data can be what’s called “raw data”, which is unprocessed data that has not yet gone through any sort of data analysis method yet. In this raw form, data can be surprisingly meaningless even if it’s factual (Taylor 29 January 2025). For example, values 156, 342, 145, wouldn’t mean much without context that these are amounts of monthly support cases.

These example values would be considered quantitative data, as quantitative data refers to numeric or measurable data. On the other hand, qualitative data is descriptive data, that cannot be easily represented in a numeric form, such as color or opinion. The type of data affects data collection, analysis methodologies and research purposes (Castellan, 2010). However, some argue that the distinction of data types is not that distinguishable (Maxwell, 2019) and some support mixed methods research, where both qualitative and quantitative data are collected and processed in the same study (Shorten & Smith, 2017).

Data quality is generally referred to as the ability of a data set to serve an intended purpose (Hassenstein & Vanella, 2022). Data quality can be assessed with various metrics that enable reliable evaluation of a dataset's utility. According to Tozzi (2022) data can be assessed through its completeness, validity, timeliness and consistency. In addition to these, Hassenstein & Vanella (2022) have illustrated data quality dimensions further in figure 1.

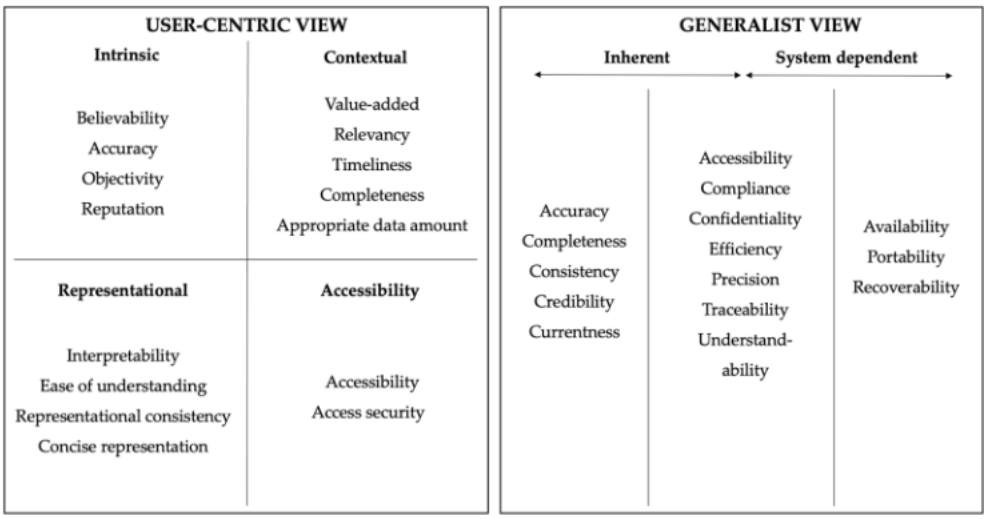

Figure 1. Dimensions for data quality (Hassenstein & Vanella, 2022).

Data is typically referred to as the base in a data-information-knowledge-wisdom (DIKW) pyramid model. In other words, data is the base for information and knowledge, and later wisdom (Baškarada & Koronios, 2013). The pyramid illustrates the progression from raw data to valuable insights. The pyramid can be used to illustrate the value created from data processing.

According to Lim et al. (2017), the data-value chain represents the nine building blocks of data-based value creation. Within this method, value is created from data collection and information creation, both phases consisting of activities and resources. One of the activities in the chain, information delivery, stands for the method by which the created information is presented to the users of that information. One method of information delivery is reporting, which compares to Glöckner's (2022) definition that reporting aims to provide information.

Similarly to metrics assessing quality of data, metrics to assess quality of report design exist. For report design, principles include accuracy, consistency, appearance, efficiency and usability (Downen, 2018). In addition to these, Pega Academy (s.a.) also adds clarity and availability as design principles for reporting.

The most common metric for reporting quality appears to be accuracy. For accuracy, a report simply must show what it promises to portray (Downen, 2018). According to Marco & Larkin (2000), there are numerous pitfalls that undermine the authenticity of reports. In addition to lackluster data collection and analysis methods, they state inappropriate graph titles, use of confusing terminology and reporting data as percentages as methods of misrepresentation. The issue with percentages seems to stem either from simply bad math being used, or that readers rarely validate them by checking the source (Cowell, 1998). However, Marco & Larkin admit that percentages are useful in some scenarios. To back this, Sauro & Lewis (2023) argue that percentages work fine

with smaller data sets. It can be argued, that to create credible and accurate reports, several of these ethical and technical pitfalls should be consciously avoided.

Comparably to reporting, one emerging topic is data analytics. Whereas reporting typically refers to collection and presentation of data in an easy to understand from, reporting generally cannot answer the question “why”. Reporting refers to the “what” with an organization data. (Coursera, 2024) In comparison, data analytics refers to the complex study of patterns within data to specifically tackle questions about the data and to deliver strategic suggestions to decision-makers.

Although data analytics can offer great insights about data for organizations, reporting serves as a great method of information delivery for helpdesk agents, as reporting presents the actual data for end users (Indeed, 2025). With reporting, agents get access to processed data instead of raw data and can draw conclusions from it. However, not all processed data is insightful, and should be evaluated based on what is relevant and value-adding.

There are several support metrics that have been coined to help measure quality of care. Quality of customer support can be measured by multiple different metrics, such as customer satisfaction scores (CSATs) or net promoter scores (NPSs). For technical support specifically, metrics include first contact resolution (FCR), average handle time (AHT) and average response time (ART) to name a few. (Najib & Pham 2024). These metrics, if used as measures of quality, can help define reporting and data needs.

Within the service industry, there exists a concept of service recovery paradox. This paradox states that a customer can become more satisfied with a company after a service failure thanks to effective response, than if the service failure had never occurred (Krishna, Dangayach & Sharma 2014). In essence, the way companies respond to failures can increase customer satisfaction, trust and loyalty more than perfect products could. Although this paradox is highly debated within academia, it can be applied to technical support within reason. All products are bound to fail at some point. To aim for perfection is futile, but each failure can be approached with quality responsivity and care. As helpdesk agents aim for this in their daily work, access support metrics can be highly beneficial, if not vital.

2.2 Applied theory

The thesis project began after the need for a reporting tool for support agents was highlighted by the helpdesk manager. Several issues were outlined that access to reports could help address:

1. Currently, support agents cannot view reporting of their own cases or the overall case load. Data of previous closed cases nor current case load is not visible.

2. Support agents cannot view cases owned by other agents. An agent has visibility only to their own cases and the open cases in queues. This can cause issues if an agent is out of work suddenly, with their cases waiting for action. Even if an agent has a planned leave with no open cases, if a case reopens it opens to that agent's private list and other agents cannot view it to take over.
3. An agent cannot easily view case age, or how long a case has been open. The only way to determine case age is to calculate it from the data field showing the date and time the case was opened. This causes difficulties with prioritizing older cases. Within the helpdesk queues, list ordering also varies, meaning one queue shows the newest case on top while another shows the oldest, while third shows them based on status and not on age. There is also no way to determine the average case age, or any characteristics of a case that result in it taking longer to solve.
4. Another issue is that an agent cannot view whether the service level for a case has been met or not. Within Verifone, the service level means that the case is worked on within 24 hours. As cases are of a wide variety and complexity, there is no resolve timeframe defined, but responsivity to incoming cases should remain under 24 hours. Because agents cannot view the case age, they cannot view whether new cases are older than 24 hours or if in general, this service level has not been met. Agents should be alerted to cases that remain untouched for 24 hours and receive reporting on team responsivity levels.
5. Another problem is that an agent cannot view data about the nature of cases they encounter. It’s reliant on the agent to keep track of what kind of requests they have encountered and peer communication to know if certain request types have been on the rise or not.

Considering the helpdesk reporting needs, the easiest and most cost-effective way of information delivery was decided as Salesforce reports and dashboards. Existing system data and data collection processes for user input data would remain the same and ensure data availability and accessibility to end users. With Salesforce Reports, data remains transparent and understandable to end users. Additionally, Salesforce tools are the most efficient in terms of access and know-how that users already possess. Another aspect taken into consideration was the complexity of data and reporting needs, as there is currently no need for a highly technical reporting program.

As the data available within the Salesforce instance is either system or user input, the quality of data can be affected by user practices and variance between user behavior. In addition, although system data is rarely erroneous, there may be instances where data is duplicated or otherwise erroneously logged by users. For example, in a situation where a customer contacts the helpdesk twice for the same issue, duplicate cases may be created.

According to Salesforce Help (s.a. c.), qualitative data exists as dimensions, i.e. categorical textual data. With this definition, majority of available data is qualitative data. Textual values are used for case owners, case status and multiple different data fields within cases. Additionally, all case comments and email contents are textual data. In comparison, available quantitative data exists as system tracks case age, durations of each stage and overall amounts of cases. Despite the abundance of qualitative data, meaningful reporting on them can be fairly paradoxical, as data analysis for categorical data typically involves a numeric data table. Although the initial data is qualitative, the produced information is represented in numeric form, or as quantitative data (Yale s.a.). With Salesforce reports, data is presented in table form, and quantitative information can be gained through sum, averages, minimums or other statistical measurements.

Quality of support could be beneficial data for agents; however, the system does not log any metrics for customer satisfaction. Therefore, reporting was focused on several other technical support metrics. The use for the reporting tool can be thought of as a “health check”, to monitor helpdesk performance.

For reporting requirements, the needs below were outlined, also represented in figure 1:

1. Quantity:
    a. Amounts of cases per queue
2. Quality:
    a. What kind of cases are being received
3. Duration:
    a. How long do cases take to close and is service level metric met
4. Contact type:
    a. Division based on how cases are received

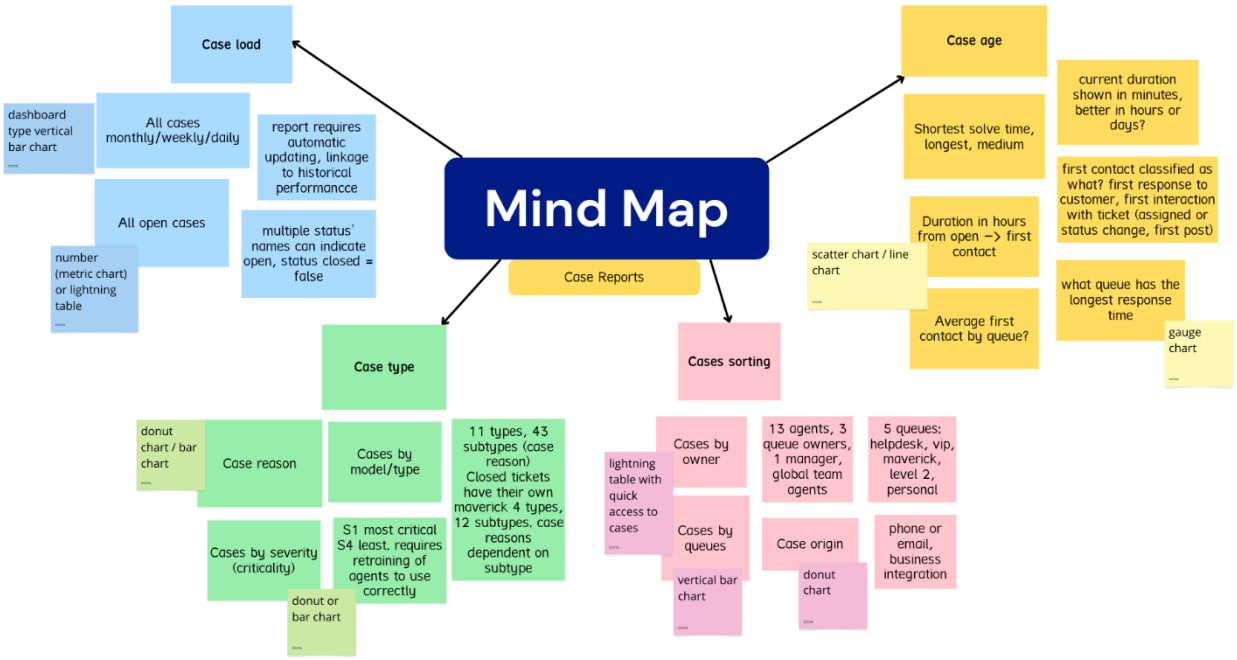

Figure 2. Mind map of requirements.

Reports needed were derived from the reporting requirements. The requirements also helped define the scope of the project. In the final product this resulted in 11 reports. The reporting requirements outline the purposes of reporting, regarding what information would be beneficial for agents to access, and how.

2.3 View of final product

Within Salesforce Reports, a folder was created. This is the starting point and enables all reports pertaining to helpdesk to be stored in one place. Access to reports was granted by sharing this folder with agents. Figures 3 and 4 portray the folder and reports as users see them, respectively.

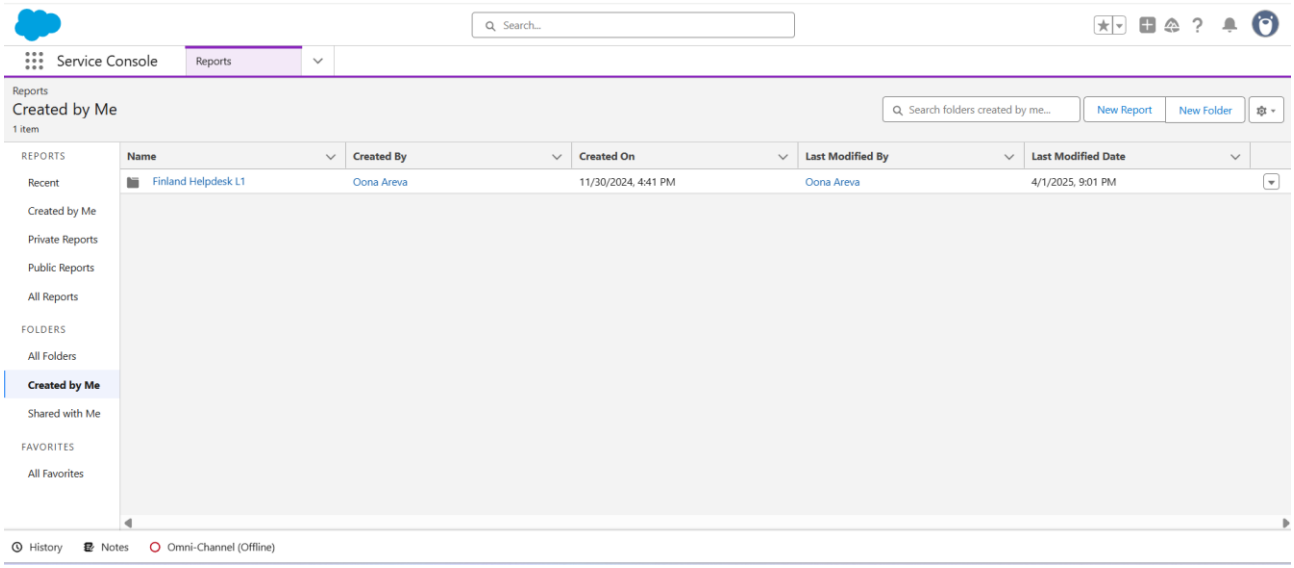

Figure 3. Report folder.

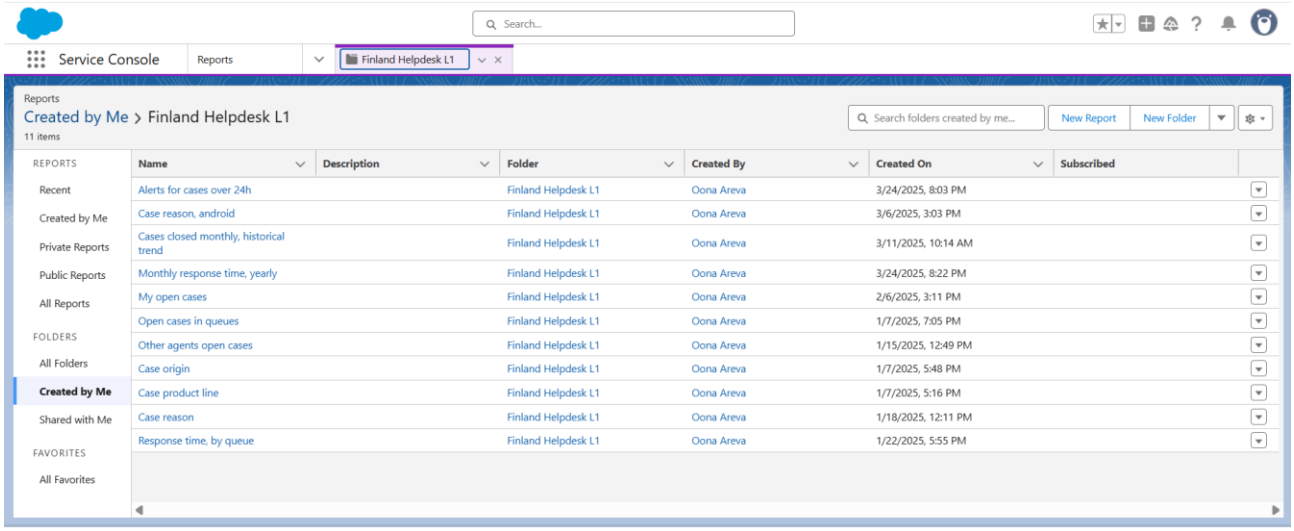

Figure 4. Reports within folder.

Reports were created one by one, either with Cases or Case Lifecycle report type. The choice between the report types was made based on available fields within the report, as custom data fields couldn't be created.

Even though one report could have been used to create multiple dashboard figures displaying different parts of the report, a single report was created to correspond to one dashboard figure and therefore to one metric. This is to help with possible modifications, but also to add clarity for report users in finding information they need.

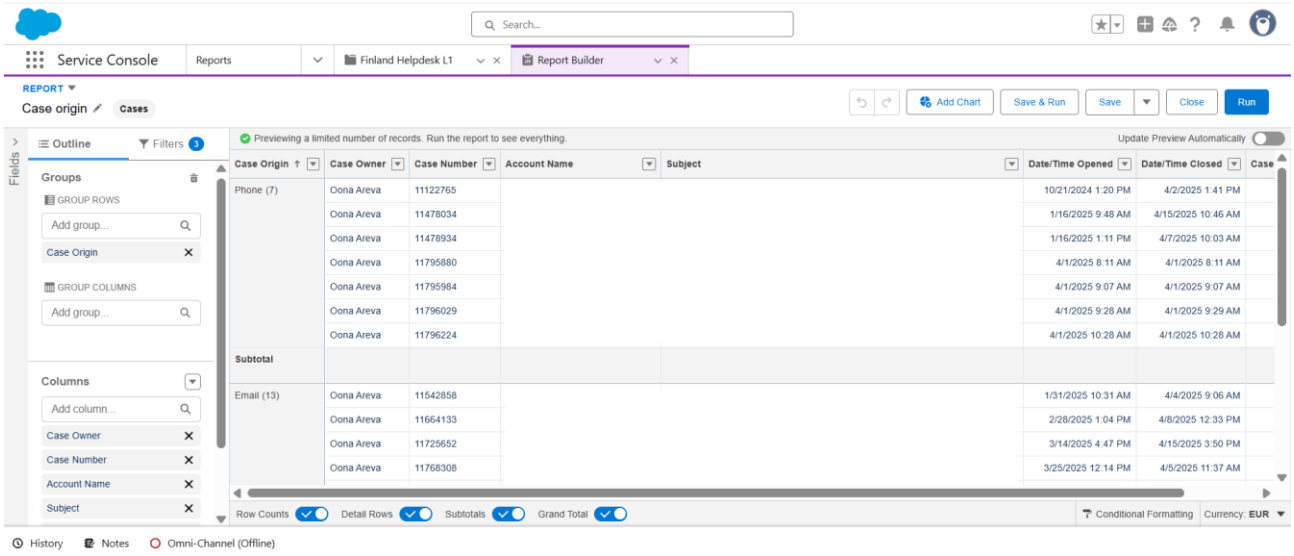

Figure 5. Report view with client information removed.

Figure 5 represents the edit view for reports, with chosen column data fields on the left, preview of report in the center and report functions on top right. Each report had the following data fields included for clarity: case owner, case number, account name, subject, opened and closed date, and case age in hours. All reports also operate on similar filters to add clarity and comparability between reports. Filters were used sparingly, to maximize report processing speed (Salesforce Help s.a. d.)

The case origin report is quite simple, with the report grouped by case origin data field. Grouping a data field allows a dashboard figure to be created. One report can have multiple grouped rows or columns. Columns represent data fields and rows represent data values.

Included below, figure 6 represents the report view as users see it.

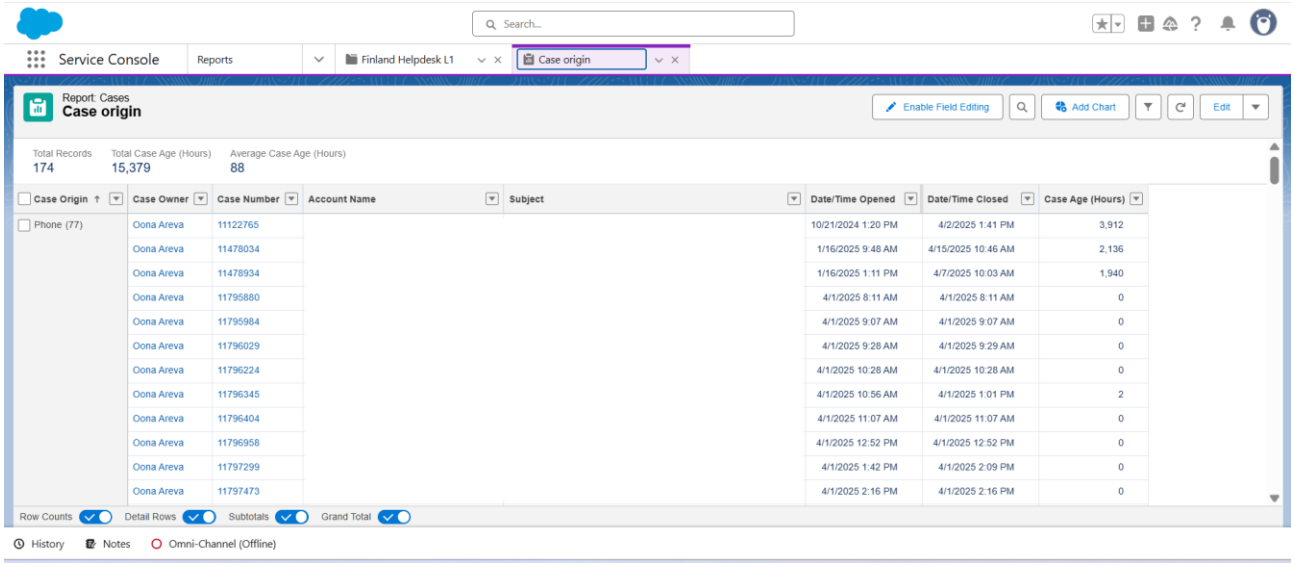

Figure 6. Case origin report view. Client information has been removed.

Most of the reports were created with this method. Some other reports needed more work to provide correct information. As an example, below in figure 7 is a view of the report for monthly response time by queues.

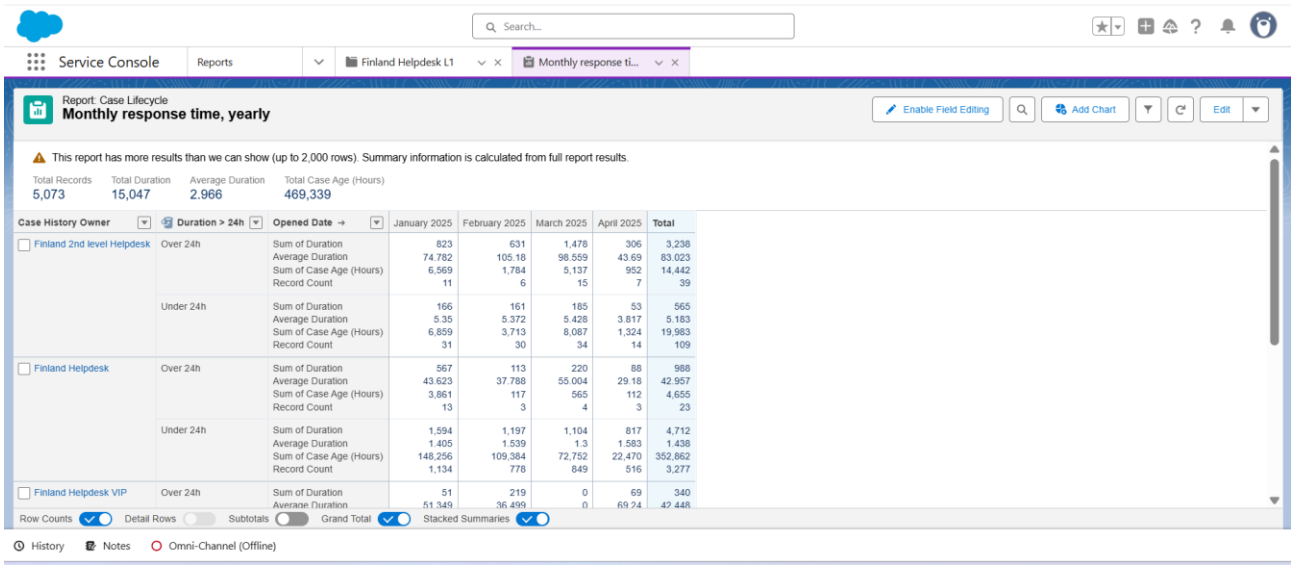

Figure 7. Response time report view.

With this report, due to the high volume of data, a summary view is generated. The report is grouped by three data fields, case history owner and a bucket column in grouped rows and opened date as a grouped column. This is shown in figure 8.

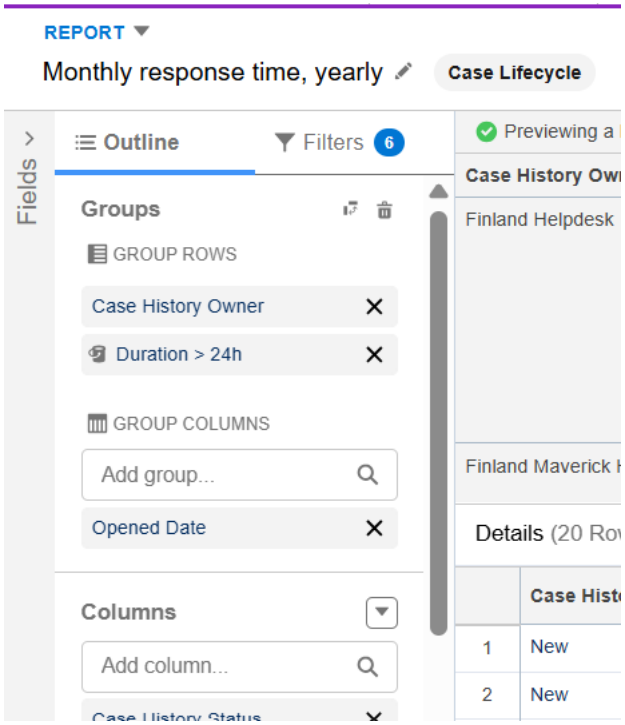

Figure 8. View of the report's grouped data fields.

A case should be responded to within 24 hours. This has been defined as “service level” within Verifone. With this report, the aim is to monitor if this pre-defined standard has been met within each queue.

Due to helpdesk work procedures, response time is measured with case duration, from opening date to first status change. All cases that arrive at helpdesk queues by email open with status as “New”. After an agent starts working on a case, they will change status to some other value signifying that it is actively being worked on. Phone cases are considered responded to by default, as a case is filed after first contact, so they are excluded from report.

Therefore, the case origin was defined as email and the case history owner was filtered to all helpdesk queues. Then case history status was set to “New” as a filter. Also, only current calendar year (CY) cases are included. With this, all cases that arrived at helpdesk queues by email this year have been collected. Filters used can be seen in figure 9.

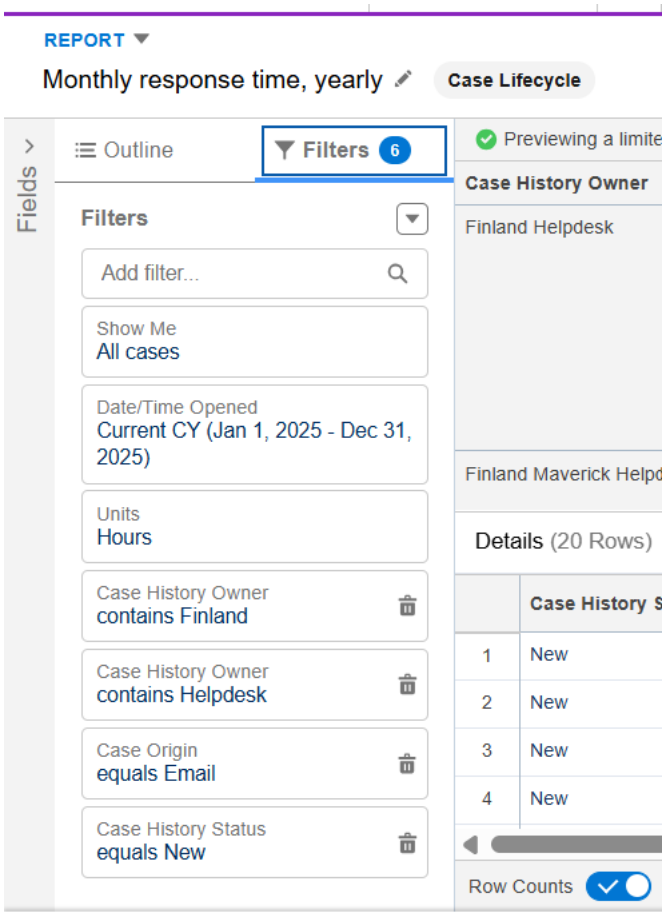

Figure 9. Report filters.

Finally, a bucket column is a report feature to define data ranges within a column (Salesforce Help s.a. e). In this instance, a bucket column was created to separate cases that spent over 24 hours on status “New” from cases that had their status changed in under 24 hours. This is represented in figure 11.

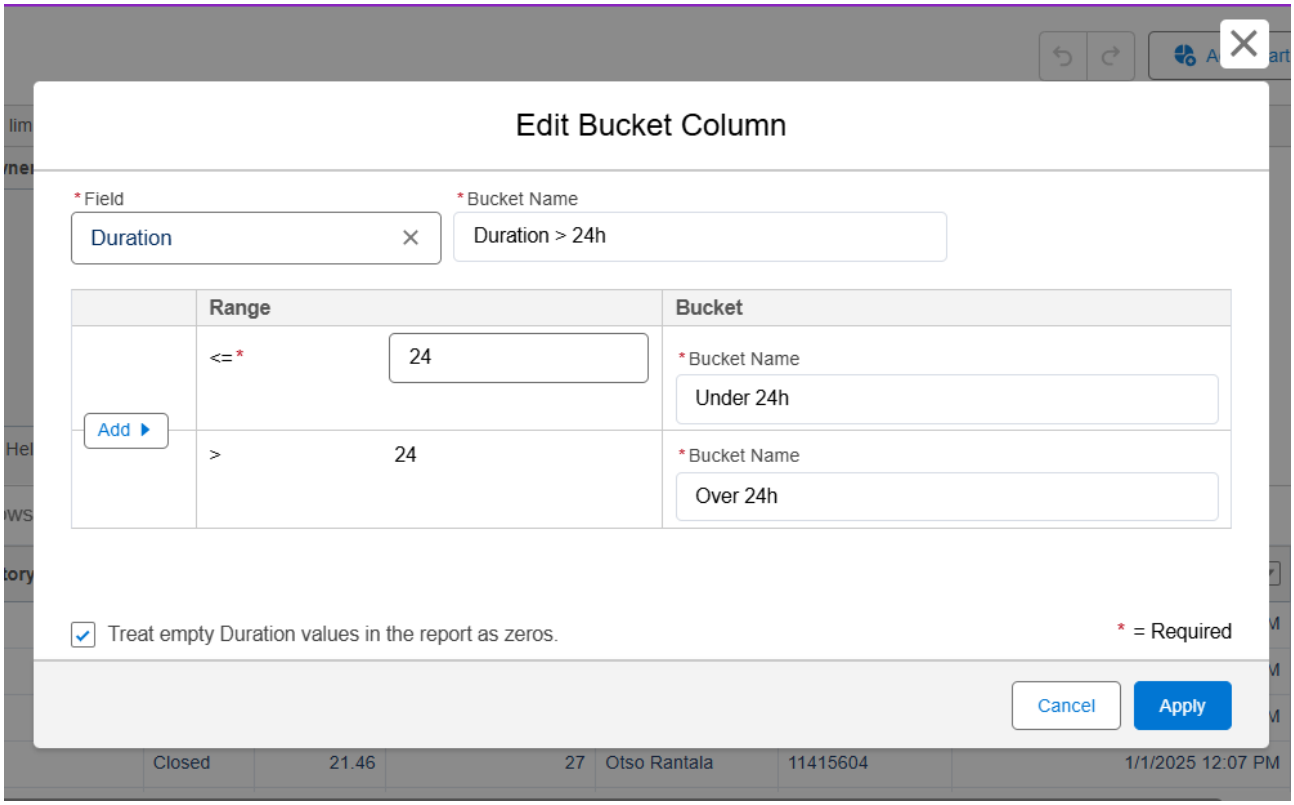

Figure 10. View of edit window for the bucket column.

3 Dashboard

3.1 Prior research

Data visualizations are graphic displays of data, either displaying each data point or summaries of data. The main objective of data visualizations is to visualize data for easier information gain. (Unwin, 2020). They are beneficial precisely because they allow the data to be translated into visual formats, that are typically easier and faster for the human brain to understand (Islam & Jin, 2017). They are also beneficial for cleaning data, identifying trends, patterns or outliers, and presenting results (Unwin, 2020). Although visualizations can be effective ways of presenting data, not all visualizations are.

Few's (2017) data visualization effectiveness profile outlines 7 criteria to critique visualizations of data. While these can be used to critique graphs or figures they can also be used as guidelines when developing data visualizations. These criteria are divided into 2 categories as represented in Table 1.

Table 1. Few's (2017) data visualization effectiveness profile.

Informative	Emotive
• Usefulness • Completeness • Perceptibility • Truthfulness • Intuitiveness	• Aesthetics • Engagement

According to Few (2017), although both categories are beneficial as criteria, emotive criteria are generally only necessary in certain situations. According to him, if a visualization contains information that is important or interesting to the viewer, aesthetics or engagement aren't generally necessary for effectiveness. However, emotive aspects of visualizations can be crucial when the viewer's attention is explicitly sought after.

Few also states that any data set can be visualized in multiple ways, the way to choose the best fit for visualization depends on the needs of the user and what is wanted to communicate. As with reports and data quality, the purpose of data visualizations is crucial to evaluating their quality. Similarly, Unwin (2020) argues that data visualizations on their own are insufficient and require context,

as text, to complement their effectiveness and memorability. Without the user understanding the methods and reasons for data collection or display choices, their understanding for visualizations will fall. According to Few (2017) data visualizations are a way of communication and as such, aim to provide full understanding to the viewer.

According to Camm, Fry & Shaffer (2017), there are three design principles to consider for effective visualizations. The first principle states that design and layout matter. Second is to avoid clutter and third is to use color with purpose. The general purpose of these principles, and the definition of efficiency in this case, is to aim for graphics that are as quickly understood as possible. The viewer should gain information quickly from the visualization, as the data is represented in a brain-friendly form.

There are numerous types of data visualizations, such as pie charts, bar charts or scatter plots to name a few. Although Few (2017) states that a dataset can be visualized in numerous ways, some academics argue that certain visualizations are simply ineffective, specifically the pie chart. According to Hill (2025), pie charts have been described as insults to man’s intelligence or even evil. This apprehension to pie charts seems to stem from a Cleveland and McGill (1985) study, where they argued that information is extracted through perceptual tasks. These perceptual tasks, showcased in figure 12, outline that the information in pie charts is derived from either its angle or area. Neither of these is the most accurate perceptual task in their study, and therefore, pie charts are not the most accurate visualizations.

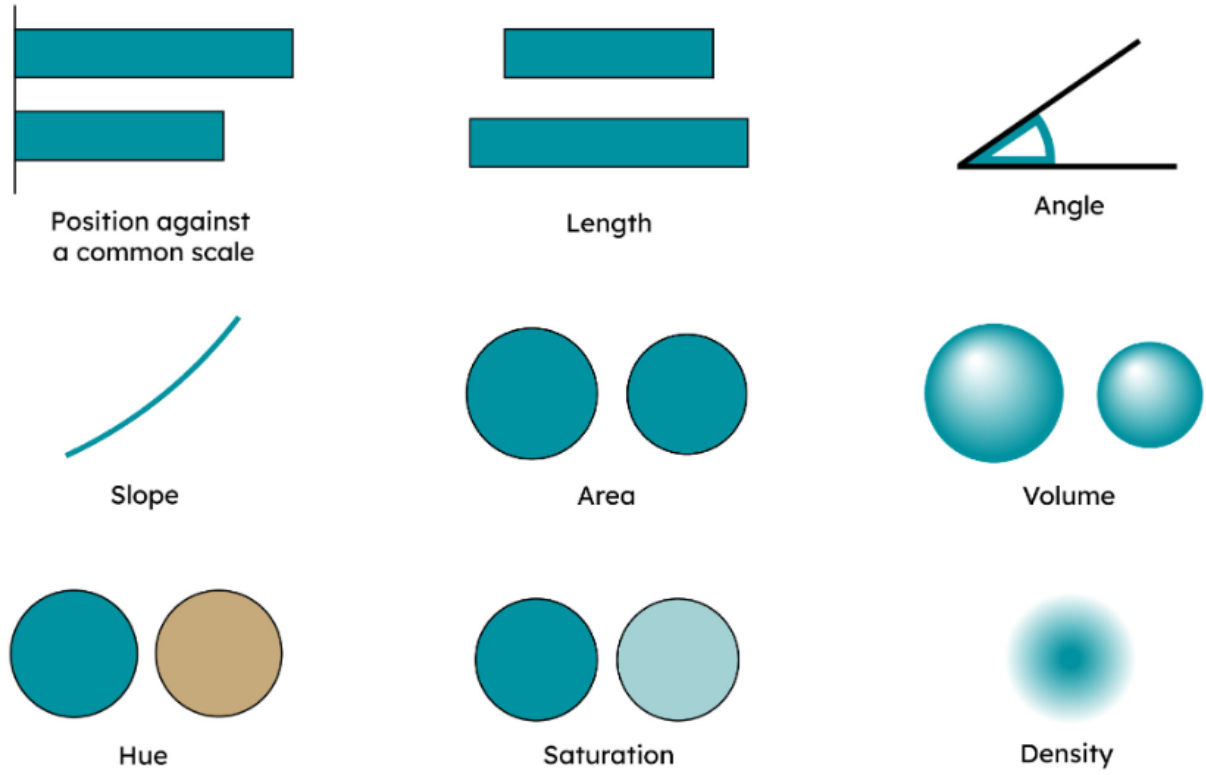

Figure 11. Perceptual tasks for information extraction (Hill 2025).

Despite this negativity towards pie charts, Hill (2025) argues that pie charts are useful for their compactness, familiarity with users, functionality and aesthetics. Compared to linear alternatives, pie charts compile categories into a smaller space and are therefore very usable in dashboards and smaller interfaces. Their visuality ties to their functionality, as design aspects help navigate the visual data. Some research even states that users prefer pie charts even though they weren't the most accurate (Siirtola 2019). For an average person, pie charts may be considered the most useful chart-type, and therefore, understanding the user is extremely important.

A collection of data visualizations can be called a dashboard. The term dashboard comes from a vehicle dashboard, such as a car dashboard, where the most important real-time metrics of car performance are portrayed to the driver (Vilarinho et al, 2018). Similarly to a car dashboard, the utility comes from quick access to crucial decision-making data. In dashboards, all necessary statistics are compiled to a singular view which allows monitoring immediately (Insight Software s.a.).

Dashboards are an example of an application of visual management that proactively supports and improves decisions, keeps employees focused on main issues in their work and helps them improve performance and achieve expected results (Vilarinho, Lopes & Sousa, 2018 1).

There are multiple different types of dashboards, but the focus of this thesis is on performance dashboards. Performance dashboards can be further divided by the different applications for them: operational, tactical and strategic dashboards. Operational dashboards focus on monitoring rather than analysis or management and enable front-line workers to manage processes. (Eckerson 2011). The result of this thesis can be characterized as an operational performance dashboard. According to Eckerson (2011, chapter 6) operational dashboards can be characterized as either detect & respond or incent & motivate dashboards, depending on their intended goal.

There is very little theoretical study into the design principles of dashboards (Sedrakyan, Mannens & Verbert, 2019). In their research, they state that choices for visualizations and aims for interpretations are subjective. Although their research targets learner dashboards in school settings, the dashboard's aim to monitor problem areas and incentivize the viewer, can be argued to relate to this thesis. Dashboards can be constructed as planning profiles, that allow the viewer to interact and reflect upon a trajectory of steps. As there is no objective correct when discussing dashboards, development may simply aim to construct a guided path for the viewer, where separate data visualizations form a coherent pathway towards actionable insights.

Sometimes dashboards are created as demonstrations of graphical abilities, which may decrease their usefulness (Janes, Sillitti & Succi, 2013). Despite the advancements in technological capabilities, there may not be a necessity for the most advanced visualizations. Inclusion of too many or overly complicated graphs can clash with the second principle of Camm et al. (2017) research, which states to avoid clutter. Cluttered graphs and dashboards hinder the viewer's ability for efficiency and pose the danger to drown the important information. Highly technological dashboards also may clash with intuitiveness, which is one of Few's criteria for effective visualizations. Unfamiliar graphs that take a bit of time to understand are only preferable, if they portray the needed information more effectively than familiar graphs.

According to Janes et al. (2013) dashboards with a "push" approach received more attention than those with a "pull" approach. A pull approach means that the user is "pulling" information from the dashboard, whereas in a push approach the information is pushed to the user to inform him. They argue the distinction can be made based upon how much effort the user must invest to use the dashboard. In the pull version, the user should have the possibility to explore and investigate the dashboard, whereas in the push method the user should understand the data without excessive user interaction.

3.2 Applied theory

Within Salesforce, after a report is created, the information within it can be presented in dashboard data visualizations. These data visualizations are called widgets in Salesforce. Each widget requires one source report that provides the available data fields. Also, the available chart types are based on the report properties. (Salesforce Help s.a. f.)

Initially, dashboard was created as a “placeholder” of quickly accessible data visualizations. Initially, the choice of data visualization types was prioritized over dashboard design and therefore dashboard was visually messy and had the danger of misguiding the users. Below in figure 13 and 14 are example pictures of the dashboard at this stage.

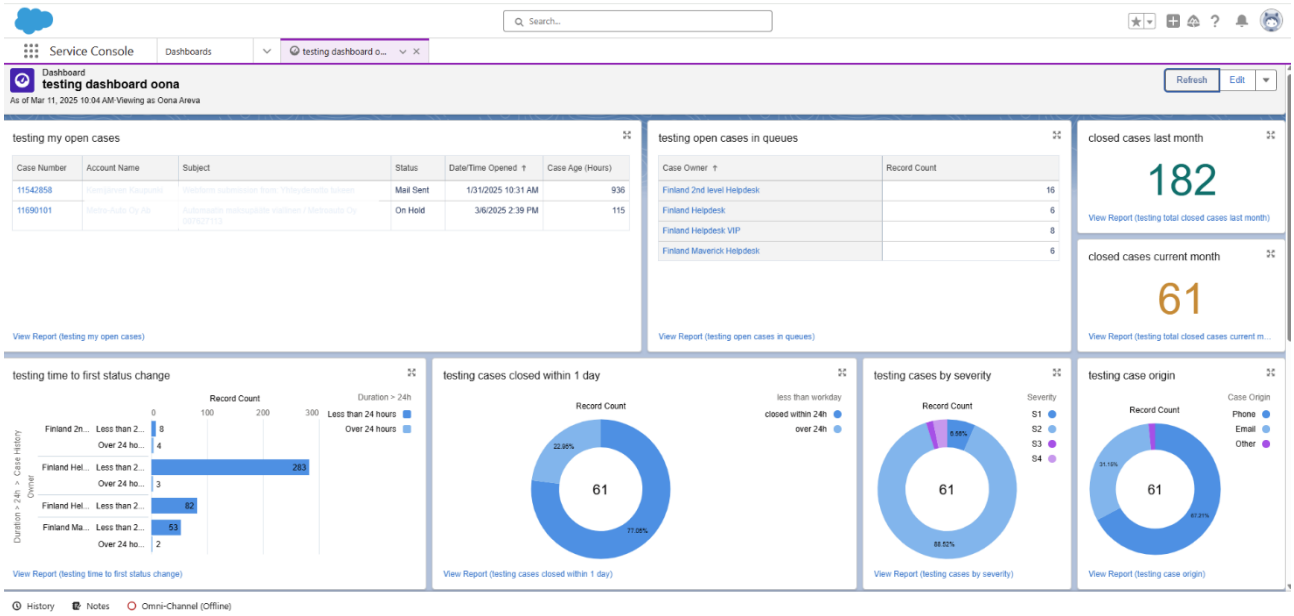

Figure 12. Initial dashboard view 1.

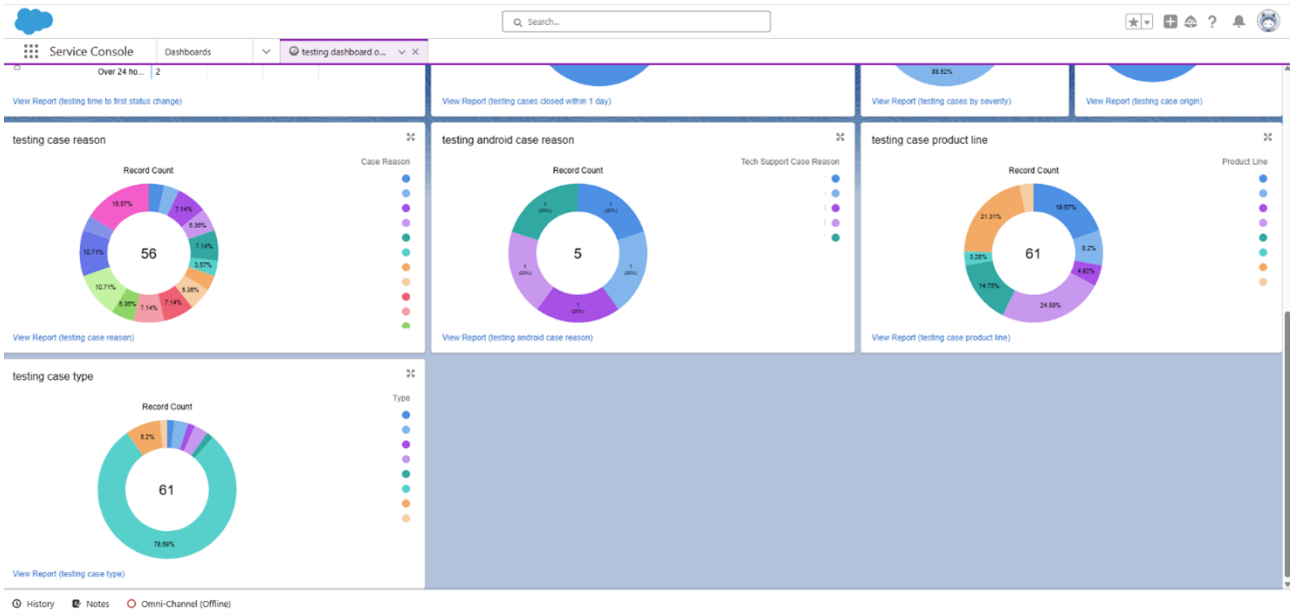

Figure 13. Initial dashboard view 2.

There were many dangers in the initial dashboard. The dashboard included unnecessary data, and the layout of information had the danger of misguiding the viewer. For example, the inclusion of closed cases at the top right overprioritized an unnecessary metric and dominated the viewers' attention from more important graphs, mainly due to the placement and size of the widgets. Therefore, the dashboard was re-designed and sectioned into different zones, where the most crucial information was displayed at the top, current performance metrics thereafter and lastly historical charts. Additionally, the dashboard was sectioned into right and left zones, where on the left are agents' own case data, and on the right is team level data. Dashboard design is portrayed in figure 15.

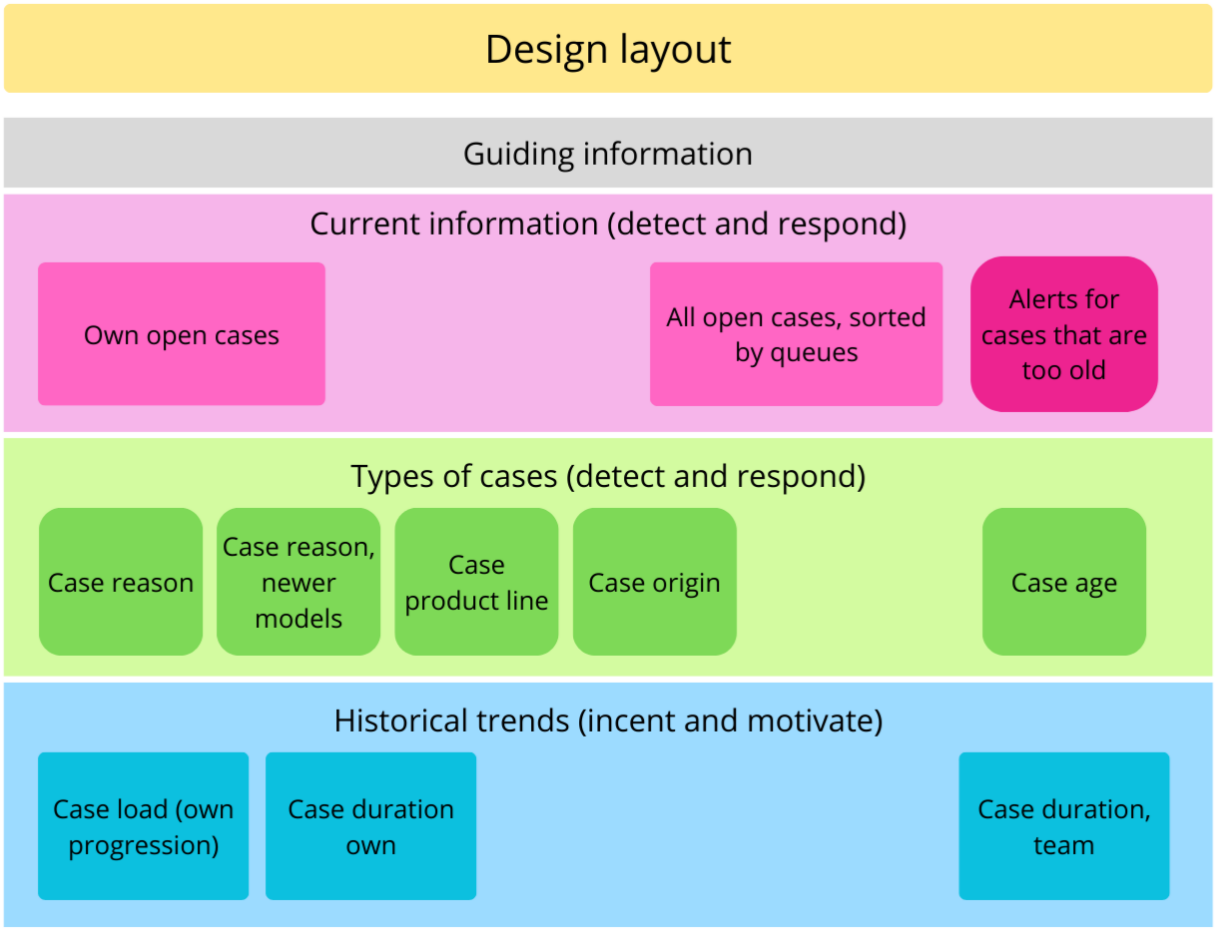

Figure 14. Final dashboard design layout.

The goal was to create only one dashboard for agents to use. Therefore, all data visualizations needed to be portrayed on one page, still in a way that avoids clutter. Dashboard zones were used to segment information into guiding blocks with a block of guiding information at the top. This “guiding information” refers to dashboard instructions and further context for the displayed data, as guided by Unwin (2020). One of the design objectives of the dashboard was to simplify the data shown, because some of the visualizations turned out to be quite data heavy. This simplicity was complemented by the need to decrease the user’s effort to understand or interact with the visualizations. In a way, the dashboard produced was created with the “push” approach proposed by Janes et al. (2013). Lastly, Eckerson’s (2011) principles of detect & respond and incent & motivate were mashed into a singular dashboard. Again, the objective was to avoid overwhelming the agents with too much data, but to also construct a pathway from detection to action.

3.3 View of final product

The final deployed dashboard is represented in figures 16 and 17.

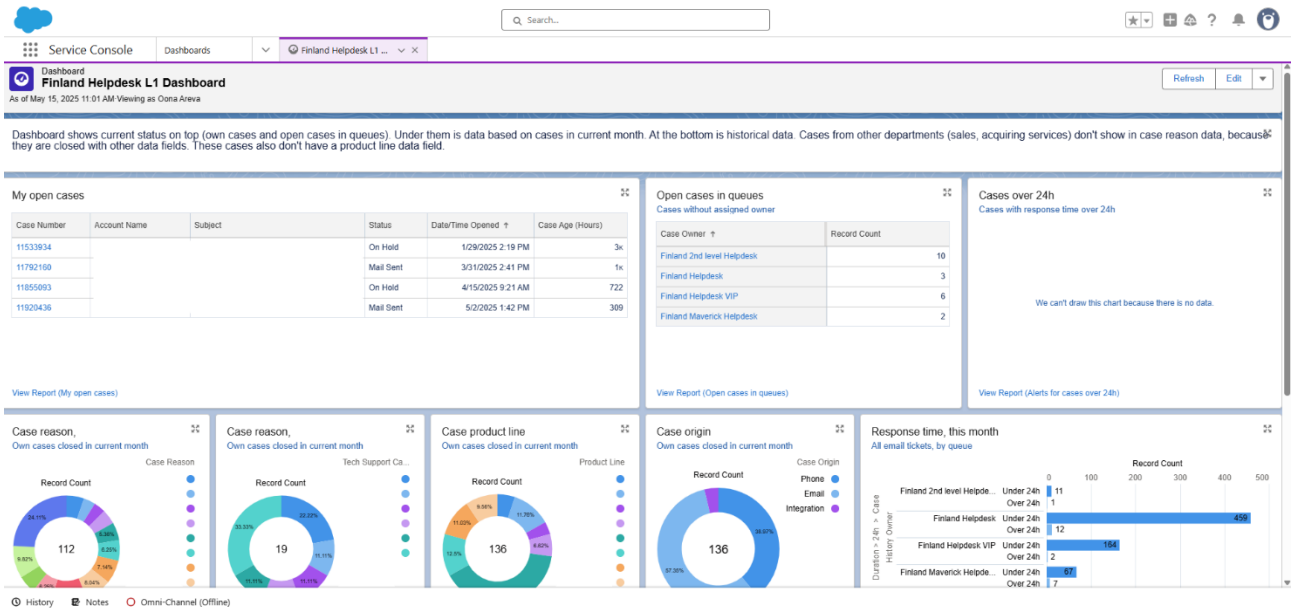

Figure 15. Dashboard view, upper section. Edited to remove sensitive information.

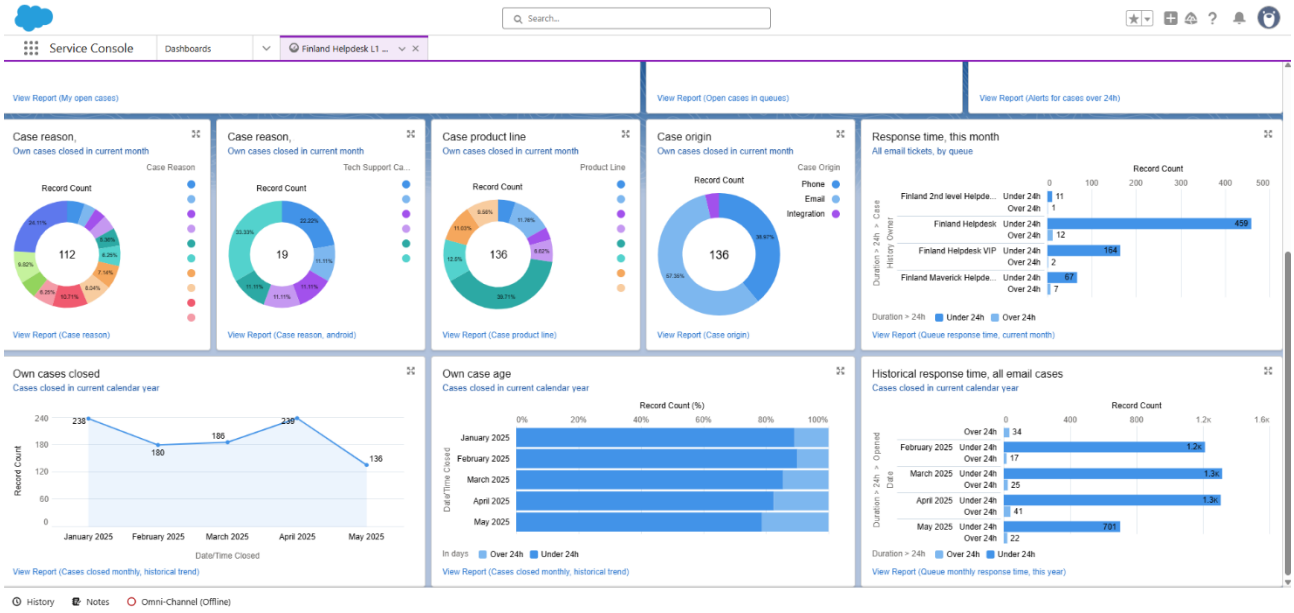

Figure 16. Dashboard view, lower section. Edited to remove sensitive information.

Taken into further analysis, represented in figure 18, is the visualization for case product line.

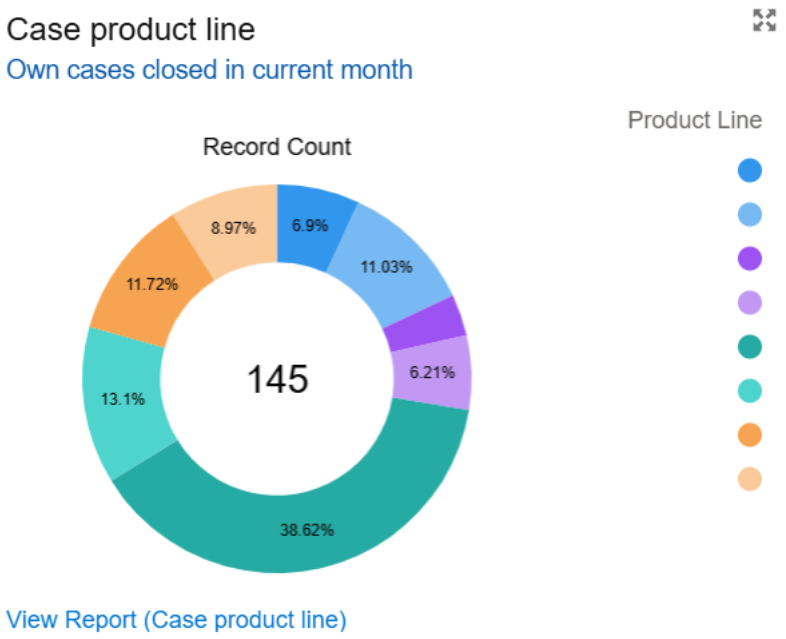

Figure 17. Case product line.

In all cases, product line is a mandatory data field that agents must fill from a pick-list value selector. The data for product line can be easily misunderstood. The graph only shows the current month's case metrics only for one agent. No agent can pre-determine what product a support request concerns, and randomness is heavily involved. Therefore, if one agent has a certain product as the highest value, it doesn't necessarily mean that it was the overall most common product type. It can be that most support requests of that type just piled up to that one agent. Additionally, if a product is the most common in support requests, does it mean that it is the product with the most problems and therefore the worst performing product? For these reasons, a donut chart (pie chart) was picked over a bar chart. According to Hill (2025), bar charts should be lined up in order to increase accuracy. This visualization could have created a falsehood in the viewer's mind where products are ordered against each other from worst to best, even though it's not the intention. A donut chart, however, is beneficial for displaying proportions and was chosen to portray the make-up of current cases.

4 Discussion

4.1 Usability

This product consists of two parts, the reports and the data visualizations displayed on one screen, i.e. the dashboard tool. Prior research states that reporting aims to provide information (Glöckner, 2022) and that visual representation improves information gain (Unwin, 2020). The delivery of information in a visual form is the definition, objective and standard for this product. Has this been achieved?

For the reports, the biggest driving factors were necessity, usefulness and availability. Within the technical helpdesk, there existed an information gap, where data did exist and agents accessed it daily but couldn't understand it. Reports needed to bridge this gap for them through information delivery, so that data was transformed into information. Within the DIKW pyramid model, this is the first ascension level. After this, report findings need to be processed to gain knowledge or even wisdom. As reports have been successfully deployed and implemented into use, agents may liberally access information as they need and derive knowledge-building conclusions from their data. Another possibility is to process the reports even further, either with data analytics or another solution.

For the dashboard and the visualizations of data, the biggest limiting factors were access rights and system rigidity. Salesforce, although not meant as a data visualization system, does offer many features to create custom and technical graphs. In the Salesforce dashboard tool, visualizations were created easily, as multiple chart types were offered and dashboard layout could be configured according to zone-centered design. With these, several of Few's (2017) effectiveness criteria were met. However, not all aspects of visual information delivery could be affected. For example, dashboard themes exist to modify color for better readability and accessibility (Salesforce Help s.a. g.). Due to the access level, this feature was not available. Although Few states that aesthetics as the emotive criteria are not necessary if informative criteria are met, the perceptual tasks outline multiple aesthetic qualities for visualizations. Especially considering the perceptual tasks of hue and saturation (Hill 2025), having access to color palettes could have possibly improved information delivery even further.

Product was tested frequently throughout production, and even during deployment. Each report and visualization were tested frequently to catch errors and explore alternative methods of representing information. Reports were run frequently with modified filters and test cases were created to understand product functionality better. Product testing was also indirectly completed by the "guinea pigs", who received early access during production. This method proved highly advantageous, as multiple errors and confusions were caught. For example, visualizations did not initially have sub-headings to explain what data they were showing. This caused agents confusion into what they were supposed to see from the graph. This applies to Unwin's (2020) theory, that without context a visualization is meaningless. It can be argued that the frequent testing on multiple users directly improved product accuracy and reliability.

4.1.1 User feedback survey

To gauge the usability of the product, a feedback survey was sent to product users, who in this thesis, were the helpdesk agents. The survey consisted of 5 questions that urged the respondent to grade the product based on a specifically stated metric. Lastly, the survey contained one open-ended question, allowing respondents to freely state feedback or opinions regarding the product.

The survey was designed according to the best practices, aiming for simplicity, understandable language and minimal bias (Brown 20 August 2023). The survey was conducted in Finnish, in the respondent's native language.

The product received favorable feedback from the survey. The survey received feedback from 9 agents and each respondent graded the product in all closed-ended questions. Only two answers were received to the open-ended feedback slot, and they offered no feedback nor improvement ideas.

For reports, the survey tasked respondents to grade them based on accuracy, usefulness and ease of use. For this question, grading scale was *bad*, *cannot say*, *good*. All respondents graded reports as "good" on all metrics.

To discuss the results received, there is a possibility that users simply are satisfied with the reports as also no feedback comments were received. However, the lack of open-ended answers may not necessarily mean that respondents had no feedback in mind, but that they simply didn't share it. The grading scale used for reports was much more condensed than for dashboard-related questions and may have pressured respondents to pick the only option remotely signifying a satisfactory product. If question had invited the respondents to grade reports on the same numeric metric as dashboards, there might have been more insight into exactly how well performing reports are in users' opinion. Additionally, it is important to consider that agents had no reporting available prior

to product launch. There may be a factor that agents cannot compare if reporting is good or not, or whether there is a better method of information delivery. Another bias factor to survey results may be that respondents personally know the author as well as the other respondents and therefore were aware of the small sample size. Possibly, out of fear of losing anonymity, respondents might have responded overly positively or held back.

For dashboard, respondents were asked to grade the product on a scale of 1 to 5, based on the metric stated in the question. These answers are outlined in table 2. Questions only received answers for grades 4 and 5, and none below 4.

Table 2. Survey results regarding dashboard metrics.

Dashboard metric	Answered 4 (1-5)	Answered 5 (1-5)
Accuracy	2 (22,2%)	7 (77,8%)
Understandability	3 (33,3%)	6 (66,7%)
Efficiency	3 (33,3%)	6 (66,7%)
Usability	3 (33,3%)	6 (66,7%)

Compared to the results for reports, more insight was received thanks to more answer options. In general, the dashboard received favorable reviews from users. 7 respondents gave the dashboard the highest grade for accuracy, and 6 respondents gave the highest grade for the other metrics.

The difficulty in analyzing survey results for the dashboard is that results do not reveal how dashboard could have improved, or which features caused some respondents to grade it as the second highest score. For example, with understandability, there is no insight into whether some specific visualizations were hard to interpret, or if all were, but agents learned to use them.

Overall, the survey does not reveal any statistics on actual use of the product. Product has been implemented into use, but there is no data on how often agents are accessing the tool, or if they haven't adopted it into their routines at all. Reports and the dashboard may be usable and satisfactory on their own but cannot influence agent behavior or experience without agent action.

4.2 Strengths and failures

For strengths, all objectives and requirements were met. All required reports were created as well as the corresponding dashboard visualizations. The data portrayed within reports has been vigorously tested and appears to be presented in a correct and factual manner. The dashboard is usable, accurate and has been adopted into use. Both parts of the product received satisfactory reviews from users, and no impending fixes remain after implementation.

For weaknesses however, reporting could have been more in depth. Custom fields and formulas could have been constructed and applied. Prior research defines multiple methods to ensure report and visualization quality, that simply could not be implemented. Salesforce also offers additional features for reporting and dashboards, that could not be accessed or there was no need for.

For project management, project constraints (iron triangle) were not compromised, and project progressed along to pre-defined objectives. Agile principles were applied throughout the project, with the sprint format, and frequent delivery to users and involvement of stakeholders were achieved successfully. However, due to lacking a strict timeline, more time was consumed than necessary. Additionally, users could have been included in planning stages to gauge user expectations and needs. There also could have been better emphasis on teaching users how to operate the new tool to ensure adoption into use and knowledge gain.

4.3 Success according to pre-defined qualitative indicators

For the qualitative indicators, accuracy, modifiability and ease of use were outlined. Ease of use has been evaluated based on survey results; therefore, the following sections discuss both product accuracy and modifiability.

For accuracy, data and information collected and portrayed needed to be factual and correct. However, the main concern for accuracy became the portrayal of data, especially within dashboard figures. With the visualizations, it’s possible to summarize data, or to exclude data portrayed. With the first iterations of visualizations, there was too much information portrayed, or no indication within the figure on what data was used.

For modifiability, the aim was to construct reporting and dashboard that can be easily scaled down or up if need arises. Within Salesforce, this generally means adding or removing reports / visualizations entirely or editing them. Any user with managing rights can edit the product as needed, and therefore the helpdesk manager’s user was granted management rights. To make future edits easier for users not familiar with the product, reports were produced to appear similar to each other. This included adding data fields in same order, similar filter logic and grouping logic. Additionally, unique reports were created to match each reporting metric and data visualization, so that if one component needs to be modified, change can be done without affecting other reports or visualizations.

4.4 Further processing possibilities

The further processing possibilities are endless, but are constrained by access levels, funds, available tools and most importantly, necessity. Solely within Salesforce, reporting can be taken to a

much deeper level with the setup function, analytics tab or an integration with other support systems.

Salesforce setup allows creation of custom data fields. These can be created to collect more data. Also, a Salesforce flow builder can be used to create custom flows, or automized process chains. (Salesforce Help s.a. h.). The report most benefiting from these options would have been “monthly response time by queues”. Currently, the case history report tracks the duration the case spends in each status, but the produced value is portrayed in some form of a percentage of an hour. This data is not easily understood and needed to be covered by bucketing the column to under or over the value 24, to simplify the value to younger or older than a day. With the help of setup, a new data field or a flow could have been created to track stage duration and portray value better.

Another function of Salesforce is Analytics, which promises even deeper levels of reporting than Salesforce Reports. Another function within Salesforce is their artificial intelligence functionality, which could be implemented to increase predictive reporting abilities, among others. (Salesforce s.a. b.).

Currently, support helpdesk uses around 9 systems in their day-to-day work. Most are used to manage payment terminals or transaction processing, but a few of them could be integrated with Salesforce to increase reporting data. For example, the call service could be integrated to match a call with a corresponding case.

However, further processing would require a need to be implemented. At the moment, more detailed reporting is available to management level. For helpdesk agents, there is no need to reveal all support data. There is also a danger of too much information and whether more information would lead to better results in their work or overall quality of support.

4.5 Own learning and professional development

This thesis has allowed me to use Salesforce to create and implement an actual solution for a real company. I’ve had the opportunity to discuss requirements, design the product, produce reports and visualizations, and release a solution to wide usage. Although I did not receive all the access rights I initially wanted, I had the opportunity to implement my knowledge of Salesforce and learn more. I’ve also had the opportunity to research deeper into reporting and data visualization practices.

I realize this thesis welcomed me only to a fraction of knowledge available on information management. There is still deeper knowledge to be attained on other methods of analyzing and presenting data, and other systems or tools.

References

Agile Alliance s.a. a. The 12 Principles behind the Agile Manifesto. URL: https://www.agilealliance.org/agile101/12-principles-behind-the-agile-manifesto/. Accessed: 19 May 2025.

Agile Alliance s.a. b. Minimum Viable Product (MVP). URL: https://www.agilealliance.org/glossary/mvp/. Accessed: 19 May 2025.

Asiakastieto s.a. Verifone Finland Oy. URL: https://www.asiakastieto.fi/yritykset/fi/verifone-finland-oy/09438199/yleiskuva. Accessed: 14 April 2025.
Atlassian s.a. What is project management? URL: https://www.atlassian.com/work-management/project-management. Accessed: 19 May 2025.

Awati, R. October 2024. What is the Salesforce Service Console? Tech Target blog. URL: https://www.techtarget.com/searchcustomerexperience/definition/Salesforce-Service-Console. Accessed: 19 May 2025.

Baškarada, S. & Koronios, A. 2013. Data, Information, Knowledge, Wisdom (DIKW): A Semiotic Theoretical and Empirical Exploration of the Hierarchy and its Quality Dimension. Australasian Journal of Information Systems. URL: https://ajis.aaisnet.org/index.php/ajis/article/view/748/550. Accessed: 19 May 2025.

Brown, M. 20 August 2023. Writing Good Survey Questions: 10 Best Practices. Nielsen Norman Group blog. URL: https://www.nngroup.com/articles/survey-best-practices/. Accessed: 21 May 2025.

Buzea, V. 19 July 2023. Agile Methodology: Benefits And Challenges For Engineering Leaders. Forbes Technology Council blog. URL: https://www.forbes.com/councils/forbestechcouncil/2023/07/19/agile-methodology-benefits-and-challenges-for-engineering-leaders/. Accessed: 19 May 2025.

Camm, J. D., Fry, M. J. & Shaffer, J. 2017. A Practitioner's Guide to Best Practices in Data Visualization. Informs. URL: https://research-ebsco-com.ezproxy.haaga-helia.fi/c/ibpxa7/viewer/pdf/3jrdj7i5cz?route=details&auth-callid=de101244-7b48-460e-91fc-73888c42afb4&auth-callid=095927d8-1f33-4b8c-ba29-0c0bf15086f8. Accessed: 19 May 2025.

Carroll, A. 9 February 2024. Project Closure Phase: A Comprehensive Guide. Project Management blog. URL: https://project-management.com/project-management-phase-5-closure/. Accessed: 19 May 2025.

Castellan, C. M. 2010. Quantitative and Qualitative Research: A View for Clarity. Macrothink Institute. URL: https://www.macrothink.org/journal/index.php/ije/article/view/446. Accessed: 19 May 2025.

Cleveland, W. & McGill, R. 1985. Graphical Perception and Graphical Methods for Analyzing Scientific Data. American Association for the Advancement of Science. URL: https://www.researchgate.net/publication/6062457_Graphical_Perception_and_Graphical_Methods_for_Analyzing_Scientific_Data. Accessed: 19 May 2025.

Coursera. 2024. What Is Data Reporting? Definition, Uses, Types, and Tools. URL: https://www.coursera.org/articles/data-reporting. Accessed: 14 May 2025.

Cowell, H. R. 1998. The Use of Numbers and Percentages in Scientific Writing. The Journal of Bone & Joint Surgery. URL: https://www.jbjs.org/reader.php?rsuite_id=448493&source=The_Journal_of_Bone_and_Joint_Surgery/80/8/1095&topics=hp+kn#info. Accessed: 21 May 2025.

Downen, T. April 2018. 5 Principles of Report Design. Strategic Finance. URL: https://www.sfmagazine.com/articles/2018/april/5-principles-of-report-design/. Accessed: 23 April 2025.

Eckerson, W. 2010. Performance Dashboards: Measuring, Monitoring, and Managing Your Business. 2nd Ed. John Wiley & Sons. New Jersey. E-book. Accessed: 23 April 2025.

Engebretsen, M. & Kennedy, H. 2020. Data Visualization in Society. Amsterdam University Press. Amsterdam. E-Book. Accessed: 19 May 2025.

Few, S. 2017. Data Visualization Effectiveness Profile. Perceptual Edge. URL: https://www.perceptualedge.com/articles/visual_business_intelligence/data_visualization_effectiveness_profile.pdf. Accessed: 22 April 2025.

Funding Universe s.a. VeriFone, Inc. History. URL: https://www.fundinguniverse.com/company-histories/verifone-inc-history/. Accessed: 19 May 2025.

Geeks for geeks, 2024. Lean Software Development (LSD). URL: https://www.geeksforgeeks.org/lean-software-development-lsd/. Accessed: 19 May 2025.

Glöckner, S. 24 February 2022. What is Reporting? Portal Systems blog. URL: https://www.portal-systems.de/en/wiki/reporting/. Accessed: 22 April 2025.

Good, L. 28 February 2024. 5 Phases of Project Management Life Cycle | Complete Guide. Project management blog. URL: https://project-management.com/project-management-phases/. Accessed: 19 May 2025.

Google Cloud s.a. What is a relational database? URL: https://cloud.google.com/learn/what-is-a-relational-database. Accessed: 3 April 2025.

Grax. 21 October 2024. What is a Salesforce Database? Salesforce Database Management. Grax blog. URL: https://www.grax.com/blog/what-is-a-salesforce-database/. Accessed: 3 April 2025.
Hassenstein, M. J. & Vanella, P. 2022. Data Quality—Concepts and Problems. MDPI. Basel. URL: https://www.mdpi.com/2673-8392/2/1/32. Accessed: 22 April 2025.

Hill, A. 2025. Are pie charts evil? An assessment of the value of pie and donut charts compared to bar charts. Sage Journals. URL: https://journals.sagepub.com/doi/epub/10.1177/14738716241259432. Accessed: 14 May 2025.

Indeed. 2025. Reporting vs. Analytics: What's the Difference? URL: https://www.indeed.com/career-advice/career-development/reporting-vs-analytics. Accessed: 14 May 2025.

Insight Software s.a. What are Dashboards and Dashboarding. URL: https://insightsoftware.com/encyclopedia/dashboards-dashboarding/. Accessed: 23 April 2025.
Islam, M. & Shangzu, J. 2019. An Overview of Data Visualization. IEEE. Tashkent. URL: https://ieeexplore.ieee.org/document/9012031/authors#full-text-header. Accessed: 22 April 2025.

Janes, A., Sillitti, A. & Succi, G. 2013. Effective dashboard design. Cutter IT journal. URL: https://www.researchgate.net/publication/286996830_Effective_dashboard_design. Accessed: 28 April 2025.

Joseph Martinez 26 September 2025. The Importance of Data in the Modern World. LinkedIn post. URL: https://www.linkedin.com/pulse/importance-data-modern-world-joseph-n-martinez-3z2xc. Accessed: 23 April 2025.
Joubert, S. 2024. Agile vs. Scrum: What’s the Difference? Northeastern University blog. URL: https://graduate.northeastern.edu/knowledge-hub/agile-vs-scrum/. Accessed: 19 May 2025.

Krishna, A., Dangayach, G. & Sharma, S. 2014. Service Recovery Paradox: The Success Parameters. Global Business Review, 15, 2, pp.263-277.

Lim, C., Kim, K. H., Kim, M. J., Heo, J. Y., Kim, K. J. & Maglio, P. P. 2017. From data to value: A nine-factor framework for data-based value creation in information-intensive services. Elsevier. URL: https://www.sciencedirect.com/science/article/pii/S0268401217300816?ref=pdf_download&fr=RR-2&rr=9403c33b0bb9d90a. Accessed: 22 April 2025.

Marco, C. A. & Larkin, G. L. 2000. Research Ethics: Ethical Issues of Data Reporting and the Quest for Authenticity. Academic Emergency Medicine. URL: https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1553-2712.2000.tb02049.x. Accessed: 21 May 2025.

Maxwell, J. A. 2019. Distinguishing Between Quantitative and Qualitative Research: A Response to Morgan. Sage Journals. URL: https://journals-sagepub-com.ezproxy.haaga-helia.fi/doi/epub/10.1177/1558689819828255. Accessed: 19 May 2025.

Mazalon, L. 27 August 2022. Everything You Need to Know About Salesforce Queues. URL: https://www.salesforceben.com/everything-you-need-to-know-about-salesforce-queues/. Accessed: 3 April 2025.

Merriam-Webster s.a. Data. URL: https://www.merriam-webster.com/dictionary/data. Accessed: 22 April 2025.

Microsoft, 2022. What is Agile development? URL: https://learn.microsoft.com/en-us/devops/plan/what-is-agile-development. Accessed: 19 April 2025.

Najib, N. & Pham, V. 30 April 2024. 4 Customer Service Metrics You Should Measure. The 360 blog. URL: https://www.salesforce.com/blog/4-customer-service-metrics-you-should-measure/. Accessed: 28 April 2025.

O'Leary, S. 11 January 2023. Complete Guide to Record Types in Salesforce. URL: https://www.salesforceben.com/salesforce-record-types/. Accessed: 3 April 2025.

Pega Academy s.a. Design principles of reporting. URL: https://academy.pega.com/topic/design-principles-reporting/v2/in/65901. Accessed: 23 April 2025.

Project Management Institute. 2017. A guide to the project management body of knowledge (PMBOK guide). 6th ed. Project Management Institute, Inc. Newtown Square. E-book. Accessed: 28 April 2025.

Raj, N. s.a. Minimum Viable Product (MVP) - What is it & how to start. Atlassian blog. URL: https://www.atlassian.com/agile/product-management/minimum-viable-product. Accessed: 19 May 2025.

Rehkopf, M. s.a. Scrum Sprints: Everything You Need to Know. Atlassian blog. URL: https://www.atlassian.com/agile/scrum/sprints. Accessed: 19 May 2025.

Salesforce Help 2024. Email-to-Case does not assign the record type selected in the Email-to-Case settings. URL: https://help.salesforce.com/s/articleView?id=000387390&type=1. Accessed: 19 May 2025.

Salesforce Help s.a. a. Set Up and Manage Cases in Service Cloud. URL: https://help.salesforce.com/s/articleView?id=service.cases_intro.htm&type=5. Accessed: 3 April 2025.

Salesforce Help s.a. b. Assign Cases. URL: https://help.salesforce.com/s/articleView?id=service.cases_assign.htm&type=5. Accessed: 19 May 2025.
Salesforce Help s.a. c. Data Exploration Concepts. URL: https://help.salesforce.com/s/articleView?id=analytics.bi_explorer_exploration_concepts.htm&type=5. Accessed: 19 May 2025.

Salesforce Help s.a. d. Improve Report Performance. URL: https://help.salesforce.com/s/articleView?id=analytics.improving_report_performance.htm&type=5. Accessed: 14 May 2025.

Salesforce Help s.a. e. Categorize Data with Bucket Columns. URL: https://help.salesforce.com/s/articleView?id=analytics.reports_bucketing_overview.htm&type=5. Accessed: 14 May 2025.

Salesforce Help s.a. f. Build a Lightning Experience Dashboard. URL: https://help.salesforce.com/s/articleView?id=analytics.dashboards_create_lex.htm&type=5. Accessed: 14 May 2025.

Salesforce Help s.a. g. Improve Dashboard Accessibility with High-Contrast Colors. URL: https://help.salesforce.com/s/articleView?id=release-notes.rn_bi_dashboard_accessible_themes.htm&release=242&type=5. Accessed: 19 May 2025.

Salesforce Help s.a. h. Explore the Salesforce Setup Menu. URL: https://help.salesforce.com/s/articleView?id=xcloud.basics_nav_setup.htm&type=5. Accessed: 21 May 2025.

Salesforce s.a. a. What is Salesforce? URL: https://www.salesforce.com/products/what-is-salesforce/. Accessed: 3 April 2025.

Salesforce s.a. b. CRM Analytics. URL: https://www.salesforce.com/analytics/crm/. Accessed: 21 May 2025.

Sauro, J. & Lewis, J. 2023. Should You Report Numbers or Percentages in Small-Sample Studies? URL: https://measuringu.com/should-you-report-numbers-with-small-n/. Accessed: 21 May 2025.
Schwaber, K. & Sutherland, J. 2020. The Scrum Guide, The Definitive Guide to Scrum: The Rules of the Game. URL: https://scrumguides.org/docs/scrumguide/v2020/2020-Scrum-Guide-US.pdf#zoom=100. Accessed: 19 May 2025.

Sedrakyan, G., Mannens, E. & Verbert, K. 2018. Guiding the choice of learning dashboard visualizations: Linking dashboard design and data visualization concepts. Journal of Visual Languages and Computing. URL: https://ris.utwente.nl/ws/portalfiles/portal/287021541/Sedrakyan_2019_Guiding_the_choice_of_learning_dash.pdf. Accessed: 14 May 2025.

Shorten, A. & Smith, J. Mixed methods research: expanding the evidence base. Evidence based nursing. URL: https://ebn.bmj.com/content/20/3/74. Accessed: 19 May 2025.

Siirtola, H. 2019. The Cost of Pie Charts. IEEE. URL: https://trepo.tuni.fi/bitstream/handle/10024/117653/the_cost_of_pie_charts_2019.pdf?sequence=2&isAllowed=y. Accessed: 19 May 2025.

Silvius, A. & Schipper, R. 2024. Sustainable project management. The handbook of project management. URL: https://www.researchgate.net/publication/377683539_Sustainable_project_management. Accessed: 28 April 2025.

Sonar s.a. The Salesforce Picklist: Complete Guide. URL: https://sonarsoftware.com/blog/salesforce-picklist/. Accessed: 19 May 2025.

Taylor, E. 29 January 2025. What is Raw Data and How it is Processed? The knowledge academy blog. URL: https://www.theknowledgeacademy.com/blog/what-is-raw-data/. Accessed: 19 May 2025.

Tozzi, C. How to Measure Data Quality – 7 Metrics to Assess the Quality of Your Data. Precisely blog. URL: https://www.precisely.com/blog/data-quality/how-to-measure-data-quality-7-metrics. Accessed: 23 April 2025.

Unwin, A. 2020. Why Is Data Visualization Important? What Is Important in Data Visualization? The MIT Press. URL: https://hdsr.mitpress.mit.edu/pub/zok97i7p/release/4. Accessed: 22 April 2025.

Verifone s.a. The Future of Payments is Boundless. URL: https://www.verifone.com/en/global/about-us. Accessed: 19 May 2025.

Vilarinho, S., Lopes, I. & Sousa, S. 2018. Developing dashboards for SMEs to improve performance of productive equipment and processes. Journal of industrial information integration, 12, pp. 13-22.

Yale s.a. Categorical Data. URL: http://www.stat.yale.edu/Courses/1997-98/101/catdat.htm. Accessed: 19 May 2025.

Appendices

Appendix 1. Survey questions.

As survey was conducted in Finnish language, below are the questions in both original language and translated into English.

1. Kuvaako dashboard mielestäsi paikkaansapitävää tietoa? / *Do you think the dashboard presents accurate information?*
2. Onko dashboardin graafit helposti ymmärrettäviä? / *Are the dashboard graphs easy to understand?*
3. Saatko dashboardista nopeasti tarvitsemasi tiedon? / *Can you quickly get the information you need from the dashboard?*
4. Onko dashboardia mukava käyttää? / *Is the dashboard easy to use?*
5. Dashboardin graafit perustuvat raportteihin. Raporteissa on joitain, joista ei tehty graafia dashboardiin, esim. muiden avoimet tiketit. Miten koet raporttien käytettävyyden? / *The dashboard graphs are based on reports. There are some reports that were not visualized in the dashboard, e.g. other people's open tickets. How do you feel about the usability of the reports?*
6. Avoin palaute: Saat vapaasti antaa kehitysideoita / kritiikkiä :) Puuttuuko dashboardista jotain olennaista mielestäsi, pitäisitkö jokin tieto kuvastaa muulla tavalla? Jos dashboard ei kuvasta tietoa oikein, voit kertoa sen myös tässä. / *Open feedback: Feel free to give development ideas / criticism :) Do you think the dashboard is missing something essential, or should some information be presented in a different way? If the dashboard does not present the information correctly, you can also tell it here.*