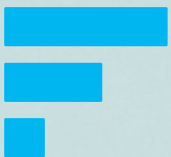

Information overload and the power of visualization

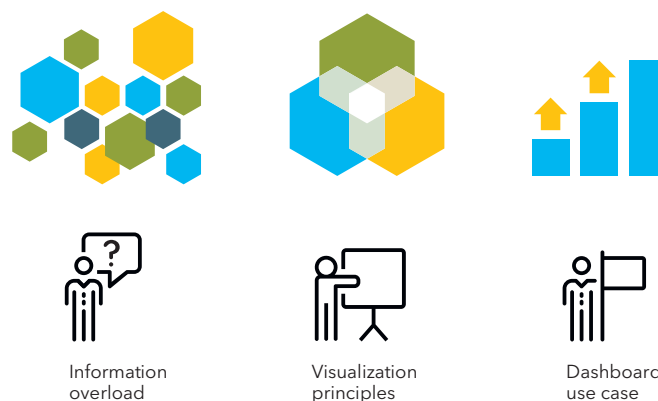


FINYON

"The drawing shows me at one glance what might be spread over ten pages in a book"

Ivan Turgenev ("Fathers and Sons", 1861)

In the era of information overload, it is becoming more challenging to get a concise overview of the business data. This paper guides the information user through the data chaos and helps organizing it into an appropriate visualization form (dashboard). The guide is accompanied by an illustrative example of a treasury liquidity management cockpit and is extendable to other use cases, which can be as broad as a strategic steering of a financial institution. As a consequence, an orderly visualization of business data shall allow the management to concentrate on the key business parameters and performance indicators to drive balanced and deliberate decisions and conduct post-decision analytics.



Advances made in communication technologies are leading to an ever-growing access to more information and paradoxical situations, when data can become a liability if it is not well understood. This phenomenon is known in the literature as "information overload", i.e., when decision-makers face a level of information that is greater than their information processing capacity (Schroder et al. 1967; Eppler and Mengis 2004). The problem is becoming widely recognized and experienced in many industries, with banking and insurance being no exception.

In his effort to estimate the size of the information overload and its impact, Lohr (2007) cites a \$650 billion figure or up to 8 hours per week per office worker. These are the "cost of unnecessary interruptions" in terms of lost productivity and innovation. Furthermore, due to the limited human processing capacities, information overload might lead to managerial biases and false decisions (Wierenga and Van Bruggen 2000). These impacts are amplified when information complexity and information quality are factored in (Bawden and Robinson 2009; Burton-Jones and Straub 2006).

To reduce information overload and its costs, multiple solutions were promoted. These include data filtering and dashboard visualization. Pauwels et al. (2009) define a

dashboard as a relatively small collection of interconnected key performance metrics and underlying performance drivers that reflect both short- and long-term commonly accepted interests throughout the organization. As an outcome, it shall help presenting the right capacity of data to the right people to improve information literacy and make informed decisions.

Technology acts here as a tool in gaining business insights. Marr (2018) emphasizes the importance of these dashboard tools being versatile, easy to use and capable of visualizing data in a variety of ways. Dashboard tools are constantly evolving alongside the increasing information volume and demand for limited processing time. The tools include standard business intelligence software like Power BI, Tableau, QlikView and more technical applications, related to analytical programming languages like Python or R.

While each of the software offers multiple capabilities, they are only as good as their capacity to serve an intended purpose. To reach the business purpose and succeed in visualization, there are several guiding principles which direct the design and implementation of a dashboard as well as the choice of the business intelligence tool.

Guiding principles for visualization

The idea that a firm should have a system that offers a holistic overview of the business is not new. This seemingly “straightforward” task is becoming more complex with the amount and variety of rapidly increasing services in the economy. In this context, there is no single metric that can adequately represent the performance of the business (Ambler and Roberts 2006) and, thus, no single dashboard that can be adopted by multiple firms across the industry.



Figure 1: Guiding principles for dashboard development

While the process of designing a good dashboard is typically bespoke, there are principles that shall guide through this process (figure 1):

- **Know your target audience** (i.e., dashboard users). Whether top executives, middle, operational level of management or a combination thereof, end users, their background, experience and qualifications shall be leading the design of the dashboard. Ideally, this is paired with other criteria such as: organizational decision style (analytical vs. more intuitive) and cross-departmental relations (cooperative vs. more independent) (Pauwels et al. 2009).

- **Identify the purpose of the dashboard.** Once the target audience is identified, it is necessary to understand the purpose of a dashboard within the organization. Depending on the purpose, dashboards can be classified into strategic, analytical, monitoring (operational), or combined. Strategic dashboards support decision makers and allow to steer the business. These dashboards focus on high-level performance metrics and forward-looking views. Strategic dashboards also allow to test the assumptions that have been driving the business decisions and incentivize further research, in the form of data collection, or experimentation. Analytical dashboards typically include more context, comparisons, and history, along with more detailed performance indicators. Monitoring dashboards focus on tracking of activities and events that are constantly changing and might require instantaneous attention and response.

- **Fit the right content.** Populating the dashboard with data is anything but trivial. Not only shall the data be of good quality, but it shall come at the right periodicity and level of granularity without overburdening the target audience with unnecessary details. Irrespective of the purpose, all dashboards will benefit from a framework for recognizing good performance, diagnosing poor performance, and evaluating remediation options (Reibstein et al. 2005). With this framework in place, data collection becomes more transparent.

- **Choose the right visualization form.** The visualization form is a central element in data storytelling and shall connect all the abovementioned principles. Whether it is a simple table, line chart, histogram, heatmap, or pie chart, each visualization type must be carefully analyzed depending on the audience, purpose and content (see figure 2 for a selection of visualization forms). As an example, bar charts are good for a comparison across the categories, whereas line charts are better to recognize the trends. All good visualization designs assist the users in reaching conclusions more quickly and efficiently. This includes color coding, structuring, sequencing of display, hierarchy and placement of text and adding explanatory labels.

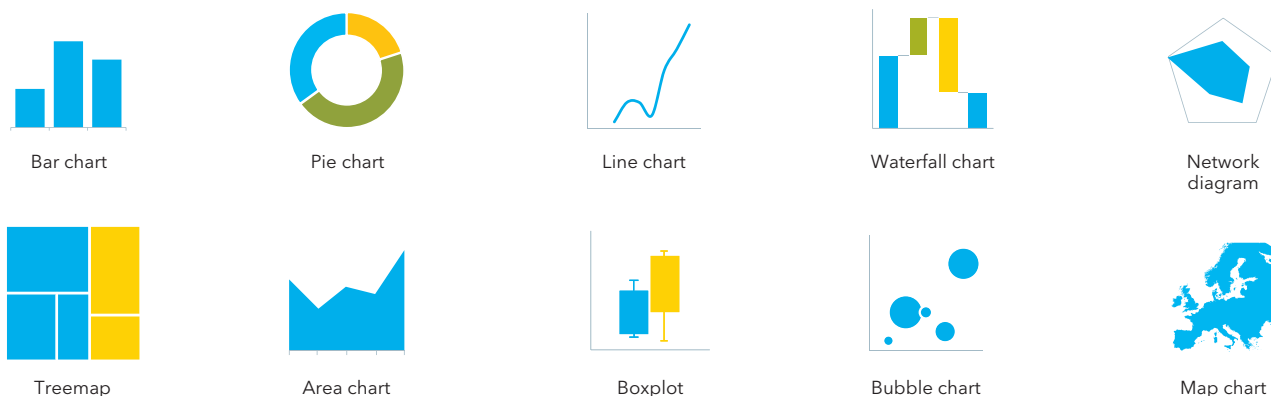


Figure 2: Visualization form examples

Dashboard use case: Liquidity management cockpit

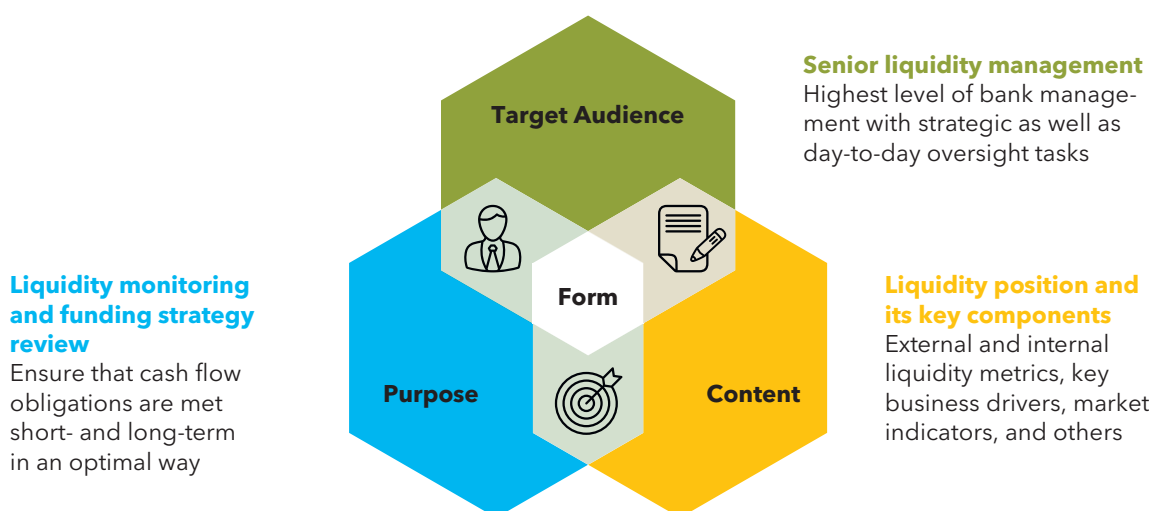


Figure 3: Dashboard case study: Treasury liquidity management

While dashboards can be applied in every business area, in this section we will focus on a case of bank treasury, where the **target audience** is defined as the senior liquidity management, i.e., the highest level of management involved in strategic as well as day-to-day management of a bank's liquidity position. The main **purpose** includes monitoring the liquidity position of the bank, its subsidiaries and/or branches as well as supporting the funding strategy review in business-as-usual and stress situations¹. The purpose partially dictates the **content** and its frequency. Liquidity monitoring information might include internal and external (regulatory) short- and long-term liquidity metrics over various time horizons, i.e., actual values, historical development, and forward-looking trends. The choice of the metrics is made so that they indicate instantly liquidity shortage (excess) and/or any related inefficiencies. Figure 3 provides a mapping between the guiding principles for visualization and the liquidity management use case.

While liquidity metrics allow to detect liquidity issues, further dashboards elements shall provide details to the drivers of these issues, funding solutions and associated costs. As stated in the previous sections, there is no one-fits-all approach. Peer analysis, market practices or regulatory guidance can serve as a starting point for dashboard development². Complemented by inclusion of key market indicators, the dashboard shall assist the senior liquidity management in monitoring the liquidity position at the required granularity, spot any shortfalls and their drivers and outline possible solutions whether in prioritization of business needs, redistribution of liquidity across the entities and/or raising additional funds in the market.

¹ In terms of dashboard classification, this purpose corresponds to a combined (strategic and operational) dashboard.

² Basel Committee on Banking Supervision has developed a set of quantitative standards to measure different dimensions of bank's liquidity and funding profile (BCBS 2019).

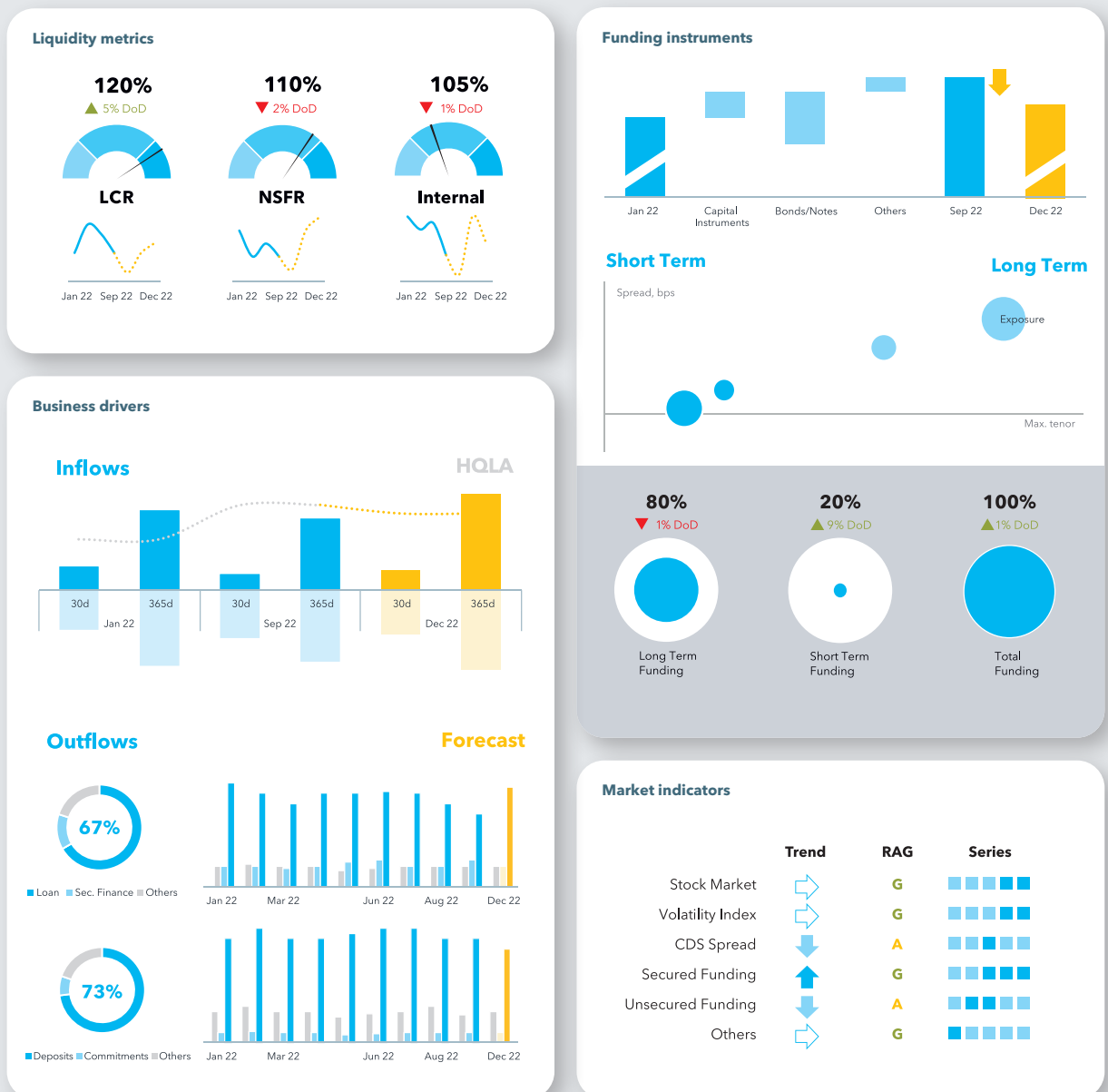


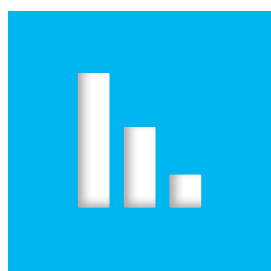
Figure 4: Dashboard illustrative example

Visualization **form** of such dashboard is outlined in figure 4. In line with the target audience, purpose and the content, the dashboard is structured around four main areas:

- Indicators of liquidity position
- Details on key business drivers
- Funding profile
- Market indicators

It is worth noting that the dashboard outlined in figure 4 is an illustrative example of the visualization approach. It is neither a substitution to the expertise and experience of the management nor is it the sole representation of liquidity management information. This and other dashboards are merely a supporting tool to provide the right information at the right time.

Finyon service offerings



Analysis

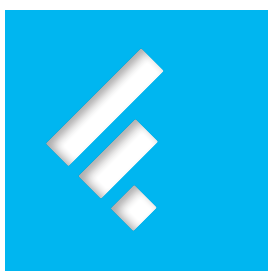
Design and
implementationGovernance
and integration

Figure 5: Finyon service offerings

Finyon Consulting AG is a boutique consulting firm in the areas of treasury, risk management and financial corporate governance. Finyon supports banks and insurance companies in dashboard development and offers an adoption framework, which is aimed at quick and efficient on-site implementation. Our framework is driven by the guiding principles described in the previous sections and includes:

- **Analysis of stakeholders' demand, data supply and the best fit between the two**
- **Design and end-to-end implementation of customizable and interactive dashboards based on Python and R programming languages**
- **Implementation of standard business intelligence tools (e.g. Power BI, OAS, Tableau) to enhance data visualization capabilities as standalone application and to support integration and visualization of advanced analysis output**
- **Review and adoption of management processes around the dashboards, including data quality assurance and respective governance**
- **Organization and execution of training and workshops to support dashboard integration in business as usual**

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