

Understanding the Role of Reporting in Work Item Tracking Systems for Software Development: An Industrial Case Study

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Abstract

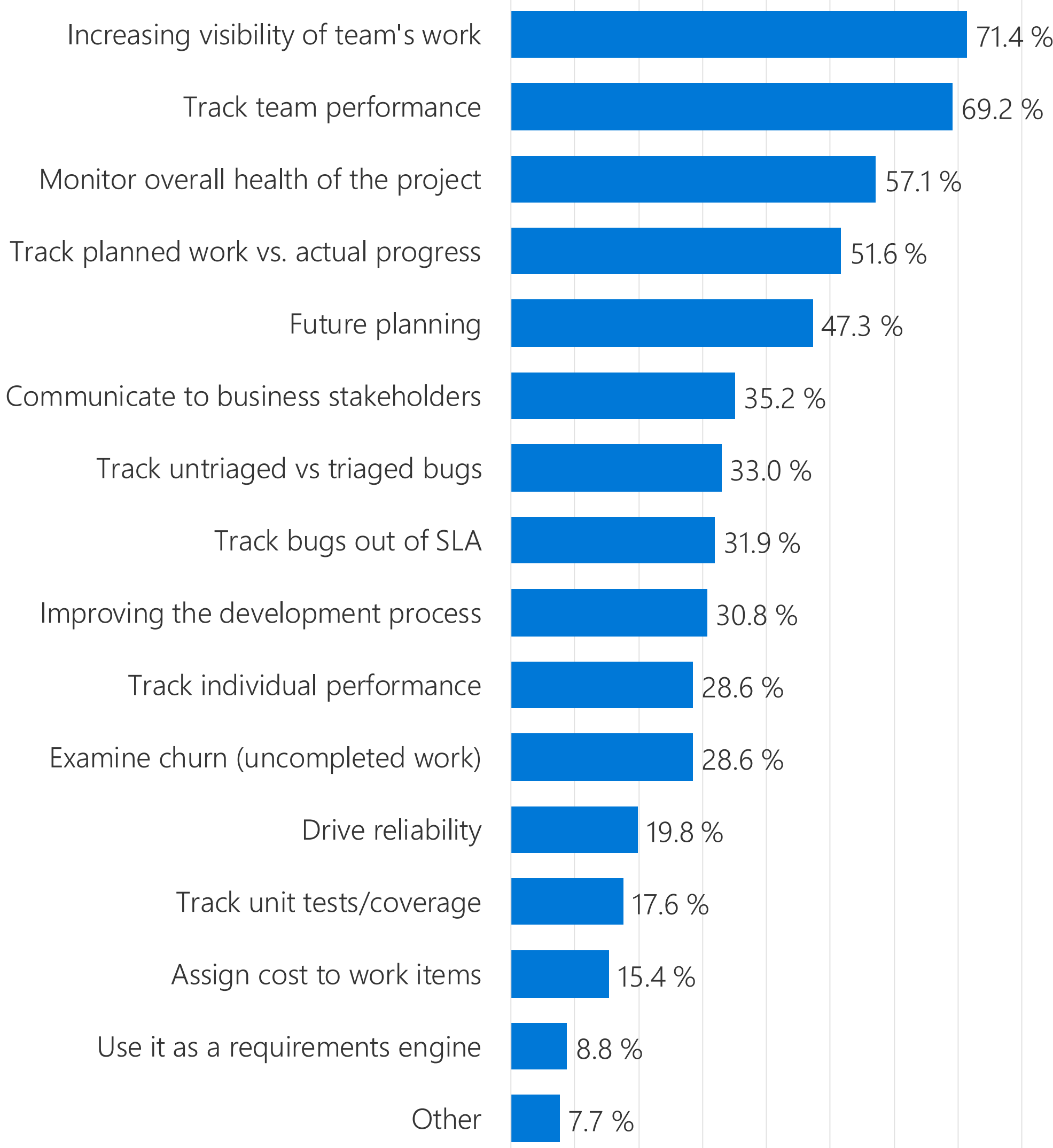
Work item tracking systems such as Visual Studio Team Services, JIRA, and GitHub issue tracker are widely used by software engineers. They help in managing different kinds of deliverables (e.g. features, user stories, bugs), plan sprints, distribute tasks across the team and prioritize the work. While these tools provide reporting capabilities there has been little research into the role these reports play in the overall software development process.

In this study, we conduct an empirical investigation on the usage of Analytics Service (AX) - a reporting service provided by Visual Studio Team Services (VSTS). In particular, we want to understand why and how users interact with AX and what are the outcomes and business decisions taken by stakeholders based on the data. Our report on qualitative and quantitative analysis can help organizations and engineers building similar tools or services.

What are the main use cases?

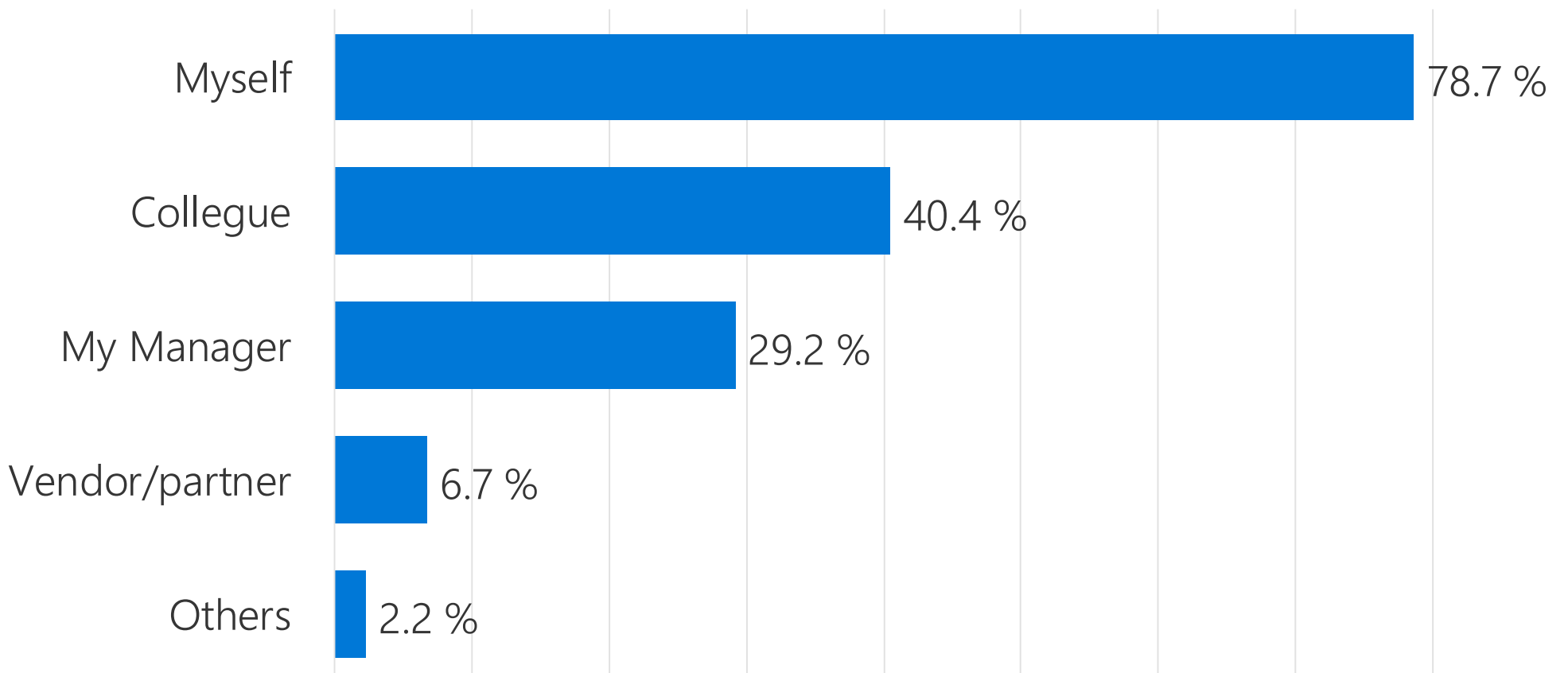
During the interviews we noticed that there are many different use cases. In the survey we chose several options to observe their frequency. Responders could select many options, thus the values do not add to 100%.

The most popular answer with the share of 71.4% was increasing the visibility of the team's work. As mentioned in one of the surveys people use reports for *"exposing things to management team, leadership and show them your people are doing this much work for driving your priorities"*.



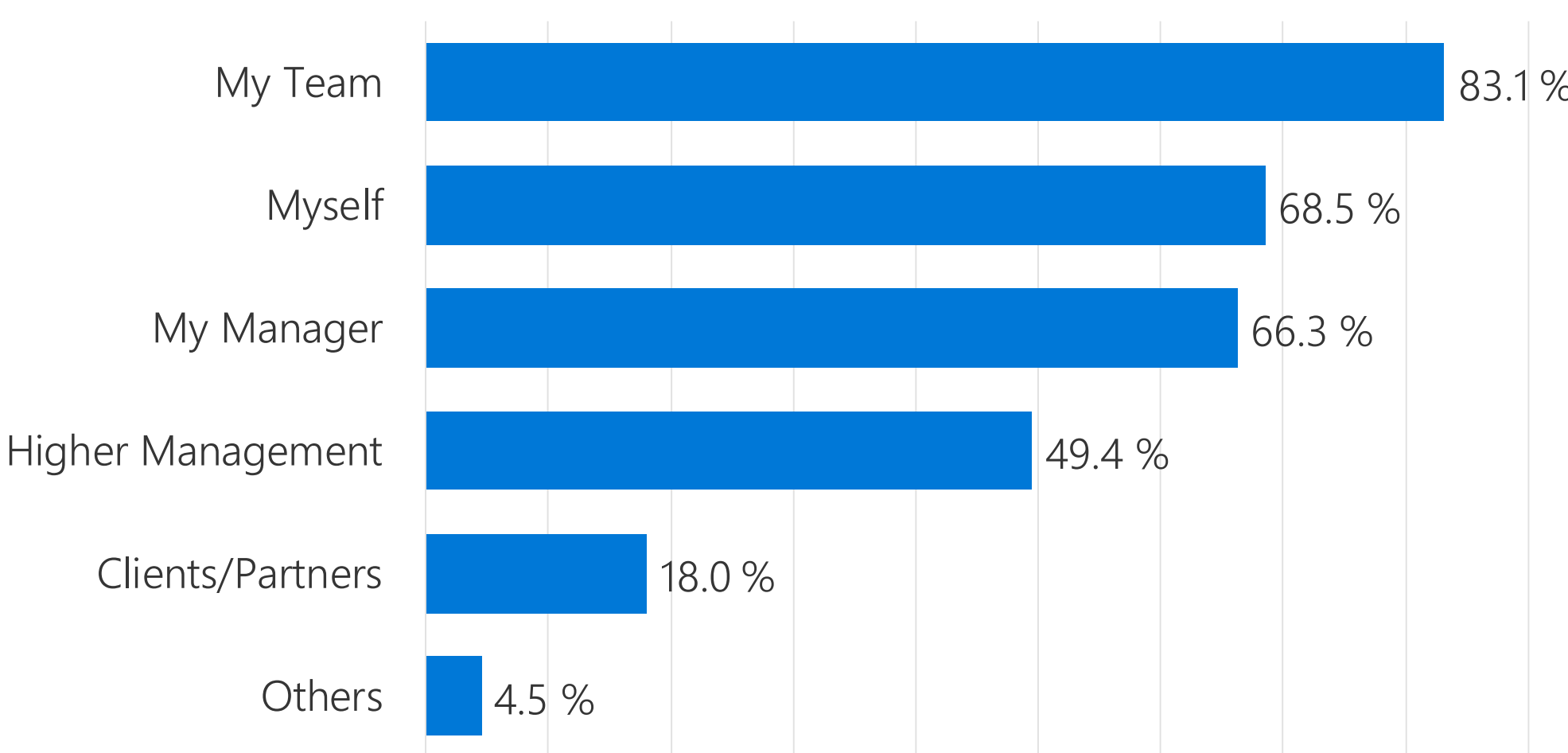
Who creates reports?

Reports can be created by different users such as team members, managers, vendors etc. This depends on the intended usage and who is the target audience. We found that a large number users create reports for themselves.



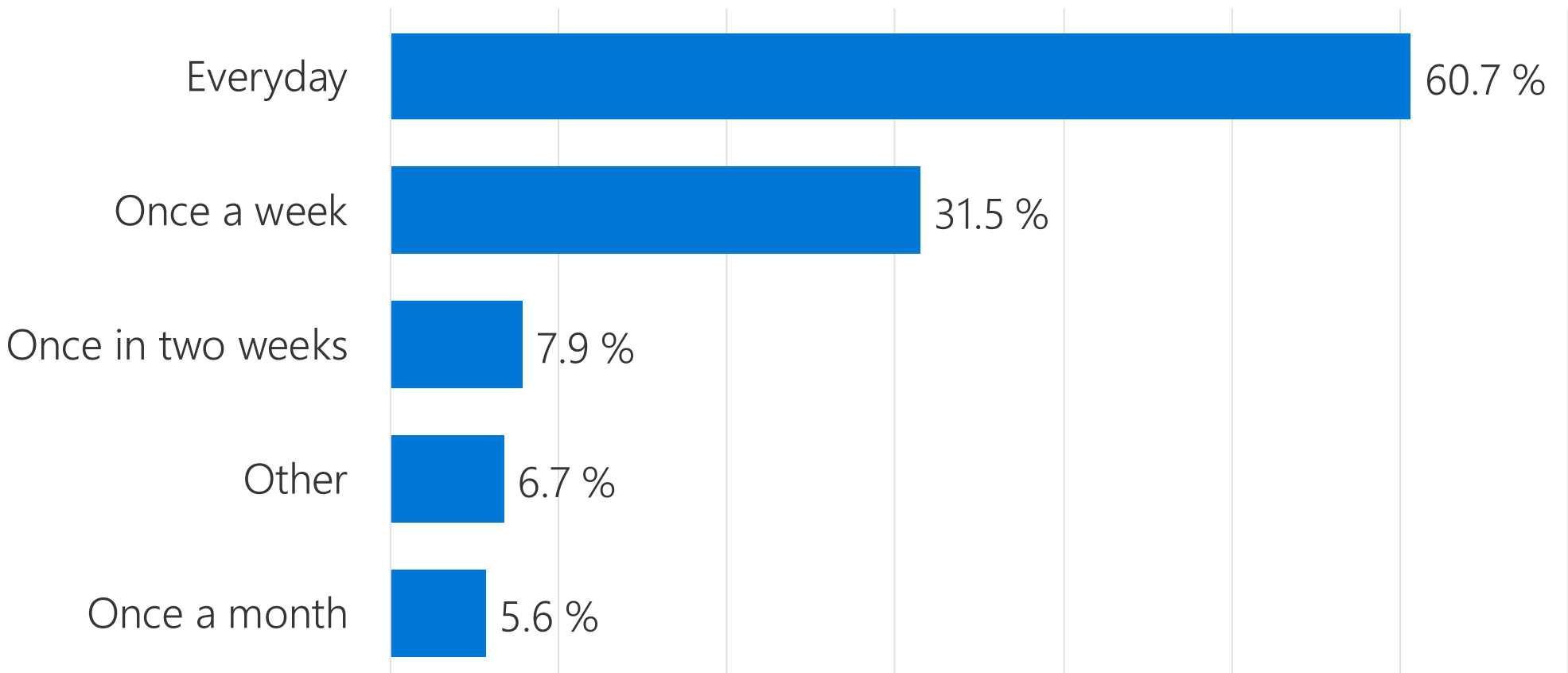
Who consumes reports?

Similarly to creators, the group of report consumers is also diverse, but more balanced. Over 80% of responders mentioned that reports are used by their teams *"We look at these in the meetings and talk about them"*, and 67% create them for their own use to track the work they are responsible for.



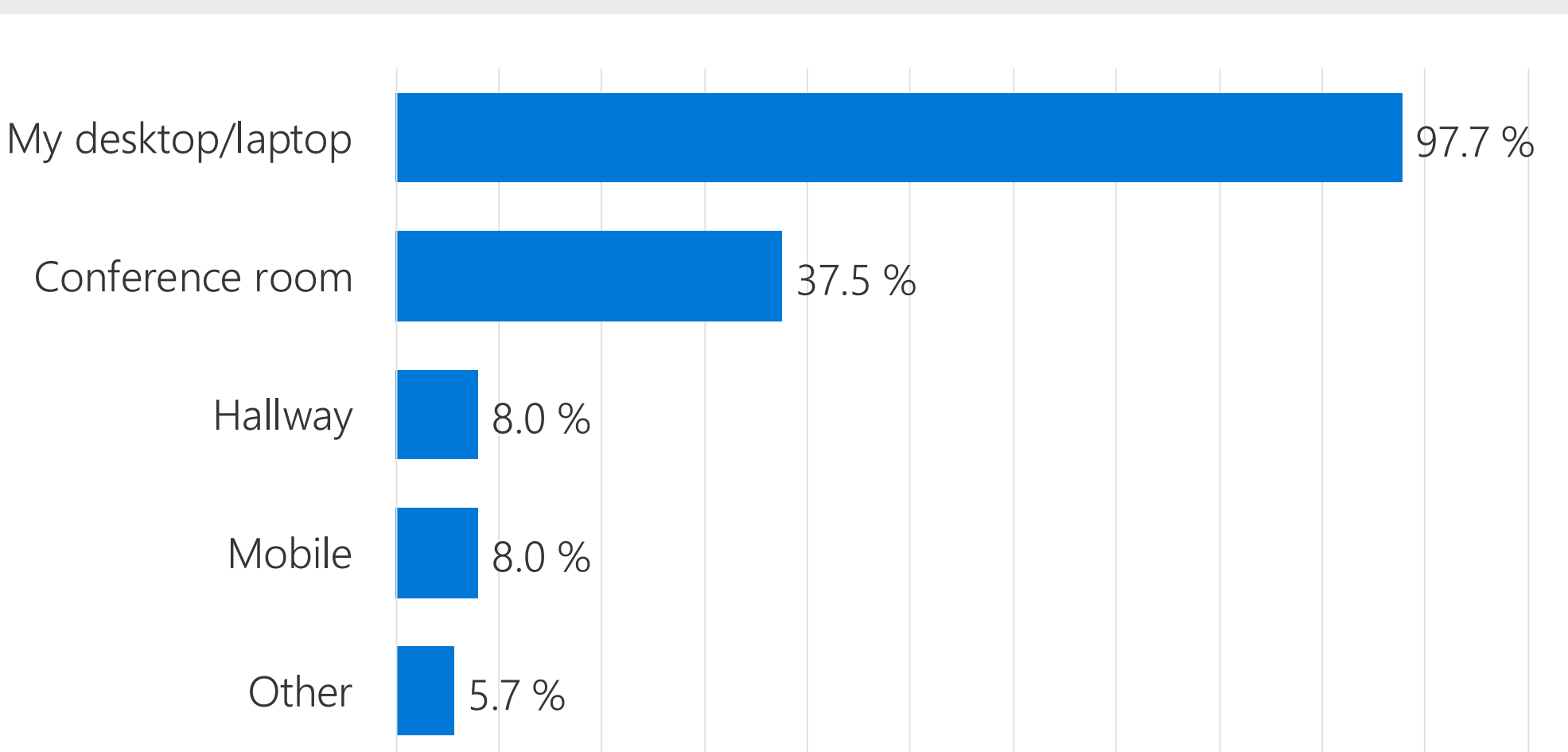
How often do users look at the reports?

We observed different frequency usage patterns. While some teams look at reports daily, others might review them on a weekly or even monthly basis. Over 60% of people mentioned that they use reports *"on a daily basis"*, and over 30% use them weekly: *"Me and another PM look at this every week"*.



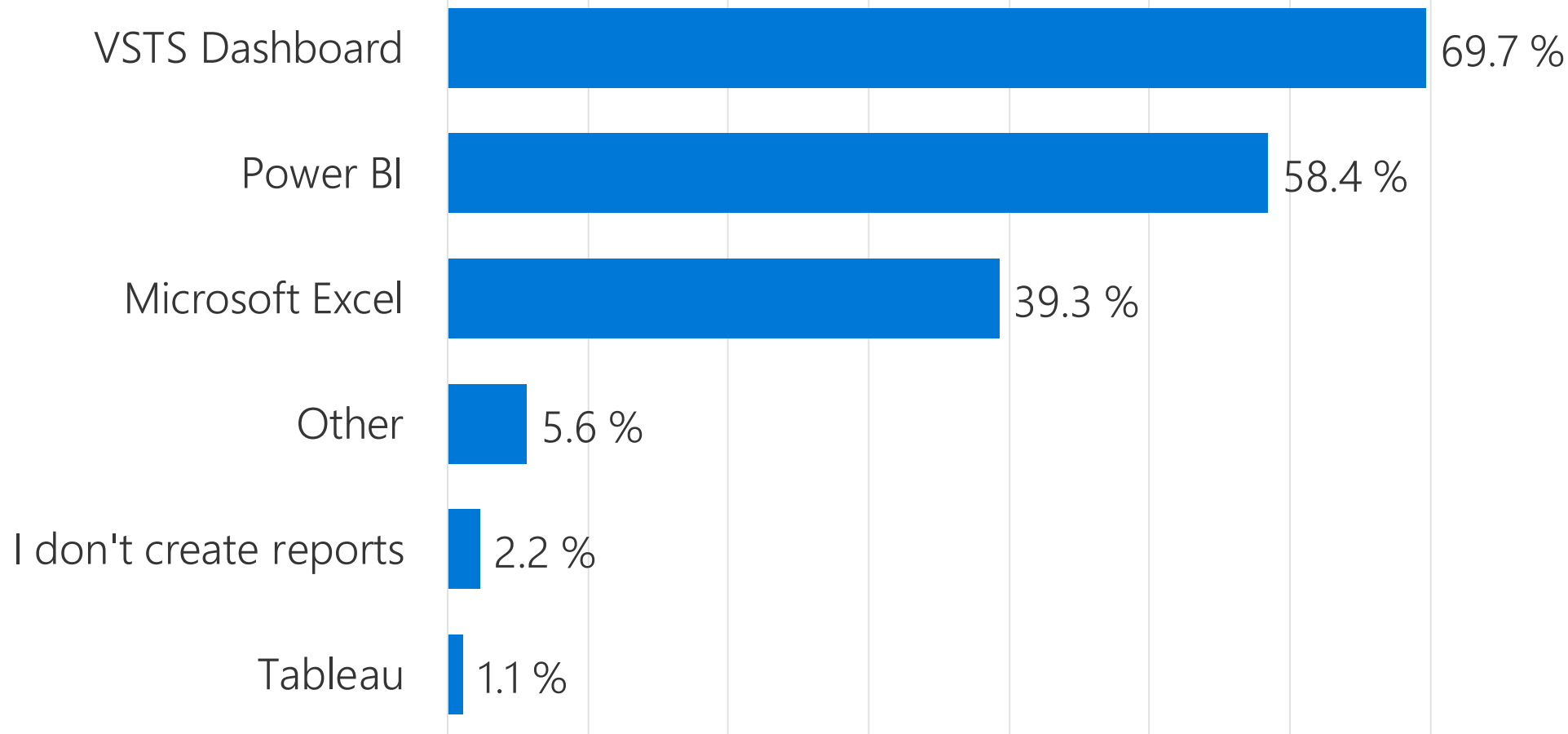
Where do users consume reports?

Reports can be displayed on a different devices in different locations. Taking into account the high percentage of users who create reports for themselves it is not a surprise that most users view reports on their desktops or laptops. Second large group represents users from teams who regularly review data during team meetings in conference rooms: *"It is a sync meetings. There are 20 of us in the meeting and we look at it together"*.



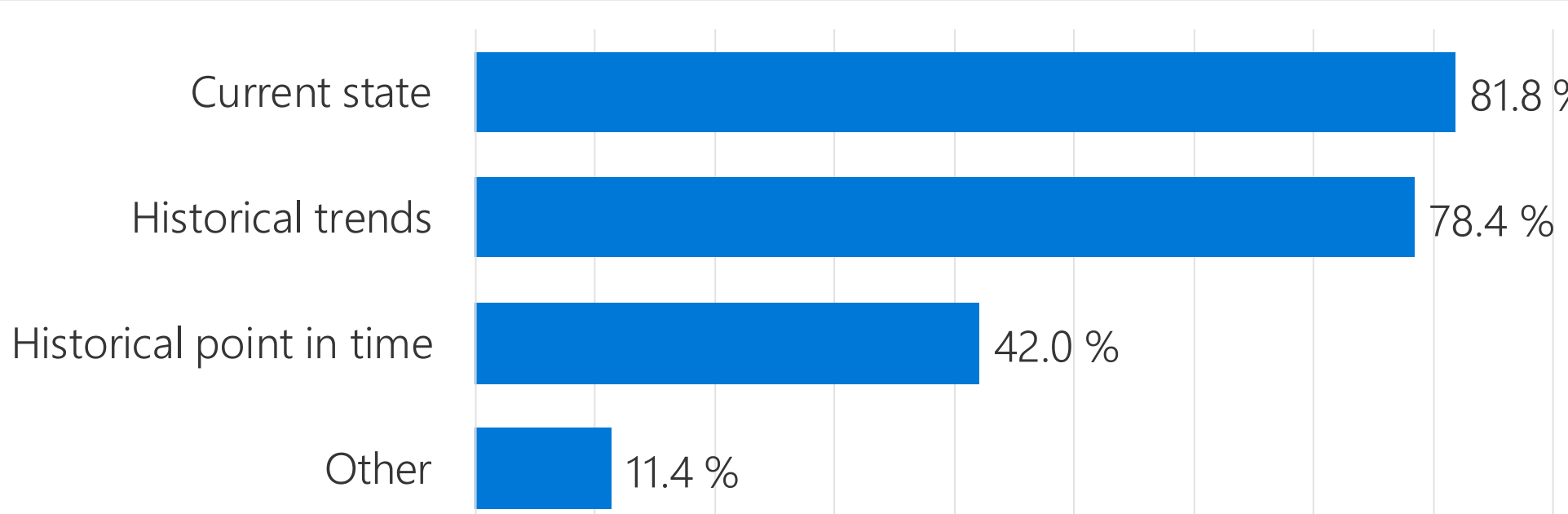
What tools are used to create reports?

VSTS provides several capabilities to create reports such as VSTS dashboards and via integration with other tools: Power BI, Microsoft Excel, Tableau. Dashboards are the most popular option with nearly 70% adoption. This is probably due to the ease of use, minimal setup requirements and the fact that they are part of the product.



What is a typical date range?

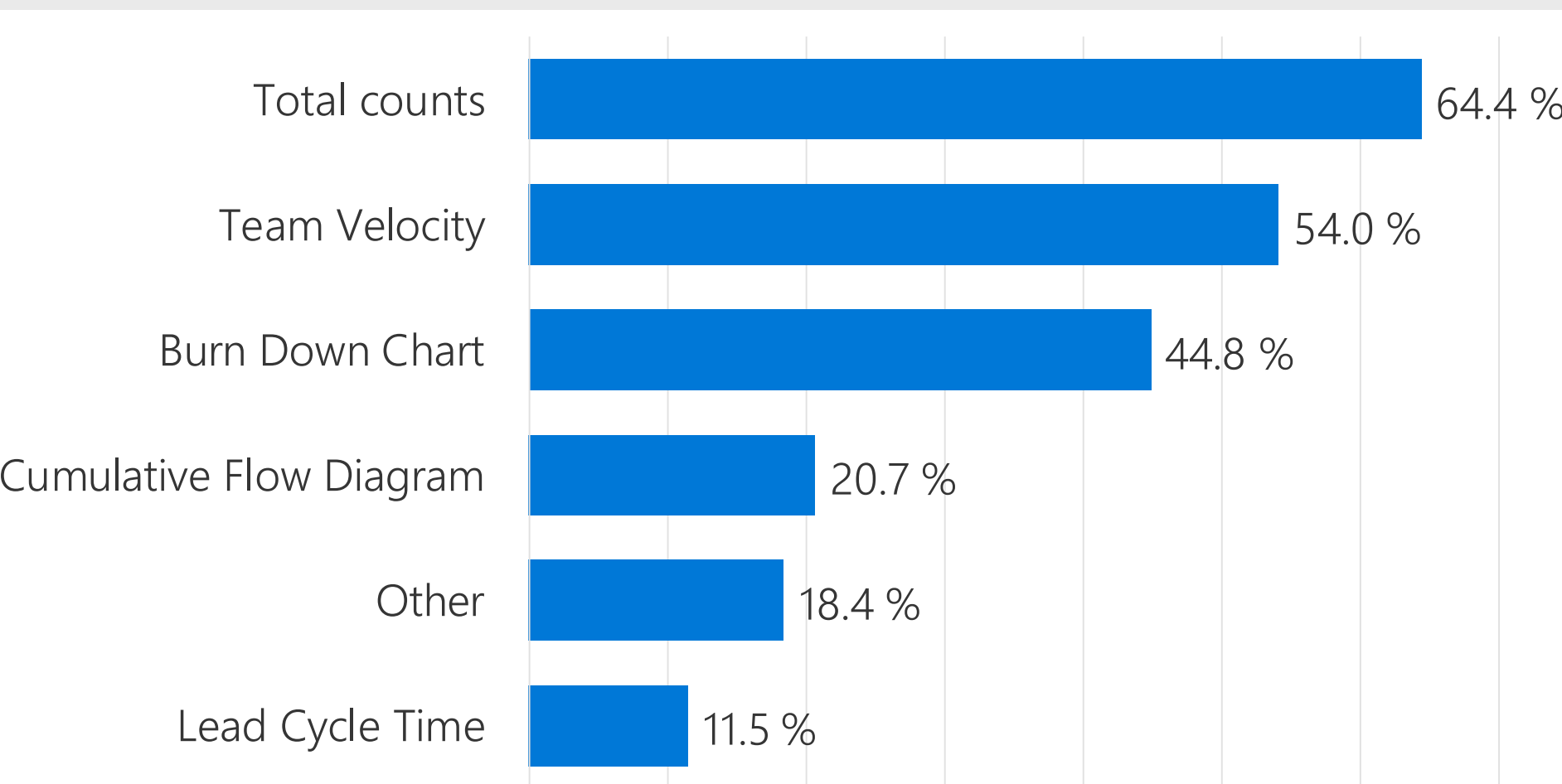
Reports might cover different date ranges depending on the scenario. Some people might be interested in current state while others need to analyze historical trends. One could also do point in time analysis to compare plan from a particular date (e.g. start of the sprint) with the current execution. Over 80% of responders mentioned that they care about current state. Almost the same percentage of users looked into historical trends. Point in time analysis was practiced by 42% and only 11% claimed to be working with other ranges such as since beginning of product release cycle or every 6 months.



What are the most popular types of reports for teams?

VSTS offers several standard report types to visualize state and progress of Agile projects (e.g. burn down chart). Moreover, users can reach out to other tools (e.g. Power BI, Excel, Tableau) to create custom reports to satisfy the individual needs of a given project.

In the study we looked into what are the most popular types of reports for personal and team usage. There were only subtle differences. Majority of users 64% focuses on the total counts (e.g. number of active bugs). Next type was team velocity chart with 54% share, followed by burn down chart. Other reports such as Lead Cycle Time and Cumulative Flow Diagram are more specialized and had lower adoption of 21% and 18% respectively.



Conclusion

This study demonstrated that there exists great diversity in terms of requirements, scenarios and usage patterns for reporting capabilities of work item tracking systems. For the system to excel in this space it should:

- Be flexible to cover many use cases.
- Be open for people to create reports both for themselves and to share then with the team.
- Provide several consumption mechanisms to make sure reports are available to the right people and in the right location.
- Not only focus on the current state but also allow people to extract historical data for trend analysis.