Gartner Research

Your Engineering Estimates Are Wrong — But They Are Not Useless

By Clifton Gilley

5 January 2022

Gartner

Your Engineering Estimates Are Wrong — But They Are Not Useless

Published 5 January 2022 - ID G00762826 - 11 min read

By Analyst(s): Clifton Gilley

Initiatives: Product Development; Foundations of Product Development

Product managers often use development estimates as part of the planning process, but relying on these estimates is no guarantee of success. Instead of using estimates that provide a false sense of precision, product managers should work with engineering to account for uncertainty into the plan.

Overview

Key Challenges

- Early estimates delivered by technical teams rarely account for the uncertainty that comes with any engineering project, leaving product managers to set dates that have little chance of being met.
- Pressure from key stakeholders to set hard deadlines at the early stages of development often results in product managers being forced later to unnecessarily sacrifice quality and value to meet these dates.
- Release deadlines are often set without fully exploring or understanding the underlying risks and assumptions being made. This places a high burden on product managers to deliver on time, on budget and in scope without an opportunity to validate the deadlines.

Recommendations

Product managers working to improve the process of setting achievable release deadlines in product development must:

- Account for uncertainty in delivery when obtaining estimates from engineering teams by asking for ranges and/or confidence intervals, and use those to set delivery expectations with stakeholders.

- Build flexibility into the process by using more agile planning practices that provide room for discovery of unknown challenges, accelerators and modifications of release scope during the development process.
- Identify risks and assumptions as an explicit step, and engage in "fail fast" experiments with customers or users, or if necessary, with customer proxies, to test those assumptions.

Introduction

A critical component of the product management and development process is obtaining estimates from the engineering and development teams who will be bringing the envisioned solution to life. Unfortunately, far too many organizations expect these teams to provide high-quality, specific estimates of the effort and time required too early in the process. In doing so, the organization is setting itself up to fail — especially if these estimates are then communicated to customers or partners. It is foolish to attempt to set a deadline so early in the process, requiring the teams doing the work to assume best-case scenarios and ignore the uncertainty inherent in product development.

As a result, such estimates are rarely, if ever, accurate. Product managers must manage stakeholder expectations related to such estimates and work closely with their engineering and development teams throughout the process. They should continually reinforce the fact that estimates are just that — and only become more reliable as the team progresses through the product development process.

Analysis

Obtain Ranged Estimates With Confidence Intervals to Account for Uncertainty

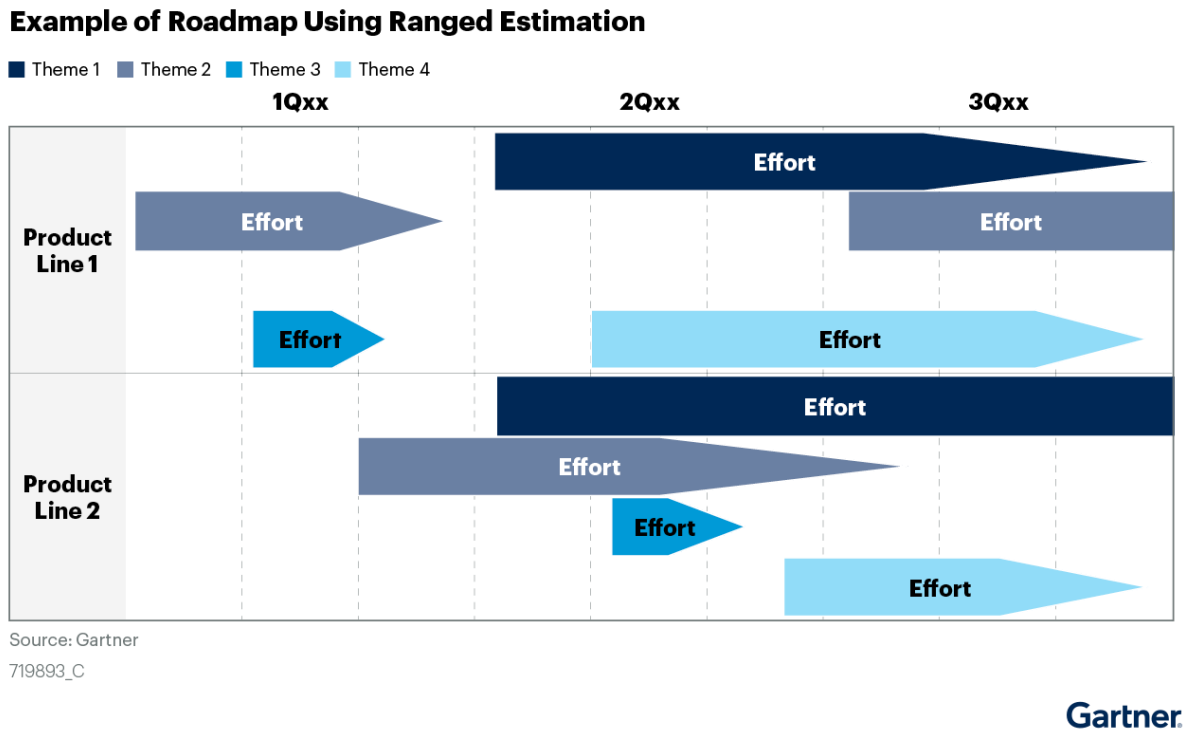
One of the key changes that product managers can advocate for and begin to implement in the use of engineering estimates in roadmaps is to switch from specific targeted estimates to ranged estimates. Rather than creating a false sense of certainty and security by saying, "This will take three months to complete," product managers should prompt their engineering teams to instead say, "This will take between two and five months to complete." This is particularly important in early phases of roadmap definition, where it's likely that minimal effort has been done to create such estimates. Even if such effort has been invested, it's often far too early in a project for any level of accuracy to be present in such estimates. Product managers can increase confidence in these estimates by ensuring the proper stakeholders are involved, but even with all the right people in the room, early estimates are necessarily incomplete.

A second technique that can be applied is to use confidence estimates or confidence intervals to communicate the level of uncertainty in the estimates being used. This would build on the previous example, whereby the engineering team would not only give a range of delivery, but rate its confidence in that estimate. Doing this also allows product managers to better quantify a "best/worst/likely" case. Thus, "two to five months" might be represented as:

- Fifty percent confidence to be complete in three months ("best")
- Seventy-five percent confidence to be complete in four months ("likely")
- Ninety-five percent confidence to be complete in five months ("worst")

This is a key change that accepts that there are unpredictable and unknown factors that exist in any product development effort. For development that extends beyond a narrow time frame, these factors can have a significant impact on the duration of work required. It also accepts that humans have inherent biases that tend to cause them to underestimate the amount of time it will take to perform most actions. This finding is well-documented in research done by Daniel Kahneman and Amos Tversky [1] and others as a specific implication of the optimism bias. In reframing estimates from development teams in one of these ways, product managers are allowing themselves to present a more realistic picture of the likely time frames, which can then be reflected in a range-based plan of execution. Ideally, such internal roadmaps should present this best/worst/likely case view of the work that is being planned in a simplified manner. Thus, a "three to five month" effort might be presented as a roadmap target with decreasing tails indicating the range (see Figure 1). It's important to ensure that these ranges balance the needs of the business for some degree of usefulness with the uncertainty that comes with product development. Thus, ranges that have a greater than three-month variance will likely indicate that more exploration is required before committing an item to the roadmap.

Figure 1: Example of Roadmap Using Ranged Estimation



Build Flexibility by Leveraging Flexible, Agile Planning Processes

Merely changing the approach to delivery estimates by using ranges rather than specific dates will not likely be sufficient to meet the needs of all stakeholders. Many teams in the organization may not be able to function well in such a high level of uncertainty in delivery dates, as they have related deliverables that they must plan for. This can be managed by implementing more agile planning and review processes in the organization, taking these original estimates, and regularly revisiting them to reduce the cone of uncertainty as time progresses.

One of the most important things that product managers must do in adopting these range-based estimates and roadmaps is to manage stakeholder and executive expectations about what these new approaches mean.

Organizations that are familiar with, and have relied on, well-defined dates (even if missed regularly) may not readily accept the uncertainty that this approach presents. Product managers working to make changes to the date-setting process must come prepared to reset expectations about what a roadmap is, how it should be used and how often it is likely to be updated. Product managers must present the roadmap as a "point in time" view of where the efforts are and where they are going, rather than a delivery schedule set in stone. The key to winning over stakeholders is demonstrating that this approach presents a more realistic view of delivery times, and one that is flexible enough to account for uncertainty while specific enough to permit strategic and tactical planning.

Equally important, however, these roadmaps and range-based estimates must be reviewed to determine where uncertainty is decreasing or increasing. This must be done through consistent, regular meetings, in which the previous state of the roadmap is compared to the current state. All major stakeholders must be involved, such that they understand when, why and how changes are being made to the schedule that may impact their own responsibilities. It also provides a forum for discussion of concerns or questions as new information is obtained.

Finally, it is critical that product managers clearly articulate which commitments are "hard" and which are "soft." Hard commitments are those that relate directly to some firm commitment on the part of the organization and that are unlikely to change in any meaningful way. Examples of these hard commitments might be tradeshows, quarterly board presentations, paid-for delivery dates set by a customer or the like. Soft commitments are those that are generally made and communicated only internally and that ideally should be subject to change based on new information as the process moves closer to completion. Clearly identifying these types of commitments helps the product manager coordinate with both the stakeholders and the engineering teams and properly prioritize work based on hard commitments higher than that based on soft commitments.

While organizations always hope that their delivery date estimates will move in rather than move out, there are many times when even the worst-case scenario is unachievable. In such cases, product managers must ensure that key stakeholders and executives are aware of such situations and are offered an opportunity to engage in the decision-making process for efforts that seem to be heading toward failure. Product managers must come to the table with a proposed plan for mitigation of the effects of this uncertainty — usually cutting scope, but possibly requesting a redeployment of resources, or simply accepting the new time frame. The participation of stakeholders and executives throughout this process is critical in changing the culture of the organization, as they must see the impacts that uncertainty has and gain confidence in the decisions of the product team.

Identify Risks and Assumptions Early to Reduce Uncertainty

Another technique that product managers can use to spread the understanding of uncertainty in the product development process is to incorporate uncertainty into some of the common artifacts used by those stakeholders early in the process. Specifically, calling out fundamental risks and assumptions will force stakeholders to take note (see Note 1). It also allows the product manager to prioritize early efforts based on those risks or assumptions that pose the greatest threats to on-time and in-scope delivery.

The most straightforward place that a product manager can insert these key risks and assumptions is in the business case. While these areas are often considered as part of an overall business case, they are often not specifically called out in separate sections of the business case template. Further, such terms don't always mean the same things to different people. Thus, product managers must:

- Clearly define what is meant by a "risk" and an "assumption." Risks in this context are generally external factors that, if proved to be true, risk the schedule or scope of the work to be done. Assumptions in this context are generally internal factors that, if proved to be false, jeopardize the schedule or scope of the work to be done. While risks and assumptions can be two sides of the same coin, you should seek to keep them independent of one another as best you can.
- Add or enhance the areas of the business case that are dealing with risks and assumptions, making sure that they are separate from other considerations (such as problem statement, solution statement, investment and ROI). This can usually be achieved by simply adding a new section to the business case template that is intended to capture the risks and assumptions underlying the proposal.

Once the risks and assumptions are documented, the product manager should stack-rank them by identifying those that either pose the greatest threat to the scope and time of the project, or those that are most likely to occur. This approach needs to take into account both business priorities and customer expectations — if there is a feature critical to customer value, loss of that should be considered a high risk. Another approach is to use a four-square plot with axes of likelihood and impact, color-coding those risks and assumptions that are most likely or most impactful. This should be done as part of the same definition process listed in the above bullets, so that stakeholders and executives can clearly identify and internalize the highest-impact and highest-likelihood risks. Repeated exposure to these risks and assumptions spreads the responsibility for understanding and mitigating them across all stakeholders.

Finally, the practical application of these specifically identified risks and assumptions requires that the product manager take the stack-ranked list and work with the engineering teams to develop hypotheses that can be used to test the items on the list. Testing the risks and assumptions is necessary to better inform the estimates that the engineering teams are providing. By taking time at the early phases of each component of work, the product manager can drive away the “unknown unknowns” and focus work on the “known knowns” that the team is best prepared to solve. While product managers can never dispose of all the unknown factors that may impact delivery, they can take clear steps to minimize risk and prove or disprove assumptions — resulting in a better understanding of scope all around.

Evidence

[1] Intuitive Prediction: Biases and Corrective Procedures, Decision Research — A Branch of Perceptronics.

Note 1: Examples of Roadmap Risks and Assumptions

Some common examples of risks that may need to be identified and assessed include:

- Technical risks, such as the inability to integrate new technology with legacy systems
- Knowledge risks, such as a lack of a sufficient sample from customers to validate the problem/solution
- Business risks, such as declining market share or a pending acquisition

Some common examples of assumptions that may need to be identified and assessed include:

- Technical assumptions based on limited feasibility analysis from development teams
- Knowledge assumptions, such as the ability to leverage existing user experience resources that may be matrixed
- Business assumptions, such as plans to revise compensation for sales related to new offerings

Document Revision History

Your Engineering Estimates Are Wrong — But They Are Not Useless - 1 April 2020

Recommended by the Author

Some documents may not be available as part of your current Gartner subscription.

Redefining the Relationship Between Product Management and the Technology Organization

Combine Lean and Agile Practices to Drive Continuous Improvement in Product Management Processes

Avoiding Audience Disappointment in Product Roadmap Delivery

The Agile Product Manager

Project to Product Is an Essential Transformation for Product Managers

Ignition Guide to Assessing and Managing Risks as a Product Manager

Actionable, objective insight

Explore these additional complimentary resources and tools for tech product management leaders:

eBook

3 Lessons From High-Growth Companies to Build a Successful Product Strategy

Avoid common product strategy pitfalls.

Download eBook

Research

Top Trends for Tech Providers for 2022

Learn the top trends impacting tech providers.

Download Research

eBook

2022 Leadership Vision for Technology Product Managers

Learn the top 3 strategic priorities for tech product managers.

Download eBook

Tool

Gartner Product Decisions

Inform your product strategy and roadmap.

Learn More

Already a client?
Get access to even more resources in your client portal. Log In

Connect With Us

Get actionable, objective insight to deliver on your mission-critical priorities. Our expert guidance and tools enable faster, smarter decisions and stronger performance. Contact us to become a client:

U.S.: 1 844 466 7915

International: +44 (0) 3330 603 501

Become a Client

Learn more about Gartner for Product Teams
gartner.com/en/industries/high-tech

Stay connected to the latest insights

Gartner®