Using a standard cost model to set project budgets and allocate resources accurately

As development projects proliferate, poor cost planning can hurt companies severely. Here is how to improve your ability to estimate costs and allocate resources.

Ruth Heuss, Thorsten Schleyer, Fehmi Yüksel, and Florian Weig

Companies across industries are finding that their customers demand more products, more frequent releases of new products, and higher levels of localized product development. Those customers also want 21st-century innovations, such as digital interfaces, that many product development organizations find challenging to provide. In this environment, inaccurate project planning can lead to massive development cost overruns, lengthen times to market, and create bottlenecks in applying valuable product development expertise. It can also make bottom-up cost estimates balloon as managers who anticipate cost overruns give themselves additional budgetary headroom. When controlling anticipates this headroom, a vicious circle emerges that plagues many companies.

We have developed a standard cost model that helps companies to overcome this challenge. Leading ones have used the model to estimate the cost of their development projects and to allocate resources among them by product and site accurately. The model is a pragmatic, easy-to-use tool that calculates requirements for individual projects or entire portfolios, instantly, with one click.

The standard cost model has helped our clients to benchmark projects, derive best practices, and assess the potential of current projects to serve as the basis for budget discussions. At the portfolio level, the model quantifies productivity disparities among different product development locations, helps teams understand cost drivers and efficiency targets, and quickly calculates scenarios by applying cost and resource forecasts. Because the tool is based on a multivariable-regression model, it requires solid historical input data to achieve the greatest accuracy.

Analyzing individual projects

Product development organizations can use the standard cost model to identify the underlying drivers of cost differences among individual projects before launching them. One client, for example, analyzed how four factors—complexity, customer,

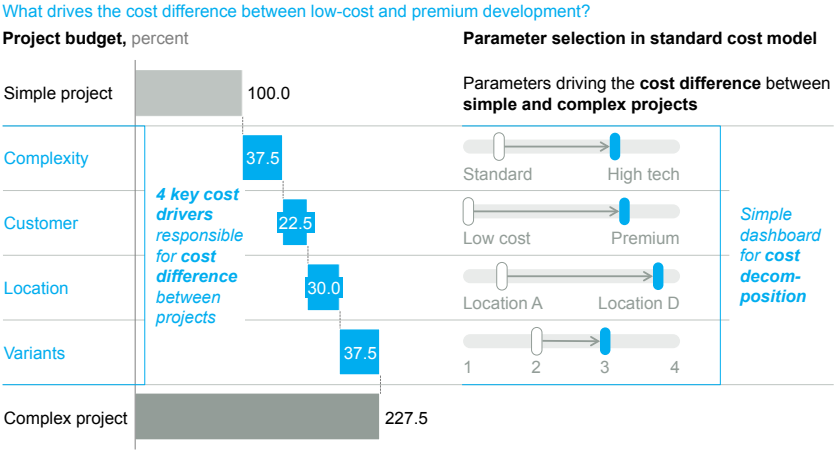
location, and the number of variants—generate cost differences between relatively inexpensive and premium development projects (Exhibit 1). Often, the model is built on a much more granular level to also allow for deep dives into functions, systems, and modules.

By revealing the similarities and differences among projects, the model makes their relative costs transparent and facilitates budget discussions. Some companies also use the model to identify projects that implement best practices and to understand the key factors that make these practices successful.

The model requires relatively few inputs. Once a company determines the parameters that drive costs and establishes a set of reference projects, it can begin using the model to create cost estimates for new projects. The model "bakes in" a number of assumptions about issues such as learning- or experience-curve effects and how costs translate into development hours. It generates time-based cost estimates for each product development function. Over time, it automatically enables companies to save on costs in other projects using the same components and to translate top-down targets into project budgets.

A model can be built to identify the drivers of project cost differences based on various factors.

EXAMPLE Exhibit 1

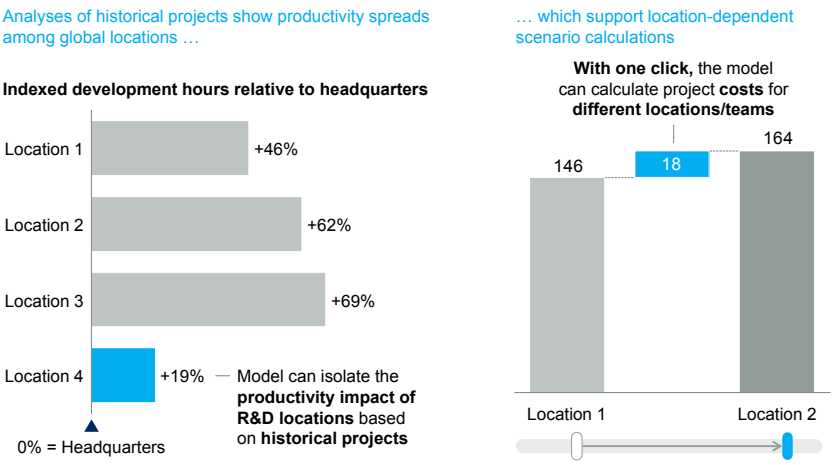


Performing project portfolio analyses

Companies can also use the standard model to assess a portfolio of projects. By analyzing past ones, for example, they can quantify the productivity differences among product development locations. Before deciding on the final location for a particular project, one company used the model to compare the historical development times of projects conducted at four global product development locations with the times of projects at corporate headquarters (Exhibit 2). This analysis enabled the company to calculate and compare each location's project costs quickly. Another company undertook in-depth analyses of how a number of factors would affect the budget. The model compared the budget implications of various growth scenarios, calculated the project costs of different locations and teams, and revealed how efficiency would affect the company's budget targets.

Additionally, the model allows companies to create and analyze scenario-based forecasts for costs and resources. To date, this forecasting capability has supported build-ups at product development locations, global capacity planning, strategic capability planning, global investment allocations, and analyses of portfolio and

Exhibit 2 The cost model can also be used to analyze project portfolios across locations.



technology effects. One company used it to forecast the evolution of global FTE levels and the personnel costs of achieving growth targets.

Building the model

Using the following four steps, companies can build the standard cost model.

1. Compile input data. Three actions can provide clarity during this step:

- **Identify cost drivers.** Look for the parameters that promote cost differences. To gain insights about them, conduct interviews throughout the product development organization and the controller's office. It often helps to start with a long list of parameters that drive cost differences and then to reduce the number for the final model (having fewer parameters in it helps to ensure the statistical accuracy of the regression analysis). Instead of focusing on the cost drivers themselves, teams should constantly seek to identify the underlying factors that promote cost differences.

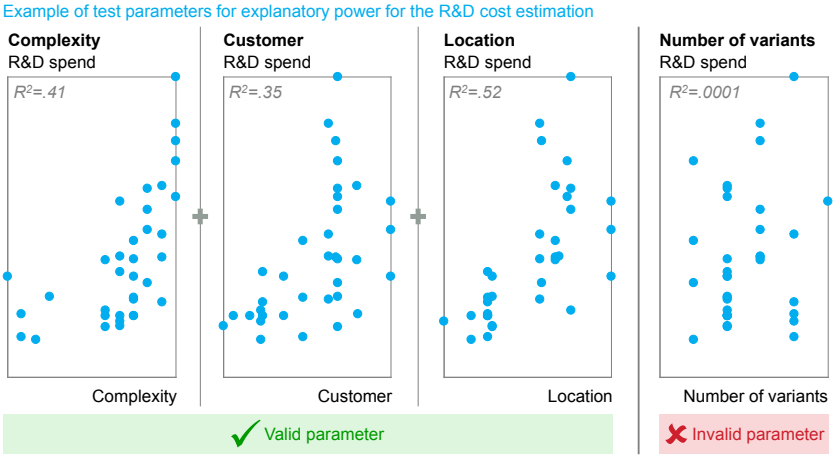
- **Determine the quality and availability of historical cost data.** Use these data to uncover inconsistencies or data issues leading to false conclusions, and take steps to remove the impact of external factors that can distort your findings. To ensure a meaningful statistical analysis, the model requires a sample of ideally more than 30 historical projects.

- **Collect data.** Some parameters refer to technical characteristics of the projects; requests for data to conduct the historical analysis should include the R&D or product development function.

2. Set up the model. As noted, the final model requires a short list of parameters. Base the selection on an assessment of their stand-alone and combined power to explain the regression results. One company discovered that its model's most important parameters were complexity, customer, and location, while the number of variants had no explanatory power (Exhibit 3). Again, it is important not to include too many parameters, since the model's explanatory power decreases as their number increases.

Next, incorporate the correct assumptions—which should be transparent and aligned with the company's business goals—into the model. It is also important to anticipate

Exhibit 3 For an effective cost model, it is essential to select the right parameters, which should be limited to the most important ones.



the product development organization's possible future changes by incorporating them into the assumptions.

Finally, define the granularity required for the model's output. A parametric model will not generate valid forecasts at all levels of detail. The quality of input data plays a major role in determining the accuracy of the results at a given level.

3. Test the model. The cost model requires substantial testing and refinement before companies can embed it in the regular planning process: they need to verify its results, explain outliers, and run plausibility checks against its estimates.

One such test involves understanding whether the distribution of calculated project costs correlates with the results of actual projects. Organizations can thus determine if the model tends to under- or overestimate the costs of different types of projects. It might, for example, overestimate the costs of those that leverage technologies from other initiatives, because it does not assume that such technologies will be used. Companies also need to refine its underlying data set to improve forecasting.

4. Embed the model in the planning process. The product development organization can also use the model to validate the budgets of current projects. For any

project with enough remaining development time, it is possible to analyze the gap between the model's estimate and budgeted costs. If they exceed the model's estimates, the organization can decide on measures for closing the gap. R&D managers then readjust their budgets.

R&D managers should also define a new cost and resource planning process that makes the standard cost model the starting point in all budget discussions. For most companies, using the model as the basis for discussing top-down targets will refine and shorten the product development organization's target setting process. The cost model helped one company to cut the time its process required by more than 80 percent.

Once embedded in the revised project planning process, the standard cost model can become a self-learning tool if the right kinds of automation are included to identify outliers relating to all projects and to update and rerun the regression model.

Capturing additional advantages

Beyond accelerating and improving processes for budgeting and internal benchmarking, companies have used the model to capture the following advantages in their daily processes:

Acceptance as a baseline tool. Managers and engineers have accepted the standard cost model as the baseline tool to calculate project costs. The availability of one overarching model has helped companies reduce the time needed to discuss and negotiate budget requirements. Because calculations are more reliable and decisions are easier to understand, engineers can focus on engineering instead of calculating project costs.

Institutionalization of technical knowledge and capacity. To ensure that new development projects succeed, companies can retrieve the technical knowledge and capacity the model captures. They can stay focused on improving development processes over time by constantly tracking the accuracy of the model and further enhancing it.

Rapid and accurate testing. Companies can use the model to test ideas for innovations and portfolio enhancements quickly and with high accuracy. The model also provides insights into the cost effects of new projects and helps organizations make first- or second-round management decisions without any need for bottom-up assistance.

* * *

The standard cost model is a highly effective, easy-to-use tool for estimating project costs and assessing entire product development portfolios quickly and accurately. For companies seeking to increase their competitiveness, the model will be essential for ensuring that development processes deliver winning products cost effectively.

Ruth Heuss is a partner in McKinsey's Berlin office, Thorsten Schleyer is an associate partner in the Munich office, Fehmi Yüksel is a consultant in the Cologne office, and Florian Weig is a senior partner in the Munich office.