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To achieve outstanding innovation results, organizations must incorporate resource planning into their portfolio management processes.

Executive Summary
To optimize the investment in new products, an organization must excel at managing its product portfolio(s). This requires good visibility into the value, risk, expenses and resource requirements of the various projects in the portfolio(s). Without fully integrating resource planning into new product development processes, there can be no visibility into and, by extension, no optimization of resources. It’s almost like driving at night with your headlamps off; you can’t see far enough ahead to know where you can run into serious problems.

In the area of resource planning best practices, there has been considerable debate about whether top-down or bottom-up planning is “better.” Support can be found for both approaches. However, Sopheon’s experience suggests that for organizations aiming to align limited resources with the most strategic and lucrative new product opportunities, a top-down approach provides the best balance of benefit to effort.

Unlike bottom-up resource planning that requires a detailed project plan and supporting project management software, top-down resource planning can be implemented early in the development cycle using simple tools. The visibility provided by top-down resource planning is more than adequate to support the level of portfolio planning required to maximize returns from the investment of R&D and other resources.

This paper clarifies the differences between top-down and bottom-up planning and examines the cost/benefit trade-offs between the two approaches. It also shows how – by integrating long-term top-down resource planning with a standardized new product development process – you can shorten time-to-market and increase product quality without overly burdening project managers with low-value administrative tasks.

Integrating Resource Planning into the NPD Process
Faced with digitalization and growing competition from disruptive technologies and business models, many organizations have restructured or are going through transformation to become more agile and more responsive to market change. They are challenged to act with speed, and their ability to make fast decisions on how to allocate limited resources directly impacts the number, quality and timing of projects being driven through product development, as well as how well they execute their strategy.

Many organizations under-resource their projects. This could be due, in part, to overly optimistic estimates of the resources required. More likely it is due to a poor understanding of how resources are currently being allocated, which results in a view that “we can handle just one more project.”

Effective portfolio management and gate meeting decisions cannot occur without a good understanding of current resource allocations and the impact of assigning new projects to those resources. High-level resource plans, if created early enough, can support decision-making on investment prioritization and timing throughout the entire new product development (NPD) process, ensuring that the most commercially viable projects receive precedence over others.

It is important to distinguish between resource planning and resource management:
- Resource planning is a long-term, forward-looking view of resource requirements and it is used to manage portfolios at the program, product and project level.
- Resource management is a detailed, day-to-day view of resource allocation and it is used to manage projects at the resource/task level.

Our focus here is on resource planning and how, when integrated with your NPD process and effectively executed, it can contribute to the optimization of your portfolio(s).
Integrate resource planning into your NPD process by: collecting resource requirements per project; consolidating the plans into a single view; using the resource data to prioritize and balance the portfolio.

Figure 1: The top-down approach to resource planning uses rough-order-of-magnitude sizing with very little detail to estimate resource needs. The bottom-up approach uses project planning techniques to create task-based estimates.

There are three steps you can take to fully integrate resource planning into your NPD process: collect resource requirements for each project; consolidate the resource plans into a single view; use the resource data to prioritize and balance your portfolio(s).

Step 1. Collect Resource Requirements for Each Project

The two dominant approaches to resource planning are what are known as bottom-up planning ("Bottom-Up") and top-down planning ("Top-Down"). As the name implies, Bottom-Up looks at the lower-level tasks that need to be completed and builds the resource plan "up" from there. Top-Down takes a more strategic view of the total resources expected to be used in completing a project of this type and allows the project managers to work "down" from there.

Both approaches have strengths and weaknesses and both are commonly used in project management. Bottom-Up and Top-Down ultimately achieve the same outcome: a resource plan to support project execution and the data required to provide portfolio-level project decision support. But the two approaches require very different amounts of time and effort to generate these end results.

Sopheon supports the view that almost all organizations will benefit greatly from adopting a top-down approach, unless specific conditions exist within an organization that suggest a bottom-up approach would be more beneficial.

Bottom-Up Resource Planning

Bottom-Up is usually implemented in a traditional project management environment and focuses on the level of effort needed to complete the tasks required by the project. This approach typically begins when project managers develop the Work Breakdown Structures (WBS) that include the individual tasks that must be performed to complete the project.
Most project management offices recommend that tasks be broken down to no more than five days each. For large projects, the result is a large number of tasks that must be estimated and managed.

This level of resource planning can be extremely valuable in helping project managers to develop critical path schedules and milestones, and to manage day-to-day resource needs and conflicts. It does, however, come at a cost. The level of detail required to schedule the projects and to track progress often exceeds the value of the information provided. So typically, Bottom-Up is most common in organizations where:

- Professional project managers are deployed.
- Adherence to the schedule provides clear financial benefit, e.g., architecture, engineering and construction (AEC) firms often have schedule-performance bonuses tied to their contracts.
- The complexity of the project requires detailed scheduling and resource management, e.g., in the aerospace and automotive industries.

Because of the complexity and administrative burden involved in creating a detailed project and resource management plan, project managers in most companies tend to opt for a simpler approach, typically using Microsoft Excel to track schedules and resource needs.

In our experience, most companies have little or no formal project management process, and the majority of tools that are deployed (such as Microsoft Project) are either under-utilized or are not used at all.

**Advantages of Bottom-Up**

Despite the potential cost and complexity of detailed bottom-up planning, there are some advantages to the approach:
There is no expectation that the early view of resources provided by top-down planning will be entirely accurate, but experience and good judgment generally result in an accuracy that falls within a 20 percent margin of error that is acceptable for the purposes of planning.

- Construction, aerospace and automotive projects benefit from this level of project planning because of the high level of investment, high cost of delays, and high project complexity.
- Bottom-up planning provides the best visibility to individual bottlenecks.
- Bottom-up planning serves as the best starting point for detailed project plans.

**Top-Down Resource Planning**

Top-Down takes a high-level view of the types of resources that will be required to support the development and launch of a new product and the length of time they will be needed. This approach is often applied early in the planning stage of the project, before detailed specifications are available to the project team and long before a detailed project plan has been developed.

Using historical data from similar projects together with professional judgment, resource planners identify the resource needs in terms of skills and large “time buckets” as shown in Figure 3.

There is no expectation that this early view of resources will be entirely accurate, but experience and good judgment generally result in an accuracy that falls within a 20 percent margin of error that is acceptable for the purposes of planning.

The value of this very simple view of resources should not be underestimated; it can be extremely powerful. The top-down approach and its value proposition is consistent with the popular Agile methodology, which is grounded in the viewpoint that one should spend time on the work that contributes to success rather than wasting time on work that does not improve outcomes.

Because Top-Down eliminates the need for detailed project plans, it becomes much simpler to create standard resource models for quick approximations. Organizations can easily create and maintain such models based on pre-defined “shirt-size” frameworks (Extra-Small, Small, Medium, Large and Extra-Large projects). They can also readily total major and minor features in release models, etc. using the same Microsoft Excel techniques that are already well-known to project teams. These simple and inexpensive models can be used to estimate resource needs for projects at a “good-enough” level of accuracy to support portfolio decision-making.

The ability to easily manage a collection of little projects or activities is a critical advantage of top-down resource planning. The creation of “administrative projects” allows organizations to easily track resource commitments that are not related to...
a project. For example, most employees have a certain amount of time set aside for training, support, product maintenance, etc. that can be planned out using administrative projects.

**Advantages of Top-Down**

The primary advantage to Top-Down is that a minimum of effort uncovers a wealth of valuable information. From the scenario presented in Figure 3, we learn that:

- The resource needs can provide a rough order of magnitude labor cost for development and launch.
- The plan shows that the product can be ready for production approximately six months after the project starts.
- The plan shows that the project will require between five to seven people and lab space for six months, with the heaviest demands on labs and marketing.

This early visibility into potential bottlenecks is invaluable in good portfolio decision support. Other advantages of the top-down approach include:

- Resource plans require less maintenance since many minor changes do not affect the pool and bucket-level views.
- Resource plans are simple to aggregate and balance due to the smaller and more consistently-aligned data sets.
- Resource plans are easy to create for small projects.
- It is simple to allocate resources for administrative or non-project time.

**Step 2. Consolidate Your Resource Plans**

Whether plans are created using top-down or bottom-up resource planning, consolidating resource plans affords visibility into the overall demands against all of the resources in an organization, business unit or functional team. The consolidated view (easily enabled by Sopheon’s Accolade® Resource Editor, as shown in Figure 4) allows functional team leaders to see all of the resource needs of all of the projects that require help from their teams.

Depending on the structure and needs of the organization, consolidated views like these make potential bottlenecks visible and allow the functional team leaders to discuss and adjust resource plans (by modifying the resource demands or shifting projects in time) for multiple projects at the same time.

You will note that at this point, there is still no need for a detailed project plan! The top-down approach has allowed the organization to identify the resource needs of the projects and candidate projects in the pipeline quickly and easily, and the consolidated view has allowed the functional leaders to roll up all of the resource demands to determine, and even resolve, potential bottlenecks and over- or under-allocation issues.
Figure 4: A consolidated resource plan as shown in Accolade Resource Editor.

**Step 3. Use Your Resource Data to Prioritize and Balance Your Portfolio(s)**

Once resource requirements are collected into a single view, it is a straightforward exercise for project managers and business leaders to look at balancing resource demands against time buckets and shift project timing to develop a realistic plan.

In this view, resource data is combined with project attributes such as project type, target market, expected economic rewards and investment requirements, providing management with complete data from which to set project priorities.

**Benefits of Using Top-Down**

The greatest benefit of having chosen top-down planning is now apparent: without the overhead associated with creating detailed project plans for every project, the organization is able to collect resource requirements data, consolidate it into a single view, and prioritize resources using a waterline view of where resources run out in the prioritized list of projects.
Figure 5: Based on what-if analysis of views showing consolidated resource requirements, projects can be balanced and prioritized simply and effectively.

Business Benefits of Integrated Resource Planning

Regardless of the approach and tools an organization uses to develop resource plans, incorporating consolidated resource planning into portfolio decision-making will enable:

• Cross-functional alignment: Creating resource plans early in the project cycle requires that the cross-functional team be aligned on project goals and constraints from the beginning stages of the project. This can help eliminate contentious discussion later on in the project.

• Early identification of capacity needs and skill set requirements: An early understanding of consolidated resource needs helps identity areas and skill sets where staff expansion, augmentation or cross-training will be needed to meet strategic organizational objectives.

• Early setting of project scope expectations: By agreeing on initial timing and resource allocations early in the project, the organization can create a consistent message concerning its expectations for a project. A project with a short, lightly-staffed resource plan sends the message that this is to be treated as a project with limited scope; a long, heavily-resourced plan sends the message that this is a major, big-bet project. One can immediately understand that the project requiring substantially more resources should return dramatically more value. As project team members and leaders change over time, the top-down resource plan provides a consistent framework.

Following the practice of integrated resource planning will enable your organization to realize a range of business benefits that are particularly critical in the digital age:

• Improve the time-to-market of your most strategic projects.

• Increase your understanding of where resources are currently deployed.

• Understand the impact of assigning another project to your project teams.

• Make real-time, data-driven decisions on project scheduling and investment prioritization.

• Improve the return on your new product development investment.
We can offer practical assistance with optimizing resources in a number of ways. Contact us at info@sopheon.com to learn more.

How Sopheon Can Help

Sopheon Consulting teams are made up of innovation experts who can work with you in a variety of ways to ensure your resource planning process meets your organization’s unique requirements. One such way is through an Effective Resource Planning Workshop aimed at helping you implement or improve high-level resource plans early in the process to support your decision-making on project sponsorship and timing.

The Effective Resource Planning Workshop can help you:

- Create a resource planning process that provides cost-effective and timely visibility to current and future resource demands.
- Design a resource planning structure that fits your business.
- Develop estimating and editing tools that make resource planning easy for your project teams and functional managers.
- Construct reporting and analysis tools that allow you to make resource availability a part of every gate meeting and portfolio review.
- Optimize the use of Accolade software’s resource planning capabilities.

We encourage you to engage us in further discussion on how the Sopheon Consulting team can assist you to optimize resources using a robust resource planning process.
About Sopheon

Sopheon partners with customers to provide complete Enterprise Innovation Performance solutions including software, expertise and best practices for achieving exceptional long-term revenue growth and profitability.

Sopheon’s Accolade® software digitalizes the entire innovation management and new product development lifecycle. For the first time, businesses can access a single source of the truth across Strategic Innovation Planning, Roadmapping, Idea and Concept Development, Process and Project Management, and Portfolio and In-Market Management.

Sopheon’s solutions have been implemented by over 250 customers with over 60,000 users in over 50 countries, including industry leaders such as BASF, Electrolux, Honeywell, Northrop Grumman, PepsiCo, P&G, Parker Hannifin, Land O’Lakes and many more.

For more information on Sopheon and its software and service offerings, please visit www.sopheon.com