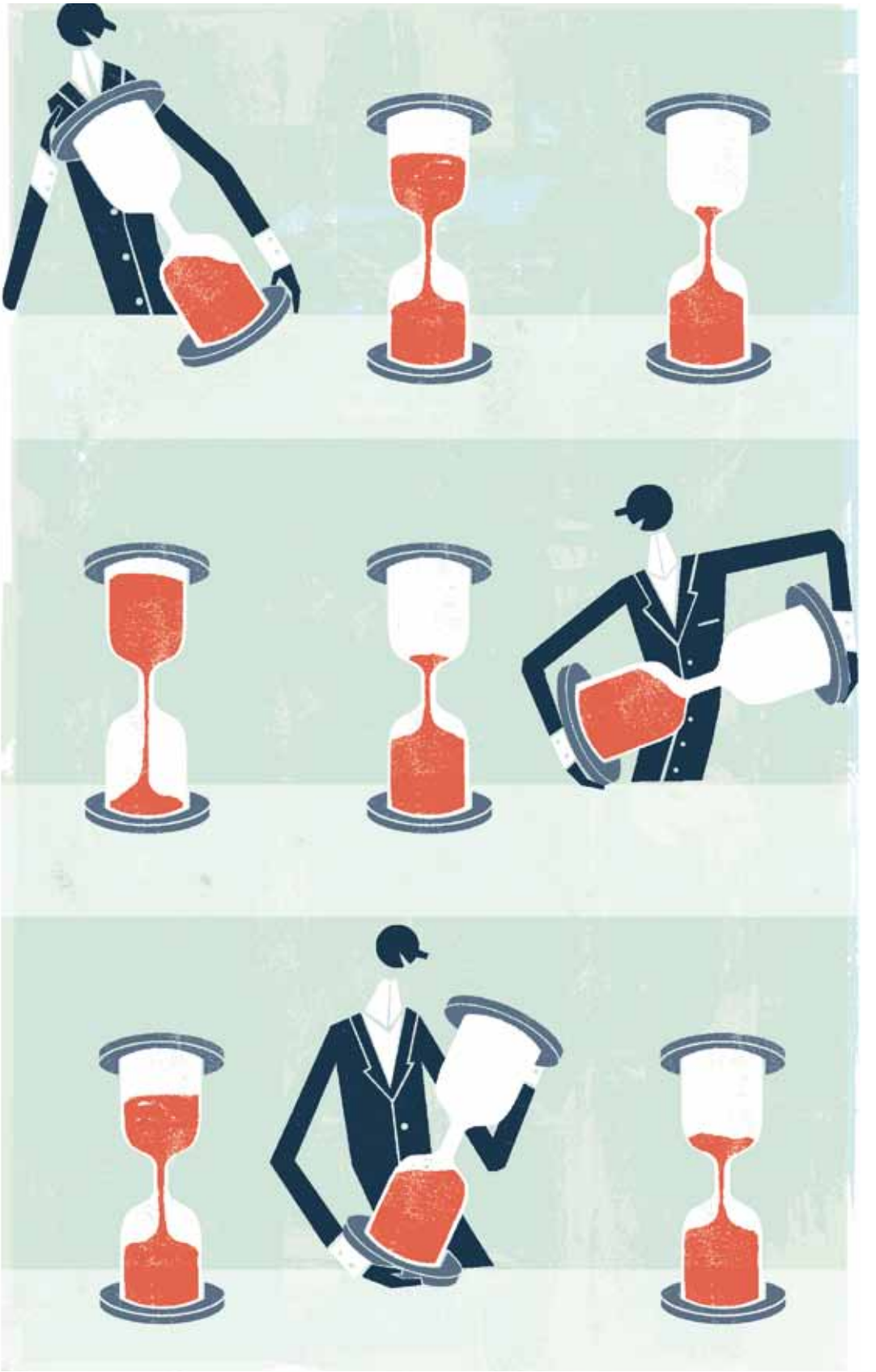


Retooling your innovation engine for higher earnings from new products

Daniel Roos, Markus Achtert and Marcus Thorin

Many companies are not reaping the profits from innovations that they were hoping for. One of the reasons is the way these companies approach their innovation efforts. In this article the authors argue that an analysis-driven process is the most suitable one for companies in industries such as automotive and manufacturing, chemicals or ICT hardware and software.

More than half of the companies in the automotive & manufacturing, chemicals and ICT hardware & software industries are not capturing the full potential value of their innovation activities. This is one of the staggering results from Arthur D. Little's recent "Pathways to Innovation Excellence" study. How a company tailors its innovation approach to the context in which it operates appears to have a large impact on its innovation success: a tailored approach can double the share of earnings from products launched within the last five years. Similarly striking effects are seen in terms of cutting the time to break-even.

By "context" we mean the factors that determine the nature of innovation and of the innovation process in the company's industry: the diversity of market segments served, the pace of technological change, development lead-times and investments, product complexity and other factors. Depending on the context in which a company operates, it can follow one of three fundamentally different innovation approaches, which we call "innovation engines": idea-driven, research-driven and analysis-driven (see Table 1).

In this article we will argue that companies pursuing an analysis-driven innovation engine enjoy greater innovation success if operating in a context that one typically finds in the automotive & manufacturing, chemicals and ICT hardware & software industries.

First, we will highlight some salient results of the aforementioned study. Then we will bring forward the reasons explaining the immense impact of the analysis-driven approach. Finally, we will show how a company can put an analysis-driven innovation engine in place.

Salient results from the "Pathways to Innovation Excellence" study

Arthur D. Little's "Pathways to Innovation Excellence" study for 2009/2010 aimed at distinguishing and measuring the performance of different fundamental approaches to innovation management (see insert for more details).

The results of the study point to a clear link between the choice of innovation engine and innovation success, at least in the automotive & manufacturing, chemicals and ICT hardware & software industries. In these three industries the use of an analysis-driven innovation engine leads to significantly greater innovation success, especially when measured by the share of EBIT from new products and the time to break-even (see Table 2).

The results of the study point to a clear link between the choice of innovation engine and innovation success, at least in the automotive & manufacturing, chemicals and ICT hardware & software industries.

For example, companies using an analysis-driven innovation engine generate 2.4 to 2.8 times more EBIT from their new products than those using an idea-driven engine. Furthermore, companies using an analysis-driven engine reach break-even with their new products in two thirds of the time required by those using an idea-driven engine.

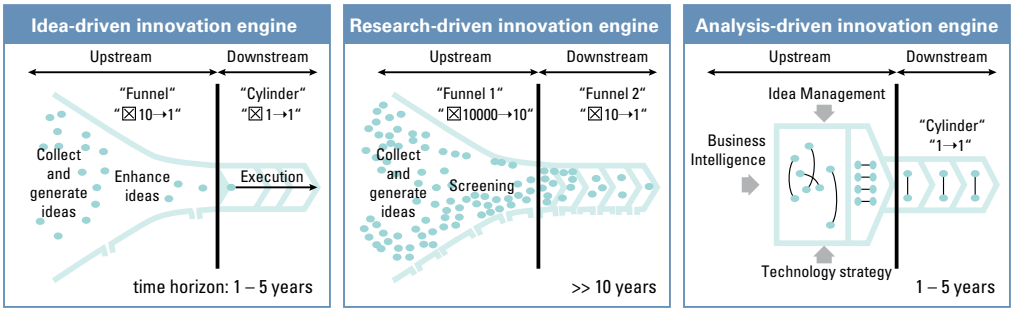
"Pathways to Innovation Excellence" study

The 2009/2010 edition of our global study was addressed to 400 companies across industries. It aimed at identifying and characterizing the fundamental structural differences in the prevailing innovation management approaches, and measuring the innovation success of the companies applying these. More specifically, our investigation focused on early innovation activities (so-called upstream activities) and on new business innovation in particular. We compared innovation success by studying the share of sales and EBIT from products younger than one, three and five years, as well as the payback time for new products. More details about the study results can be found on our website www.adl.com.

Innovation engines explained

The innovation engine is the approach a company deploys to manage its upstream and downstream innovation activities. "Upstream" refers to the identification and selection of innovation opportunities. "Downstream" refers to the development, launch and follow-up of the chosen opportunities.

Table 1 **The three innovation engines**



Source: Arthur D. Little Innovation Excellence 2009/2010

Idea-driven innovation engine

The idea-driven innovation engine is fed bottom-up by a large number of ideas. In most cases one idea corresponds to one product or service. The process aims at picking winners from a wide selection of ideas while unpromising ideas are discontinued or put on hold. Once initiated, projects downstream are seldom stopped before launch, even though most products are test-marketed before the roll-out to all markets. The idea-driven approach is particularly common in the fast-moving consumer goods industry (e.g. food & beverage, household products, apparel). A typical example would be a cereal company that generates and launches one wild new taste idea after the other.

Research-driven innovation engine

The research-driven approach is common in research-heavy industries such as biotech and pharmaceuticals. As with the idea-driven engine, the research-driven innovation engine is fed bottom-up by a huge number of ideas, but in this case originating from research. One

idea tends to correspond to one promising compound or key component of a new product. Portfolio management is about picking the winners among the huge number of ideas. For example, in the pharmaceuticals industry, out of 5,000 compounds entering pre-clinical trials (testing in animals) only five drugs reach clinical trials and only one of these is eventually approved by the FDA. Contrary to what happens in the idea-driven engine, a majority of projects in downstream development will turn out not to be viable and consequently be stopped before launch. The time horizon from idea to product launch is often more than 10 years.

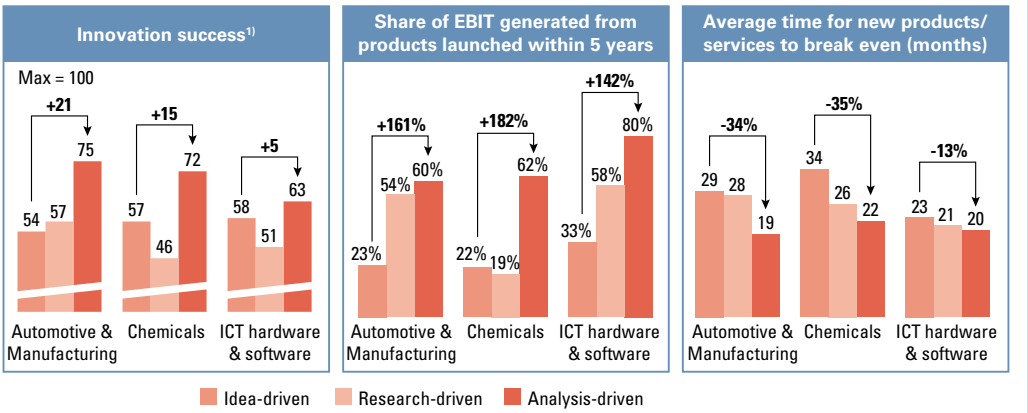
Analysis-driven innovation engine

The analysis-driven approach is very common in assembled products industries (e.g. automotive, appliances, medical equipment, aircraft). The analysis-driven innovation engine is fed top-down by a product strategy and plan. These are the results of an analytical selection process through which the company determines the nature and timing of products to launch and the corresponding development projects to execute as a function of expected market demand, anticipated competitor actions and the company's capabilities. Ideas are as important as in the idea-driven engine, but they tend to be fragments of a complete product or service. Once initiated, development projects are seldom stopped. The time horizon from idea to product launch is typically one to five years.

There are good reasons why the analysis-driven approach leads to greater innovation success in contexts that are typically found in the automotive & manufacturing, chemicals and ICT hardware & software industries.

In industries other than these three, it is not as clear-cut which innovation engine is the most conducive to innovation success. The most likely explanation for this finding is that in these other industries the context in which any given company operates can be quite different from that of other companies in the same industry, or that company-specific characteristics rather than the company's context determine which innovation engine is most appropriate.

Table 2 **Impact of the choice of innovation engine on innovation success**



[1)] Calculation of innovation success is based on the dimensions sales and EBIT from new products as well as average time to break even

Source: Arthur D. Little Innovation Excellence Survey 2009/2010

Explaining the impact of the analysis-driven approach

There are good reasons why the analysis-driven approach leads to greater innovation success in contexts that are typically found in the automotive & manufacturing, chemicals and ICT hardware & software industries. Those reasons are linked to four key characteristics of these industries.

a. Product complexity

The automotive and ICT hardware industries tend to have complex products. They are made up of many components and subsystems, possibly based on different driving technologies and with a large degree of interdependence. Many different technical and non-technical disciplines are involved in developing a new product, which requires careful management and planning. As a consequence, it is crucial for companies in these industries to ensure a sophisticated and balanced level of commonality between products, be it within and across product families (for automotive companies) or at least within technology platforms (for ICT hardware companies). For example, large engine manufacturers typically have to be able to deliver

thousands of unique configurations of their engines (from only a handful of product families) in order to meet requirements from different markets and applications.

b. Pace of change

The automotive and ICT hardware & software industries live in constant flux as far as technology, regulations and standards are concerned. Miscalculating the pace of their change and the moves of rivals can have devastating effects on the market acceptance, cost position or lifetime of a new product or service. As a consequence, these companies must be able to map the likely future evolution of technologies, regulations and standards, and synchronize their product/service and technology portfolios and plans correspondingly. For example, mobile phone manufacturers experience a very high technology flux (e.g. GPS modules, new cameras, new open software platforms and new infrastructure generations), making strategic portfolio planning important in order to meet future customer demands better than competitors.

Many significant developments in base chemicals involve very long introduction times, sometimes more than 10 years, to prove the concept and viability, and consequently require comparatively high investments and patience before the return is obtained.

c. Recovery of sunk costs

Development projects in these industries tend to be large and costly, and development lead-times are long relative to the lifecycle of the product. Upfront expenditures on dedicated product tooling and facilities are high, as are the costs of late corrections. While companies can't afford to test the market – too much is at stake – they must still ensure high probability of success before investing in final development and commercialization. As a consequence, it is an important skill for these companies to make choices upfront that will optimize the likely revenues and profits from a new product across its entire lifecycle, including deciding which market window of opportunity to target for product launch, how to control development lead-times, and how to extend the product lifecycle through planned upgrades. For example, many significant developments in base chemicals involve very long introduction times, sometimes more than 10 years, to prove the concept and viability, and consequently require comparatively high investments and patience before the return is obtained.

d. Diversity of market segments

Finally, companies in these industries often serve a multitude of related market segments or even individual customers with slightly diverging needs or expectations about basically the same product. Tailoring the product to every individual need is not economically viable. As a consequence, it is important to first assess the attractiveness of segments and customers and then translate the outcome into a manageable and economically viable product portfolio. For example, a manufacturer of heavy industrial machines found that, as a result of deficient market analysis, it had been investing massively in developing a product for a segment where demand for this type of product was almost non-existent.

What is common to these four industry characteristics is the need to have a holistic perspective on the product portfolio and to consider the interdependencies of components, systems, technologies, disciplines, production processes and regulations, both functionally (e.g. how will the one interface with the other?) and timing-wise (e.g. which is a prerequisite for which?). Therefore, without a top-down analytical approach, it is impossible to manage the concomitant complexity and set meaningful innovation priorities. An analysis-driven innovation engine provides the answer.

It is important to first assess the attractiveness of segments and customers and then translate the outcome into a manageable and economically viable product portfolio.

For example, a European car manufacturer decided to launch a convertible two-seater even though it would have significantly lower profitability than the other models in the portfolio. It, nevertheless, did so in order to improve brand recognition and image and thus increase sales of its standard car families. As this example shows, only an analysis-driven approach will allow consideration of the impact of single products on the entire portfolio. First setting the business boundaries within which all subsequent strategic and planning considerations will take place prevents the company from getting carried away by "off the wall" ideas and analyses.

Putting an analysis-driven innovation engine in place

Regardless of the innovation engine in place, most companies today have a function or at least a person responsible for product planning or product portfolio management. For companies that seek to implement an analysis-driven approach as a true capability, it is crucial to connect the product planning process with the business planning process at both business unit and corporate level. Doing so takes four steps:

- Define a segmentation model that allows for product differentiation.
- Do a market analysis to assess the strategic potential of each segment.
- Formulate the product strategy, thereby answering the questions of where, how, when and against whom to compete.
- Develop the product plan.

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a. Define a segmentation model

Segmentation is the foundation for strategic positioning and should therefore be done carefully and thoughtfully. First, a good segmentation model is robust and stands the test of time. It features a manageable number of quantifiable segments, each of which is as homogeneous as possible within and as distinctive as possible from the others. It includes both a customer or application-oriented dimension and a product-oriented dimension. Second, a successful segmentation allows for product differentiation. A common pitfall is to base the segmentation on the accepted "industry standard" or some tradition. A Nordic electrical tool manufacturer fell into this trap and ended up with segments consisting of customers with contradictory instead of homogeneous needs. As a consequence the company was unable to determine what products to develop for which segments.

b. Do a market analysis by segment

Once the segmentation model is anchored firmly in the minds of the company's decision-makers, the size, attractiveness, customer requirements and company's competitive position in each segment are analyzed thoroughly in order to assess their strategic potential. The analysis often leads to surprising results. For example, an automotive company found that it had allocated 30 % of its R&D budget to a segment that was ranked only 17th out of 22 in terms of strategic potential.

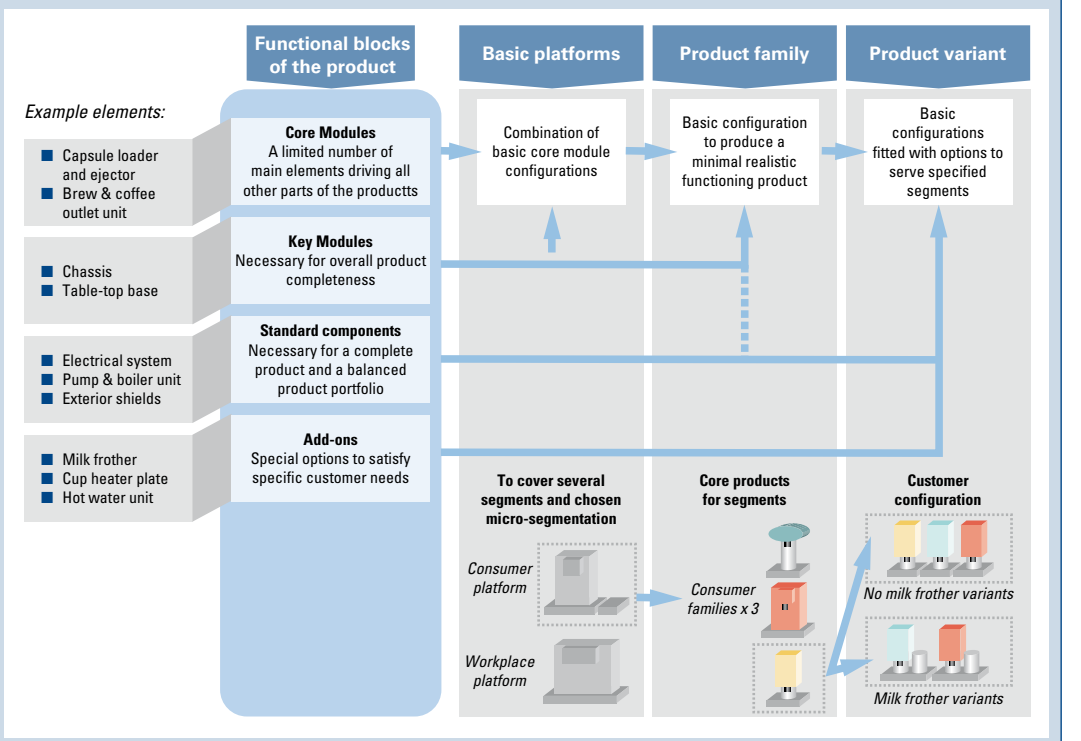
c. Formulate the product strategy

The product strategy provides answers to four questions:

- Where shall we compete, i.e. what priority do we attach to the various segments and from which segments do we stay out explicitly?
- How shall we compete, i.e. what value proposition do we bring in order to achieve our wanted position in each segment?
- When shall we compete, i.e. what are the triggers and launch frequency of new product generations, upgrades and line extensions in order to optimize market impact?
- Against whom shall we compete, i.e. how do we position our product range and do we time our launches relative to those of selected reference competitors?

Furthermore, the product strategy defines the strategic product structure, i.e. the company's product families, the product range within each family and the link between the product range and the company's product platforms. A platform is a particular combination of building blocks (core modules, key modules, standard components and add-ons) that serves as the functional basis for product families and product variants (see an example in Table 3). It is particular in that it allows different market needs to be met in the most economically beneficial way because it reduces the number of parts and development costs and allows a fast response to changing market demands.

Table 3 **Illustration of the platform concept: a capsule-loaded espresso machine**



Source: Arthur D. Little

For example, a manufacturer of mobility aids (such as wheelchairs) identified the need to expand its current portfolio with a low-end platform. It characterized the market segments in terms of product sophistication level, user demographics and geographic spread. By mapping its current portfolio coverage onto the segments, it became clear which segments were the most attractive for the new platform and which specifications of the new offering would best meet customer requirements.

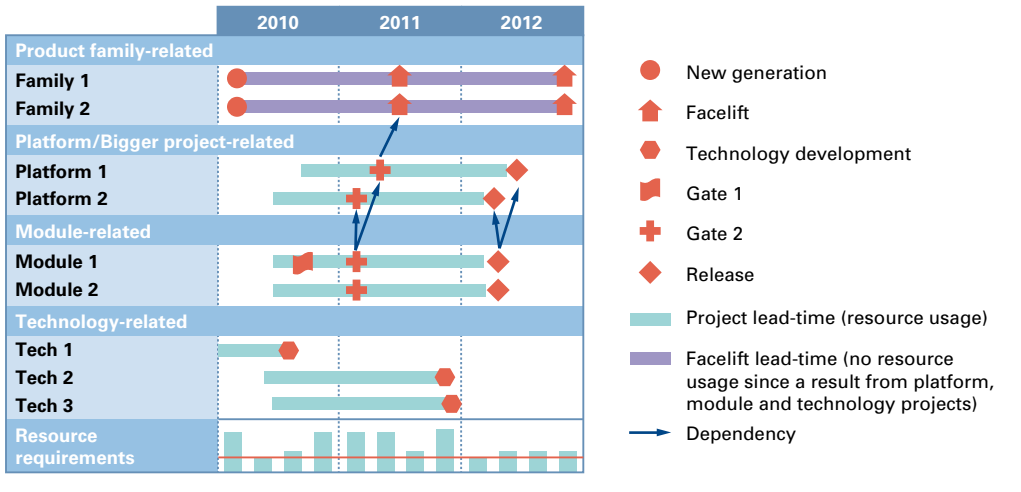
d. Develop the product plan

The product plan is the roadmap that outlines the developments and product launches through which the company over time will realize its strategy. It addresses all activities related to product and technology development. It is preferably structured by product family, platform, module and technology, showing the major project actions and their

interdependencies (see Table 4). Several iterations are required to reach a balanced product plan that will meet both the company's strategic ambitions and its internal resource and budget constraints.

For example, a chemicals manufacturer managed simultaneously to reduce the number of development projects by 50 % and to increase the value of its product portfolio by 30 % by improving its portfolio management and resource prioritization. The improved allocation mechanisms made it much more agile in meeting changing customer demands.

Table 4 **Schematic representation of a product plan**



Source: Arthur D. Little

Insights for the executive

Tailoring a company's innovation approach to the context in which it operates has a large impact on the share of revenues and profits from new products and on the payback time on new product development expenditures. Arthur D. Little's recent "Pathways to Innovation Excellence" study shows that pursuing a so-called "analysis-driven" approach to innovation is superior to the "idea-driven" and "research-driven" approaches, at least for companies that operate in a context with the following characteristics:

- The company's products are complex. The design or manufacture of new products require the combination of several new technologies and the coordination of many operational departments. Both content-wise and time-wise, the development of the various interdependent technologies, components, platforms and products in the portfolio requires careful synchronization through a comprehensive roadmap.

- The pace of change in the company's industry is high. Technologies, regulations and standards change rapidly or unpredictably. Both existing and new rivals make unexpected moves. Frequent new product launches raise the performance bar continually. Business intelligence-gathering is a core capability.

- New product development requires large upfront expenditures to be recovered through a short commercial product lifecycle. Lead times from first concept to production are long, relative to the lifecycle of the product. High project development expenditures (e.g. dedicated product tooling and facilities) have to be committed before results can be measured. The cost of late corrections is high.

- The company serves customers in a large number of diverse yet often small segments. Individual customers have (slightly) diverging needs or expectations about basically the same product. A careful balance is to be found between catering for these particular wishes and ensuring the economic viability of the product portfolio.

Clearly, companies in the automotive & manufacturing, chemicals and ICT hardware & software industries operate in such a context. Our study has shown that adopting an analysis-driven innovation engine in these industries leads to greater innovation success. Whether one or other innovation engine is more conducive to innovation success in other industries such as fast-moving consumer goods depends on the way any individual company in that industry chooses to compete.

Once a company has decided to adopt the analysis-driven approach as its innovation engine, it will have to take the following steps:

- Define a segmentation model that allows for product differentiation.
- Do a market analysis to assess the strategic potential of each segment.
- Formulate the product strategy, thereby answering the questions of where, how, when and against whom to compete.
- Develop the product plan.

When putting in place an analysis-driven approach and environment, the company should ensure first that the affected organisation is capable of change. Changing from one innovation engine to another is a huge change management undertaking. But, when successful, it can double the earnings from new products.

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