

critical issues. These meetings were formally minuted, had a formal, pre-circulated agenda and pre-published the dashboards for each programme to be discussed. A series of such review meetings led eventually to sign-off for the programme, and a mandatory sign-off for beta release.

Overall, we observed that these strands of interaction were articulated through telling and elaborating (and challenging, amending, negotiating and confirming) 'stories' about the courses of action that participants were engaged in. There were stories about 'what this product will contribute to the business', 'how this product will be constituted, physically, financially and operationally to do this' and 'how we will organize this stream of events and outcomes to achieve a beta launch'. To emphasize the active nature of this, its utter strategic seriousness, and the highly focused and skilful attention that participants gave to this kind of activity, we might label it *story development* rather than story telling. In other words, story development appeared to be a central and intrinsic aspect – perhaps even the primary mode – of product development work.

Source: Hales, M. and Tidd, J. (2009) Routines and representations at work in new product development. *Industrial and Corporate Change*, forthcoming.

Factors influencing product success or failure

There have been more than 200 studies that have investigated the factors affecting the success of new products. Most have adopted a 'matched-pair' methodology in which similar new products are examined, but one is much less successful than the other.⁴ This allows us to discriminate between good and poor practice, and helps to control for other background factors. Table 9.1 summarizes some of the main research on the topic of product success and failure.

TABLE 9.1

Some key studies of new product and service development

Study name	Key focus	Further reference
Project SAPPHO	Success and failure factors in matched pairs of firms, mainly in chemicals and scientific instruments	5
Wealth from Knowledge	Case studies of successful firms – all were winners of the Queen's Award for Innovation	6
Post-innovation Performance	Looked at these cases 10 years later to see how they fared	7
Project Hindsight	Historical reviews of US government-funded work within the defence industry looking back over 20 years (from 1966) at key projects and success/failure factors	8

(continued)

TABLE 9.1 (Continued)

Study name	Key focus	Further reference
TRACES	As Project Hindsight but with 50-year review and also exploring civilian projects. Main aims were to identify sources of successful innovation and management factors influencing success	9
Industry and Technical progress	Survey of UK firms to identify why some were apparently more innovative than others in the same sector, size range, etc. Derived a list of managerial factors which comprised 'technical progressiveness'	10
Minnesota Studies	Detailed case studies over an extended period of innovations. Derived a 'road map' of the innovation process and the factors influencing it at various stages	11
Project NEWPROD	Long-running survey of success and failure in product development and replications	12
Stanford Innovation Project	Case studies of (mainly) product innovations, emphasis on learning	13
Lilien and Yoon	Literature review of major studies of success and failure	14
Rothwell	25-year retrospective review of success and failure studies and models of innovation process	15
Mastering the Dynamics of Innovation	Five retrospective in-depth industry-level cases	16
Sources of Innovation	Case studies involving different levels and types of user involvement	17
Product Development Management Association	Handbook distilling key elements of good practice from a range of success and failure studies in product development	18
Ernst	Extensive literature review of success factors in product innovation	19

(continued)

TABLE 9.1 (Continued)

Study name	Key focus	Further reference
Interprod	International study (17 countries) collecting data on the factors influencing new product success and failure	20
Christensen	Industry-level studies of disruptive innovation – includes disk drives, mechanical excavators, steel mini-mills	21
Eisenhardt and Brown	Detailed case studies of five semiconductor equipment firms	22
Revolutionizing Product Development	Case studies of product development	23
Winning by Design	Case studies of product design and innovation	24
Innovation Audits	Various frameworks synthesizing literature and reported key factors	25
Radical Innovation	Review of radical innovation practices in case study firms	26
Rejuvenating the Mature Business	Review of mature businesses in Europe and their use of innovation to secure competitive advantage	27
Innovation Wave	Case studies of manufacturing and service innovations based on experiences at the London Business School Innovation Exchange	28
Tidd and Bodley	Effects of product novelty on effectiveness of development tools, based on 50 development projects	3
SPOTS	Contribution and effectiveness of strategy, processes, organization, technology and systems for new service development in 108 firms	29

These studies have differed in emphasis and sometimes contradicted each other, but despite differences in samples and methodologies it is possible to identify some consensus of what the best criteria for success are:

- *Product advantage* – product superiority in the eyes of the customer, real differential advantage, high performance-to-cost ratio, delivering unique benefits to users – appears to be the primary factor separating winners and losers. Customer perception is the key.
- *Market knowledge* – the homework is vital: better predevelopment preparation including initial screening, preliminary market assessment, preliminary technical appraisal, detailed market studies and business/financial analysis. Customer and user needs assessment and understanding is critical. Competitive analysis is also an important part of the market analysis.
- *Clear product definition* – this includes defining target markets, clear concept definition and benefits to be delivered, clear positioning strategy, a list of product requirements, features and attributes or use of a priority criteria list agreed before development begins.
- *Risk assessment* – market-based, technological, manufacturing and design sources of risk to the development project must be assessed, and plans made to address them. Risk assessments must be built

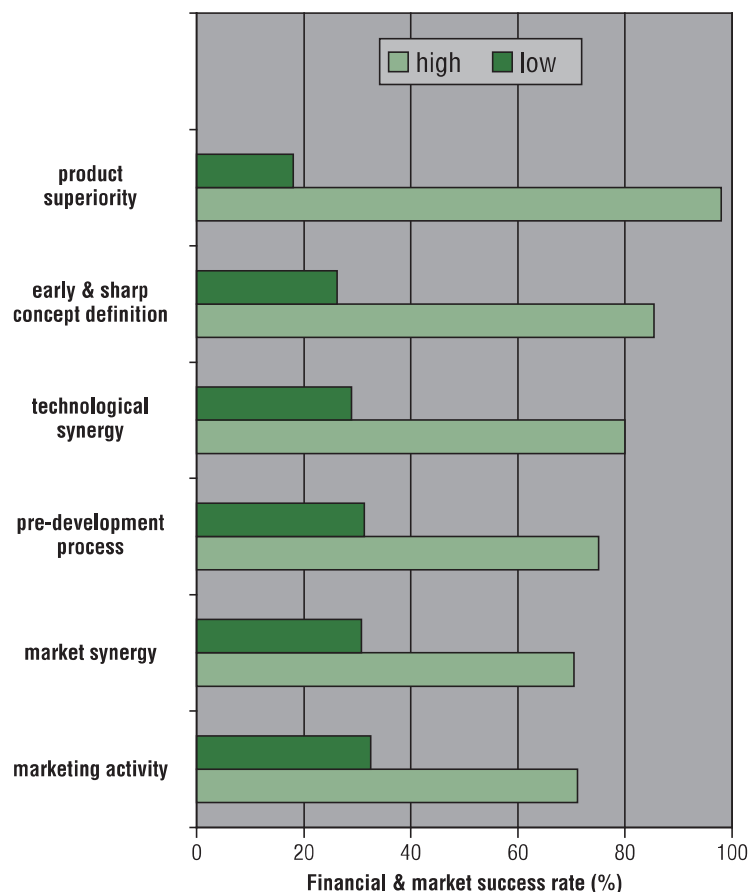


FIGURE 9.3: Factors influencing new product success

Source: Derived from Cooper, R. G. (2000) Doing it right: winning with new product *Ivey Business Journal*, 64 (6): 1–7.

into the business and feasibility studies so they are appropriately addressed with respect to the market and the firms' capabilities.

- *Project organization* – the use of cross-functional, multidisciplinary teams carrying responsibility for the project from beginning to end.
- *Project resources* – sufficient financial and material resources and human skills must be available; the firm must possess the management and technological skills to design and develop the new product.
- *Proficiency of execution* – quality of technological and production activities, and all pre-commercialization business analyses and test marketing; detailed market studies underpin new product success.
- *Top management support* – from concept through to launch. Management must be able to create an atmosphere of trust, coordination and control; key individuals or champions often play a critical role during the innovation process.

These factors have all been found to contribute to new product success, and should therefore form the basis of any formal process for new product development. Note from this list and the factors illustrated in Figures 9.3 and 9.4, that successful new product and service development requires the management of a blend of product or service characteristics, such as product focus, superiority and advantage, and organizational issues, such as project resources, execution and leadership. Managing only one of these key contributions is unlikely to result in consistent success.

The organizational issues appear to dominate in the case of more radical product or service offerings. This is probably because it is much more difficult in such cases to specify, in advance, the product or service characteristics in any detail, and instead managers have to rely more on getting the organization right and influencing the direction of development.

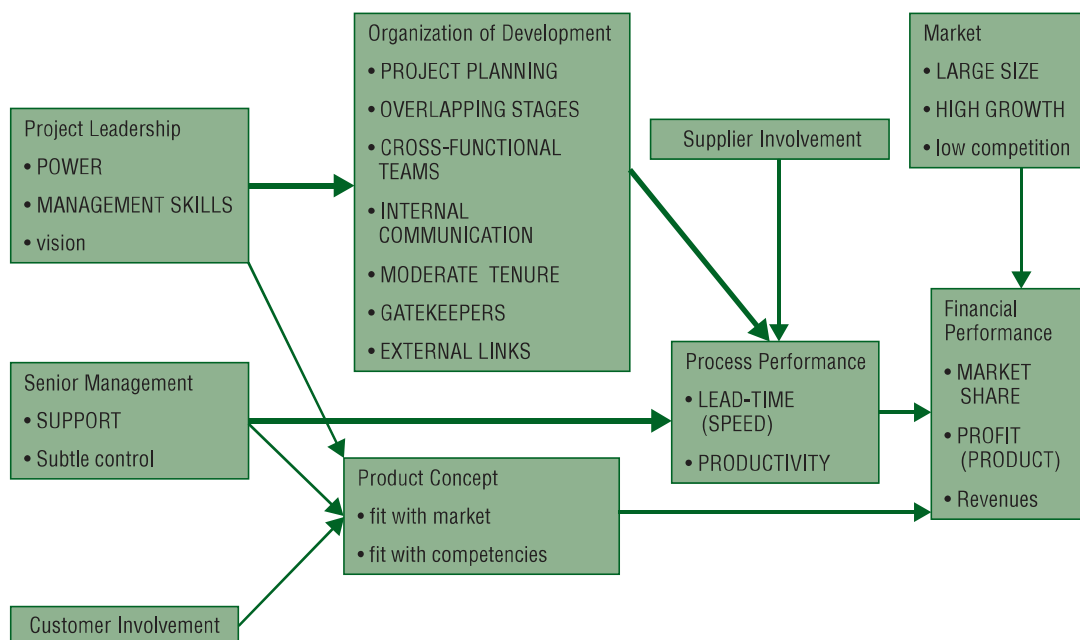


FIGURE 9.4: Key factors influencing the success of new product development

Source: Adapted from Brown, S.L. & Eisenhardt, K.M. (1995). Product development: Past research, present findings and future directions. *Academy of Management Review*, 20, 343–378.

RESEARCH NOTE Factors influencing product success

Of the 200 or so systematic studies of new product development, many adopt the categories developed by Cooper in the famous NewProd research programme. For example, one study surveyed 126 development projects in 84 companies in China to try to better understand the effects ownership has on product success, and how factors influencing product success might be different in emerging and more mature economies.

The study found that the following factors were the most significant factors influencing success, ranked from the most to least important:

- Product advantage – e.g. unique features or higher quality.
- Market research proficiency – market segments, trends and competing products.
- Concept development and evaluation – development and screening.
- Market potential – large potential market and growth.
- Market information – customer needs and competitor intelligence.
- Technological synergy – adequate skills and resources.
- Marketing synergy – skills and resources.
- Market pre-testing – customer feedback, analysis and learning.
- Pre-development and planning – definition, cross-functional integration and clear timetable and milestones.
- Market launch – promotion, distribution and sales effort.
- Proficiency of technical activities – designing and testing.
- Strong financial and management support.

There are few surprises here, as these factors feature in most studies. However, the precise ranking and relative importance of different factors will vary with the type of product, technology and market.

Source: Jin, Z. and Z. Li (2007) Firm ownership and the determinants of success and failure in new product development. *International Journal of Innovation Management*, 11 (4), 539–64.

When we have asked managers to describe how radical products and services are developed, the answers include the mysterious and intuitive, and many highlight the importance of luck, accident and serendipity. Of course, there are examples of radical technologies or products that have begun life by chance, like the discovery of penicillin, but Pasteur's advice applies: 'luck favours the prepared mind'.

Gary Lynn and Richard Reilly have tried to identify in a systematic way the most common factors that contribute to successful product development, focusing on what they call 'blockbuster' products – more radical and successful than most new products. Over 10 years they studied more than 700 teams and nearly 50 detailed cases of some of the most successful products ever developed, and compared and contrasted these organizations with less successful counterparts. They identify five key practices that contribute to the successful development of 'blockbuster' products:³⁰

- Commitment of senior management.
- Clear and stable vision.

- Improvisation.
- Information exchange.
- Collaboration under pressure.

All five practices operate as a system, and blockbuster development teams must adopt all five practices. Size of the organization did not seem to matter; neither did the type of product.

Commitment of senior management

Those teams that developed blockbusters had the full support and cooperation from senior management. These senior managers functioned as sponsors for the project and took on an active and intimate role. Senior managers would often provide more of a ‘hit and run’ kind of involvement for those teams that did not produce blockbusters.

Clear and stable vision

It is important for the development team to have a clear and stable vision to guide them, with specific and enduring parameters, something called ‘project pillars’. These pillars are the key requirements, or ‘must haves’ for the new product. Mission awareness is a strong predictor of the success of R&D projects, the degree to which depends on the stage of the project. For example, in the planning and conceptual stage mission awareness explains around two-thirds of the subsequent project success. Leadership clarity is also associated with clear team objectives, high levels of participation, commitment to excellence and support for innovation. Leadership clarity, partly mediated by good team processes, is a good predictor of team innovation.

Improvisation

A clear and stable vision is necessary, but nobody is so brilliant that they can see the end product from the beginning. They may have a vision of what the end product may look like or what the experience of using it will be (or must be) like. It’s more like having a dialogue with the product – in trying to get the end results you may ditch what you’ve done and try something else. You may just have to accept that you may come up with something you never thought you would produce and you might be better off for it. Teams that produce blockbuster products complete the traditional stages of product development, but they take a different approach to the process. Although this may appear to be undisciplined, the teams nearly always have to meet a hard and fast deadline, and are more likely to monitor their progress and costs than the less successful teams.

Information exchange

Effective communication and information exchange is another key practice. Many blockbuster outcomes require the use of cross-functional teams. Exchanging information openly and clearly on a cross-functional team can be challenging to say the least. Not only do specific functions have their own specialized language, they also often have conflicting interests. Team members call on each other through a variety of informal and personal ways like casual conversation, phone calls and meetings. In addition more formal knowledge exchange happens through a system for recording, storing, retrieving and reviewing information (see Chapter 11 for more on knowledge management). Both types of information exchange can be enabled for virtual team working, but all teams need some face-to-face time.

Collaboration under pressure

Blockbuster development teams are generally cross-functional, but must also often deal with outsiders to bring in a new perspective or expertise. Collaboration in the face of conflicting functions and other sources of internal and external pressure requires a number of facilitating factors. Teams that produced blockbuster products complete the traditional stages of product development, but take a different approach to the process. Rather than going through the gates step by step, waiting for a final decision to be made about going forward, they focus on getting an early prototype out quickly to learn how customers might respond. Once they learned how customers responded, they then continued to take out new prototypes for more continuous feedback. The teams need to be able to balance the insights they gained from the customers with the desired outcome. This constant balance allowed them to adjust and fine-tune their understanding of both the market need and the product concept. This fast, iterative process was critical to their success. 3M's application of the lead-user method is a good example of using external partners to develop radical products.



9.2 Influence of technology and markets on commercialization

So far we have described a generic process for new product development, and factors which we know affect success and failure. However, the type of innovation also influences the best way to develop and commercialize an innovation.

The innovation literature has long debated the relative merits of 'market pull' versus 'technology push' for explaining the success (or failure) of new products and services. The usual truce or compromise is to agree on a 'coupling model', whereby technological possibilities are coupled with market opportunities. However, this view is too simplistic. More than 40 years of research, case studies, surveys and econometric analysis are clear. In some cases clear market needs are unmet because of technological limitations, for example, the proverbial cure for cancer, but in other cases technological possibilities have no immediate or obvious commercial application, and anticipate or even create new markets. For example, lasers ('light amplification by the stimulated emission of radiation', if you ever wondered) were for many years simply a useful instrument in scientific experiments, initially used in various military applications, with mixed success, but later formed the basis of almost all optical recording and transmission of data, from broadband to DVD. In this section we try to provide an understanding of the influences the market and technological context has on new product and service development.

Marketing focuses on the needs of the customer, and therefore should begin with an analysis of customer requirements, and attempt to create value by providing products and services that satisfy those requirements. The conventional marketing mix is the set of variables that are to a large extent controllable by the company, normally referred to as the 'four Ps': product, price, place and promotion. All four factors allow some scope for innovation: product innovation results in new or improved products and services, and may change the basis of competition; product innovation allows some scope for premium pricing, and process innovation may result in price leadership; innovations in logistics may affect how a product or service is made available to customers, including distribution channels and nature of sales points; innovations in media provide new opportunities for promotion.