

TECHNICAL-COMMERCIAL INTERFACE - A BASELINE FOR SUCCESSFUL NEW PRODUCT DEVELOPMENT

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1. Introduction

The need for effective R&D-marketing integration within New Product Development (NPD) processes has been widely recognized in modern business environments due to the ever changing requirements of fast growing markets. Despite extensive publications in this area, very few companies have actually succeeded in achieving the optimum levels of such integration. That is particularly noticeable in established technology companies that are involved in business-to-business (B2B) relationships with their stakeholders. In such companies the gap between R&D and marketing has proven still to be very significant. As Barczak et al [2009] found in their PDMA best practices study, the way NPD teams are usually assembled, trained, enabled, supported and managed is not consistent with recommendations from published research on topics such as R&D-marketing interface and NPD team performance. Furthermore, they note that “additional research on developing effective NPD strategies and on integrating NPD strategy across all levels of organizations would be useful, with potentially powerful outcomes” [Barczak et al. 2009].

Pioneering work in this field has been done by Gupta et al [1986], who provided a theoretical framework for studying the R&D-marketing integration levels. Their work *has its origins in strategy-structure-environment paradigms of organisational design, the organisational context of innovation, and the social differences between marketing managers and technical specialists. It is based on three main concepts, namely:*

- 1. The required degree of R&D-marketing integration depends on the company's new product strategy and its perceived environmental uncertainty;*
- 2. The company's ability to achieve R&D-marketing integration is affected by its organisational factors such as its structure and reward systems and socio-cultural differences between R&D and marketing managers.*
- 3. The integration gap that results from the difference between the perceived need and achieved integration is expected to affect the NPD success of the company.*

This work is the most widely cited in the field, but has yet to be subjected to holistic empirical test, because it failed to address specifics of the environment in which the company operates, especially the cultural aspects of the company's origin.

Early studies such as those of Ruekert and Walker [1987] and Song and Perry [1993], identified integration factors important in different stages of NPD and linked the cross functional integration to NPD success. Furthermore, some studies actually determined in which areas of NPD a specific function needs to be more involved, and where the cooperation/integration of R&D and marketing is most needed, for example Olson et al [1995]. An integrated literature review on the topic has also been provided by Griffin and Houser [1996], but has not been updated recently; therefore there is still a need to consider the trends developing in the 21st century such as globalization, IT technologies, NPD in virtual environments, the recent recession and others.

Song and Thieme [2006] developed testable hypotheses based on Gupta's et al [1986] work and highlighted similarities and differences in cross-functional involvement between R&D and marketing in NPD across three countries. However, they focused only on parts of the original Gupta model and failed to study the relevant strategic and environmental factors influencing the interface. Similarly, Lu and Chang [2002] focused on studying the three cross-functional gaps, defined by Gupta et al [1986], but failed to put them into a wider social context.

The studies mentioned here provide validating evidence of the majority of factors relevant in R&D-marketing integration but treat them as separate issues. Therefore an integrated holistic approach is needed. Furthermore, available studies do not provide explanations of possible practical implementations, and do not support real-life companies in establishing an effective R&D-marketing interface in NPD.

This issue has been recognized by Howden Compressors Ltd. (HCL), a UK based technology manufacturing company. The company has been investing heavily in NPD over the past years, and has recognized the importance of an effective R&D-marketing interface. For the purposes of developing and implementing such an interface in HCL, the company has established a close partnership with City University London. This paper elaborates on the collaboration between the company and the university on minimizing the R&D-marketing integration gap and presents the findings of the first phases of the joint project.

2. The background

HCL is a well established manufacturing company with a strong position in several market segments. Its major strategy for growth is differentiation through an effective NPD process. To achieve the goal of retaining its technology leadership, the company has heavily invested in R&D over the past few years and has consequently started bringing new products and software developments to market. With the start of a new R&D department in the company, it was recognised that no proven process of commercialisation/marketing of new R&D projects existed within the business. This led to the conclusion that an efficient internal process for successful and sustainable commercialisation of HCL's NPD needed to be developed and implemented into the company's' business processes. This included activities to recommend and implement organisational changes for better integration of Marketing and R&D in NPD, which would enable sustainable growth of the company over a number of years and establish best practice in marketing for highly sophisticated engineering product development. For these purposes HCL started a joint project with City University London. It is structured into four stages, which lead to the final output in the form of a scalable commercialisation framework and a differentiation matrix that define methodology to introduce technology leadership in the market.

3. Research methodology and overall structure of the project

A multi-disciplinary approach has been applied for successful execution of the project: a combined research methodology with tools of both qualitative and quantitative research is being used. The combination of these techniques enables examination of evidence, matching the empirically observed events to theoretically predicted events, revision of theoretical prepositions, and examination of the evidence once more from a new perspective.

The research design for this project is shown in figure 1. The four main phases of the project are namely:

- Preliminary analysis of the R&D-marketing interface within the company
- Pilot model of the new R&D-marketing interface
- R&D-marketing integration
- Reorganization and control of change.

The baselines for the 1st phase, preliminary analysis of R&D-marketing interface, were two theoretical frameworks, adopted from the literature [Gupta et al. 1986], [Song and Thieme 2006].

The motivation to use them in the preliminary analysis was:

- To determine the size of the R&D-marketing integration gap in HCL

- A moderate R&D-marketing integration gap exists.
- The main integrative mechanisms which influence the size of the R&D-marketing integration gap in HCL are the organizational climate and harmony.
- These two main mechanisms affect both the R&D-marketing integration gap and the level of NPD effectiveness; however the two influences are contradictory.
- The R&D-marketing integration gap has a direct effect on the final NPD effectiveness.
- 91.4% of the influences on the R&D-marketing integration gap were captured by the studied integrative mechanisms.
- The existing NPD process is formalized. However both, the ideation and commercialization phase are rather loose and depend on the initiative and experience of people involved in the process.
- The relationship between the R&D and marketing functions is perceived as relatively harmonious; however a communication gap exists.

This importance of organizational climate in R&D-marketing integration in HCL raised several important issues that needed to be addressed at the managerial level of the company. The key point is that the positive organizational climate has a direct effect on NPD effectiveness, but is not considered as positive for reducing the size of the R&D-marketing integration gap. Therefore the managerial team needs to consider the role of the climate on two levels, within the R&D-marketing function and within the organization as a whole in order to ensure an effective NPD process. Since the organizational climate is related to behaviour, attitude and feelings of the employees about working in the company, the subject should be approached from the social or psychological perspective.

To enhance the social interaction within the organization, top management should also provide incentives and support which will in turn encourage employees to build up their formal and informal collaborative links. Individuals generally prefer interaction and cooperation with one another when they perceive the characteristics of organizational structure as more autonomous, empowered, and integrated. Special focus should therefore be placed on developing a preferable organizational climate in the NPD processes. Furthermore, R&D and marketing personnel may have different perceptions of the R&D-marketing interface. This should be addressed by implementing further integrative mechanisms that will bridge this gap between R&D and marketing.

5. Pilot model

On the basis of these findings a pilot model of the HCL R&D-marketing interface has been proposed as shown in figure 2.

The R&D-marketing interface should support a wide range of activities from research through new product and process development, all of which should be connected to the business objectives of the company. The model shown represents the NPD process in 5 phases: discover, define, design, develop, and deliver. These phases in turn encompass competence and capability analysis, innovation, organizational learning and NPD management. In the framework, these processes are placed within a wider business environment and linked closely to the key business processes, such as strategy, innovation and operations.

At the strategic level the key activities are strategic analysis and vision of the future, defining policy to bring together the marketing and R&D activities and prioritising projects. These will direct long-term research and development. For marketing, this involves customer contacts, and market intelligence. For R&D it involves long-term research and analysis of both in-house and public domain research results. For all it means gathering competitor intelligence.

At the innovation level, the activities involve planning to incorporate new or additional activities into the business plan taking into account resource requirements. For marketing this involves defining and executing product plans and defining strategies for promotion and sales. For R&D it involves program planning and execution through applied research and development.

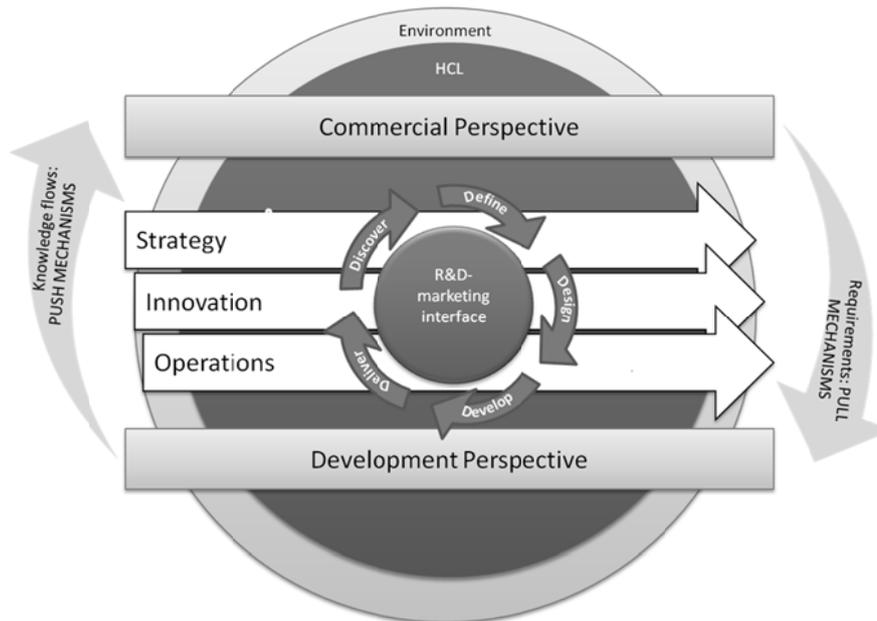


Figure 2. Pilot model of R&D-marketing interface

At the operational level, the detailed daily activities are carried out. Marketing is faced with activities such as promotion, sales operation, processing orders and monitoring customer satisfaction. R&D performs detailed experimentation, technical service and provision of technical sales information. At the interface, both functions interact and are optimised to achieve the common business goals.

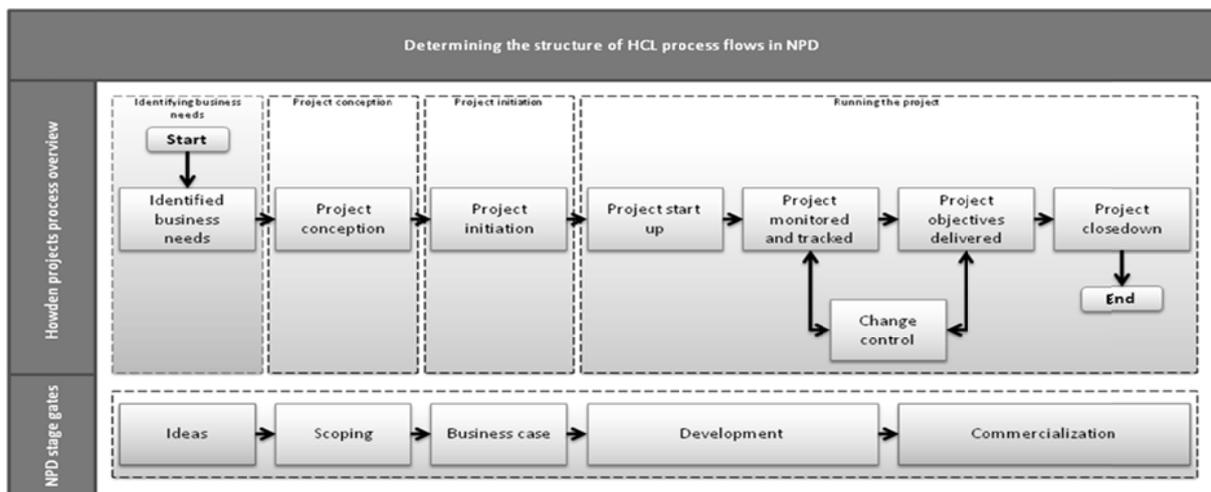


Figure 3. The proposed alignment of NPD processes with the project methodology

Communication and interaction from both functions needs to be facilitated at the interface in order to bring together the scientific and market expertise in a way that will contribute to the success of the company. The key role of the R&D-Marketing interface is to integrate various phases of the NPD process. Therefore it needs to be organised in the most effective way for the company, in order to minimise problems that can occur between R&D and marketing. Many organisations are described as either market or technology driven, but best innovation comes through a real balance of the two, which can be fostered by an effective R&D-marketing interface.

While the proposed HCL framework is conceptually helpful and predetermines the HCL R&D-marketing interface, it can only be meaningful if placed into tangible organizational form. Taking the specifics of HCL into focus, developing visible and credible process flows is the best way to ensure this. Structuring these process flows is currently being performed at HCL. The baseline for this is the

Howden project methodology that encompasses several stages in the run of the project, as shown in figure 3, which in the current state of R&D projects is lacking clear structure of the ideation and commercialisation phases. The NPD process will ensure full implementation of this methodology.

6. Current and future developments

The set of process flows or activities with clearly defined inputs and outputs has been determined for each of the five phases of NPD. To illustrate the deliverables of stage 3 of this project, an example of a process flow is given in figure 4. This represents the 1st phase in the NPD process known as the discovery or ideation phase.

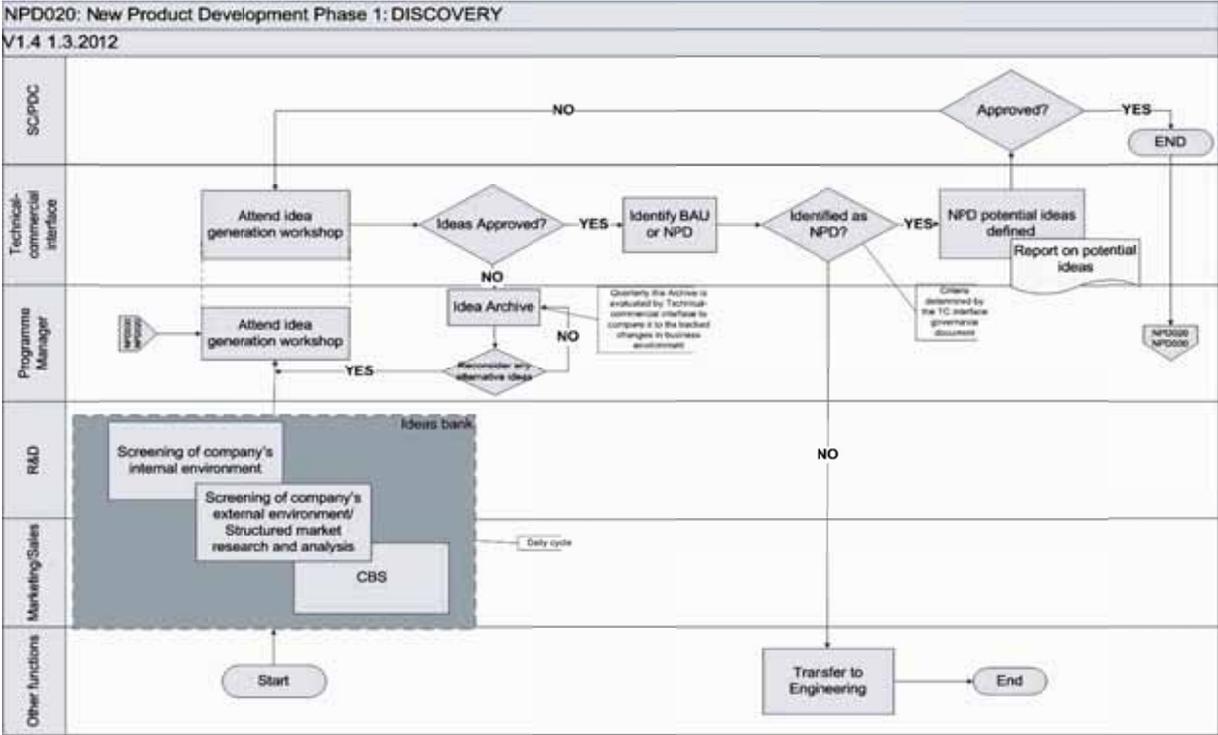


Figure 4. Example process flow within the NPD process drafted for HCL

The discovery process, for identifying business needs, represents the base line for faster and more effective creative thinking in generating new product ideas, which in turn could be introduced to the market and enable realisation of the strategic goals of the company.

The process is constructed out of sequential steps that should enable shorter transition from the initial to the final idea arranged in a portfolio of feasible projects. This is the prerequisite for the start of a successful NPD project. The process includes the following steps:

- Idea bank – identifying new ideas in all areas of work within the company
- Idea generation workshop - filtering and determining the priorities of ideas
- Identifying potential NPD projects – filtering ideas that can be directly transferred to BAU
- Drafting the outline of potential ideas
- Presenting the idea to the Steering Committee (SC) who decides on starting a new NPD project.

The process of collecting ideas into the idea bank is considered to be a daily process, whereas the further steps are to be processed and evaluated quarterly.

The idea bank is to an extent novel for HCL and is drafted to enable continuous idea search and generation within a manufacturing orientated company. The basic principle behind it is that the employees of the company as well as the external environment of the company are the source of numerous ideas that do not get sufficient attention due to unstructured processes. By providing a short structured document for each idea to the manager of new projects, the ideas can be stored and

evaluated formally. The ideas which are classified as potentially beneficial are then developed in terms of scope/concept at the idea generation workshop. Since most of customer contacts and market research are performed in the Sales and Marketing departments, they should be the main provider of information to the idea workshop. The full implementation of modern management principles, such as LEAN 3C which becomes an integral part of HCL business, can also provide a useful tool for drafting ideas across the company.

The idea bank information is systematically built up and maintained by the manager of new projects, who is responsible for structuring, updating and reporting on the idea database, firstly to the Technical-Commercial (TC) interface and then to the SC. The Steering committee is fully responsible for strategic decisions on further development of NPD activities.

In this phase of the project, the process flows for all five stages of the NPD process have been determined and tested in the implementation stages of the project. After being aligned with the Howden project management methodology they will serve as a formal procedure for NPD in HCL.

7. Discussion and conclusions

This paper outlines the process of a joint industry-academia project which was initiated in order to enable faster transfer of initial new product ideas to the market in the form of a profitable product for the partner company. This project is based on scientific research and practical application of the findings into the company. Its two main objectives are to implement changes in the NPD process in the company with the goal of effective commercialisation, and to generalise findings of this project and test the effectiveness of such activities with the aim to encourage growth of the UK economy.

The developed NPD process flows are not completely new for this company. They combine elements of the effective practices in existing R&D projects with the best practice and theory of general NPD found in literature and through experience of the main key actors in the company's NPD.

However, the findings of the project bring several novelties to the proposed process flows. These are listed as follows:

1. Introduction of the technical-commercial (TC) interface team:

The research done within the project has shown that combining only R&D and marketing functions is not sufficient to provide an effective transition of the initial idea onto the market in the form of a successful product. Several more functions, i.e. Sales and Engineering need to be involved. Therefore a Technical- Commercial interface team needs to be formed which will be overlooking the process of transforming the idea into a desired product. This team can be implemented into the company in two different ways: (1) as an ad hoc team formed quarterly solely for the purposes of initiating and assessing R&D projects, or (2) through reorganization within the company, where a dedicated team is formed, exclusively for the purposes of initiation and monitoring of NPD. In both cases a TC interface team should be formed of at least four people, each one responsible for the following functions, namely Engineering, Sales, Marketing and R&D. Current experience and practice in HCL suggest that second option might be preferable, as people aspire to work within predetermined roles, focused on the formal procedures they need to adhere to. It is possible to locate this team in one of the departments or to make it respond directly to the MD of the company. Such a team will enable greater control over the NPD process, quicker responses and consequently shorter decision and change management spans.

2. Separation of NPD from business as usual (BAU) in terms of the R&D function

Currently, the day-to-day activities of R&D are split between the NPD and the BAU. The employees of this department approach them concurrently in their daily routine. Since the processes of BAU and NPD differ significantly, it is proposed to separate these functions formally. The NPD process should foster creativity and development of NEW products, whereas the BAU R&D should focus on updating and modifying existing products, which could be responsibility of the Engineering department. This will consequently lead to reorganization within the company and will depend on the strategy, political, economical and other factors considered by senior management.

Determining the direction and size of organizational change brought by the new interface is the major challenge this project faces in its current form. Organizational change is a lengthy process that demands employee engagement and willingness to change.

A company is a social system composed of interdependent subsystems required to function harmoniously. Their coordination is accomplished through management policies and practices, which in turn interact with the environment in order to help achieve a set of goals or objectives. This coordination may be a lengthy process, in particular within long established manufacturing companies, since the required continuous engagement of employees may be blocked due to cultural issues. HCL has recognized the importance of this coordination for the business and has taken a step towards shortening such processes by engaging in this project. The findings of this project are therefore most probably justifiable for the majority of UK industries in this and similar sectors. However such a claim needs to be justified by evaluation of the operation of other businesses. It is therefore proposed for one of the future projects that firstly other companies of the Howden group are evaluated and consequently companies in a similar sector in the UK.

Following the need of UK industry to establish sustainable growth, the formalization of process flows and the TC interface model in HCL is the means to find a suitable balance between the existing manufacturing cycle performed as business as usual and the need for fast and effective implementation of new products to the market. Although the project is intended to run for two years, it is expected that the full benefits of having a formal interface will materialize in the company soon after the projects' closure at which stage further generalisation may be made.

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