



STRATEGIC MANAGEMENT OF INNOVATION AND DESIGN

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CAMBRIDGE

Strategic Management of Innovation and Design

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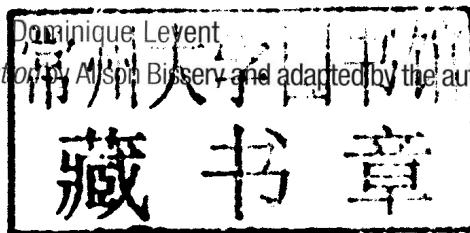
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Foreword by Paul Rivier

It gives me great pleasure to preface this book on innovation. In 1994, a young student contacted me because he wanted to do a PhD thesis on innovation at Tefal. I agreed, but on the condition that he took an active part in designing new products. Vincent Chapel was more successful than I had ever imagined. He managed some very interesting innovations for Tefal and then went on to create several innovative start-ups, one of which is described here. Also, his PhD, directed by Armand Hatchuel, gave me the opportunity to get to know and appreciate the research presented by the authors of this book.

As a company director, the necessity for innovation seems quite natural to me. It is not just one priority among others, as all the rest depends on it. First, economic survival, of course, but also the social well-being of the personnel, which, in my view, is the main purpose of firms. In the different companies I have managed over the years, I have always personally committed myself to exploring all the possible paths for new developments. I believe this is part of a manager's responsibilities. If all we have to propose are efforts to increase productivity, we can hardly expect members of staff to be really committed to the firm. It was doubtless this frame of mind which encouraged us to adopt design reasoning and business decisions in favour of innovation. To my surprise, people often failed to understand this approach, despite our growth record and continued success over a number of years.

Had we invented a 'model', as the authors suggest? It is not for me to say. Nonetheless, as I followed the work with the Ecole des Mines team, I became convinced that, once it was correctly analyzed and studied, our experience could be of benefit to other firms. Very wisely, the authors methodically confronted our solutions with those found in other firms, including some outside France. Their efforts in modelling and generalization also widened the scope, as their propositions go well beyond our particular context and business sectors.

The notions of innovation field, repeated innovation, lineage, reusing knowledge and prudent strategy that the reader will discover in this book are perfectly in line with the spirit needed to innovate in the current competitive environment. I also greatly appreciate the efforts made to clarify notions such as R&D, project, rule-based design and innovative design, because misunderstandings can arise due to the standard language of innovation and are often obstacles to cohesive action within firms.

I leave it to the readers and to researchers to discuss these propositions in more detail.

I would like to say how much I have appreciated the discussions I have had with the authors over the years. This book is a precious contribution to our collective capacity for innovation. It provides the firms and the scholars concerned with a better understanding of the notions and methods, which are fully up to date and present a remarkable, effective step forward.

I still have the privilege of helping firms which have been through major difficulties but which, thanks to these same values and approaches, are returning to growth, to everyone's benefit and through their joint efforts. Innovation based on solidarity is the best solution for maintaining employment.

Paul Rivier,
former CEO, Tefal

Foreword by Marc Maurer



Innovation and competitiveness

The impact of globalization goes way beyond the issue of relocations of manufacturing plants. It throws firms into a new arena where competition is no longer based on product performance alone but also on the overall effectiveness of their innovation strategies. The authors' experience and the numerous discussions we had the privilege of taking part in over the past ten years enabled us to be involved in and put into practice many of the recommendations found here. The notion of organizing intensive innovation, the structuring of lineages of innovative products and the organizing of constantly evolving technological sectors have become management methods that place this 'RID' at the heart of the firm's strategy. One of its main advantages is to structure the long-term view whilst also giving the management sufficient confidence to manage the short and medium term.

Until the 1990s, teams in charge of managing innovation – the R&D and marketing departments – were expected to deliver results whilst roughly keeping to the specifications, timetables and budgets. This operating method was often project-based; it brought new products onto the market in satisfactory conditions and helped to keep challengers at bay. In western countries, companies managed to maintain their growth and profitability. However, outsiders then started to improve their performance: they acquired technological capacities and were quick to learn, meaning they were able to almost catch up with the innovators, who were then obliged to speed up the rate of product renewals. At the same time, the growing number of new technologies that firms had to master led to an explosion in the financial burden of innovation, introducing the need for far more rigorous management of R&D resources. The management of innovation – in terms of both contributions and costs – is now an area where a firm's competitiveness is at play and where management methods have changed

quite spectacularly. The good old recipes, where the CEO's intuition and the R&D managers' experience were sufficient for the firm to maintain its leadership, have been replaced by these far more structured methods, which use a more holistic approach to innovation.

The authors of this book, P. Le Masson, B. Weil and A. Hatchuel, have dissected a certain number of real cases. With a solid theoretical foundation, this comprehensive work provides a new formal framework for organizing Research-Innovation-Development. This book proposes a method which 'organizes' the interface between R&D (which delivers knowledge to the firm by consuming some resources), the market (the 'I' part) and the top management charged with organizing the strategic choices. This new method for managing RID puts into perspective a horizontal relationship between the technologies, at a given time, together with the notion of evolution over time. This helps optimize the synergies between projects and then build up the knowledge with a view to maximizing the results without consuming too many of the firm's resources. Those who take inspiration from this book and put its principles into practice will find it provides a powerful new competitive weapon.

Marc Maurer,
Head of R&D Centers,
Saint-Gobain Glass

Figures

2.1	Rise in the number of engineers working in design	page 30
2.2	Growth in R&D staff and GDP growth in the United States (1950–1989)	37
2.3	The paradox of R&D in large companies	38
4.1	Turnover and number of employees at Tefal, 1961–1996	72
4.2	New products and design staff in Tefal's household electrical goods division	77
4.3	Renault vs. Tefal, design staff management and growth	78
4.4	Schematic diagram of how PTFE adheres to aluminium	86
4.5	From incremental to radical	93
5.1	Co-generation of products and competencies at Tefal: product lineages as innovation martingales	107
5.2	The lineage versus the concept of dominant design	109
5.3	The three static characteristics of a lineage	110
5.4	The ring-based organization	119
6.1	Examples of patents for nail-holders	127
6.2	The Avanti nail-holder, the first in the 'smart tools' range	127
6.3	Avanti's growth, based on the extension of the smart tool lineage	130
6.4	Two variations on tools used in the preparation phase	132
7.1	Airbus and the domestication of innovation: designing ranges of commercial aircraft	144
8.1	Relationships between <i>R</i> , <i>I</i> and <i>D</i>	178
9.1	The stabilization of a dominant design	195
9.2	Growth rates for Saint-Gobain Sekurit	200
9.3	Initial stage, fragmented research	204
9.4	Stage 1, focused research	205
9.5	Stage 2, repeated innovation organized by lineages	214
9.6	The alternatives for thin layers for windscreens	214
9.7	Intensive innovation and innovation field management	218
10.1	Summary of the C-K process	233

10.2	'Research' and 'development' reasoning	236
10.3	The object's identity is revised; the hopper concept appears; and reasoning continues until <i>R</i> and <i>D</i> are activated	237
10.4	Value management and design spaces	242
10.5	The value of an exploration in an <i>I</i> function	243
10.6	Initial configuration of the first design space	248
10.7	Summary of explorations	249
10.8	Evaluation of the exploration carried out on WITAS	250
11.1	The sail-like shells of the Sydney Opera House	261
11.2	Examples of nail-holders	262
11.3	The initial partitions for nail-holders	263
11.4	The nail-holder that 'holds without holding'	264
11.5	374 unfeasible or not very innovative ideas!	266
11.6	Redesigning from a user's idea – the reverse engineering of users' ideas	268
11.7	Structuring value from learning relating to uses	269
12.1	Rear windscreen of Clio 2	279
12.2	Horizontal heat-treated processes	281
12.3	δC - ΔK reasoning and the importance of managing by value – the case of the S4 shaping process	284
12.4	δC - ΔK reasoning pattern	286
13.1	The design spaces in Schlumberger's 'reservoir monitoring and control' innovation field	295
13.2	RMC phase 1, restricting the initial concept – initial learning	295
13.3	RMC phase 2, opening up alternatives	296
13.4	RMC phase 3, rewording the concept	297
14.1	Rule-based design in the C-K formal framework	301
14.2	Initial configuration and launch of the first design space, 'adding a scent'	302
14.3	Design space 1, 'adding a scent'	304
14.4	Return to main C-K (value management)	305
14.5	Design space 2, 'testing airtightness'	306
14.6	Design space 3, 'prototyping gentle air-conditioning'	307
14.7	Return to value management – the embryo of rule-based design	308
14.8	The SBP process in the language of design space and value management	311
15.1	Partnerships in a context of 'value management and design spaces'	320

Tables

2.1	Summary of ‘innovation management’ models and specifications for managing innovation capabilities in the context of unstable object identities	<i>page</i> 49
3.1	Specifications for managing innovation capability	64
4.1	Some of Tefal’s specific features	83
5.1	Summary of theoretical contributions of the Tefal model	120
7.1	The R&D firm, a limited model of the innovative firm	158
8.1	The <i>D</i> function, a component of the model of the R&D-based firm with its own coherence	171
8.2	The <i>R</i> function, a component of the model of the R&D-based firm with its own coherence	173
8.3	Comparison of the principles of management for research, innovative design (<i>I</i>) and development	181
8.4	The specifications of an <i>I</i> function for an RID model of the innovative firm	183
8.5	From R&D to RID	190
10.1	The paradoxes of innovative design reasoning	231
10.2	How the C-K formal framework solves the paradoxes of innovative design	233
10.3	C-K and design spaces: elements of an action model for an <i>I</i> function	245
11.1	The exploration of ΔC - δK innovation fields	259
12.1	The exploration of δC - ΔK innovation fields	278
13.1	The exploration of ΔC - ΔK innovation fields	294
14.1	The basic languages of rule-based design	308
14.2	The basic languages of rule-based design – application in the microclimate case	308
15.1	Four families of collaborative partnerships	321

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Our aim was to combine design disciplines (engineering and industrial), innovation and project management and, in the longer term, to lead the design sciences to the same level of maturity as the sciences of decision-making and programming. In a few years, the research programme gathered speed at an unexpected rate. Most areas of teaching were gradually reorganized around an inspiring and unifying theoretical core, the C-K (Concept-Knowledge) design theory (Hatchuel 1996; Hatchuel and Weil 2001, 2003), which is now taught in a number of establishments. The programme was also in line with a major preoccupation, the necessity of strengthening firms' innovation capabilities. The progress made in this area helped us build up precious partnerships with many leading firms. This book owes a great deal to this original teaching and research project, although it looks at only part of the areas covered by it.

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Introduction: from R&D to RID

There is now widespread agreement that innovation holds the key to future economic and social prosperity in developed countries. Experts studying contemporary capitalism also agree that the battle against unemployment and relocations can be won only through innovation. It is *the* great challenge of the day and, for many specialists, the only possible solution to the problems facing western societies and to the current recession. Whether it is studied from a local or a global standpoint, innovation is the only way of satisfying the social, environmental and economic facets of growth, and of increasing levels of education whilst also creating value, jobs and purchasing power. It also seems to be the only way of reconciling, at least temporarily, employees, managers, consumers and shareholders.

In the face of such unanimity, governments in developed and in emerging economies have set up various incentive schemes designed to promote innovation, including special subsidies and aids for investment in R&D. Initiatives such as the EU common policy aimed at ‘building a knowledge-based economy’, notions such as ‘lifelong learning and key competencies’ and even the ‘information society’ all translate the same imperative for innovation. But is enough being done to meet the challenge?

A great deal of research has been carried out by firms and government departments, but what do we actually know about innovation? For instance, do we know which factors enhance a firm’s innovation capability and whether financial incentives guarantee effective innovation? Can we use the traditional views of innovation to build the innovative firms and regions of the future? Are the current R&D organizations and the traditional engineering and marketing methods suited to a high pace of innovation? Do we have a set of management principles that can be taken as ‘best practices’ for managing innovation? It has to be said that, thanks to past and present interest in innovation, scholars from different disciplines (management, social studies, economics, etc.) have learned a lot about the importance of innovation and the stakes involved,

but we still understand little about the relationships between ‘knowledge’, ‘innovation’, ‘growth’ and ‘research’.

These are the issues we sought to address in the research project described in this book. In the course of our work, we made use of a number of international experiences in industry, together with new theoretical frameworks. Our first observation was that innovation has changed! Our second was that organizing an innovation process is neither simply a question of how much is spent on R&D, nor of better dialogue between the different functions and departments. Innovation needs more than just a good dose of courage and good forward planning. But above all, our observations led us to believe that fundamental, long-term changes are in store and that all organizations and professions must be prepared to face them. Actually, bearing in mind industrial and entrepreneurial history, this is not really surprising: innovation always involves more than just ‘good ideas’. Each of the great industrial revolutions was linked to new forms of innovation, either in content, functions or organizations.

Innovation-based capitalism therefore faces a new challenge. The actors are aware of the stakes involved in innovation, but now they must be convinced of the need for a radical change in the place and the role of innovation in firms. And this change must be carefully prepared and organized. The following propositions clarify our point of view and sum up the general outline of the book:

1. Innovation is now *intensive*: it is systematic, repeated and oriented, instead of random and episodic. In its new form, it has become a major driving force for contemporary capitalism and it will determine the conditions of international economic competition in the future.
2. An intensive innovation process is *not the same thing as either research or development*, or traditional R&D, conceived as cooperation between the two. It is essentially based on *innovative design* activities, whose specific principles of rationality, efficiency, organization and management will be explained throughout this book.
3. Firms must make room for *innovative design and its organization* in their strategies and structures.
4. These wide-reaching changes can be expressed by a simple formula: *the transition from R&D to RID*. The new ‘*I*’ between research and development refers to the functions and competencies of innovative design. It is neither simply another structure or body, nor a simple coordinating function. It has an original, specific mission. We will see how innovative design activities are not only exploratory but *activate*, throughout the

firm, an *innovation-oriented metabolism*, i.e. a collective capacity to continually and simultaneously recreate *sources of value* (products, concepts, patents, environmental and social values, etc.) and new *competencies* (knowledge, expertise, rules, functions, etc.).

The transition from R&D to RID entails a drastic change in the way firms are managed and has economic, social and ecological impacts as it concerns all the different dimensions of innovation. The change is not confined to large international groups but affects all organizations. In fact, it could have the same universal thrust as Taylorism and Fayolism at the beginning of the twentieth century.

Before going any further, it is worth pausing for a moment to think about what we mean by 'innovation', as its different forms can be somewhat disconcerting.

1 Innovation, a victim to fashion?

Everything involves 'innovation' today, and its omnipresence emphasizes its natural ambivalence. It is such a vague, well-worn notion that it tends to leave people perplexed or to prompt an ironical smile.

Innovation is often synonymous with fashion, gadgets or illusions, witness expressions such as 'umpteenth reform', 'so-called novelty', 'patch-up job', etc. It is true that the notion has little substance if nothing is done to explain its content or the economic and social value it creates. The notion of 'innovation' *does not mean anything in itself*: the same innovative proposal will be assessed differently by any two observers. However, the same thing can be said of 'research': a new truth is not necessarily interesting. When companies began to set up research laboratories about a hundred years ago, there were always debates about the value of the research produced. It is interesting to study the mechanisms of innovation only because *the question of the value of the innovation is an integral part of it*. This means that the more a productive activity is innovative, the greater the need for methods to assess its value. This can be seen, for instance, in cultural or artistic creation where the critics are fully involved in the production process. Similarly, the most active consumer organizations are found in the most innovative markets (automobile, IT, etc.).

Innovation is always associated with change, uncertainty and risk. Unpleasant surprises can be found lurking in ambush behind the most brilliant ideas. By definition, innovation is unsettling and upsets people's

habits. However, this implies that innovation is unintended and comes out of the blue, whereas in reality it can be intentional, prepared and organized to anticipate risks. This is the case for explorers, in sports or in science, who are all the better prepared and all the more organized in situations where they do not know what they are going to find. So it is not innovation as such that merits study but the ways and means, methods and mechanisms that design, elaborate and form the innovation process. Without such considerations, the term 'innovation' loses its substance and ends up provoking a mixture of enthusiasm, confusion and suspicion.

Commercial, technical or industrial innovations that create value are hardly a recent phenomenon. More than 200 years ago, during the Industrial Revolution in Britain, there were already debates about the advantages and disadvantages of 'industrial progress'; and the *Belle Epoque* before the First World War saw the birth of the car, Taylorism, electricity, bureaucracy, industrial design, underground rail systems, etc. But by now, in a civilization that has already undergone four or five major waves of social or technical change, are firms not used to innovation? Do they not already have well-organized, well-managed R&D departments, at least the largest among them? Everything seems to confirm a simple idea: there is nothing less innovative than talking about innovation. In which case, *why write yet another book about it?*

Why another book?

There were several reasons for undertaking the research project presented in this book. In the past twenty years, there have been great changes in the pace of innovation in the workings of contemporary capitalism and in its content. We put forward the idea of an emerging *innovation-intensive capitalism*, which obliges all organizations to invent functions based on innovation. Starting from this assumption, we developed a research strategy that differed from the usual orientations in several respects:

We did not study innovation, as such, *as a problem or a phenomenon*, but all the activities and organizations which, over the course of time, have been set up to *generate, direct and evaluate* innovations.

We therefore focused on the *design activities*, i.e. the activities used to conceive and formulate innovations. Traditionally divided into R&D, engineering and industrial design, these activities had increasingly been studied from different perspectives. It became more and more common for the notion of 'design' to be mentioned as a central

resource for management thinking, yet no *adequate theoretical framework* emerged until recently.

Our approach *calls into question the central notion of R&D* and paves the way for developing a theory on *innovative design activities*, a major challenge for business history and theory.

Intensive innovation: constantly questioning the identity of objects

Contrary to a commonly held idea, innovation is not a natural, almost random phenomenon to be found in practically all organizations and firms.¹ Whether it takes the form of a new technique, new aesthetics or new work organization, innovation is above all *the result of the activity of communities that determine its form and its conditions of acceptability*. The history of architects, engineers, industrial designers and researchers illustrates this point. Although the need for innovation has taken different forms depending on the era or the sector of business, each time it has led to the emergence of new ‘innovation professionals’ with their own means of analysis and experimentation and with their own principles of action.

Intensive innovation: value creation through competition

In less than half a century, the process of generating innovations has become the major competitive playing field for contemporary capitalism and a vital source of sustainable development for contemporary societies. We will see in Chapter 1 that, as far as firms are concerned, it is a question of surviving in an innovation-intensive capitalist system. In societies that are used to regular changes in projects and lifestyles, it is even the fundamental way of creating value because, whether the value is judged on the basis of profits or on the progress achieved in terms of human, ecological or social development, it always requires innovative activities. This is one of the lessons to be learned from recent work on the role of innovation in sustainable development.² We must therefore stress a fundamental point in our work: innovation itself is not a new question, *but its place, scope and content have changed* and it is now characteristic of competition. Innovation has become intensive.

¹ Despite their sophistication, economic models of endogenous growth that try to take innovation into account still model the birth of innovations as random sequences.

² See the study on sustainable development policies proposed by Aggeri *et al.* (2005).