

BRITISH STANDARD

**Design management systems –
Part 1: Guide to
managing innovation**

ICS 03.100.01



NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© BSI 2008

ISBN 978 0 580 58704 7

The following BSI references relate to the work on this standard:

Committee reference MS/4

Draft for comment 07/30164294 DC

Publication history

First published January 1989 as BS 7000

(subsequently renumbered as part 1)

BS 7000-1:1989 superseded by BS 7000-2:1997

Second edition November 1999

Third (present) edition April 2008

Amendments issued since publication

Amd. no.	Date	Text affected
-----------------	-------------	----------------------

Contents

Foreword *v*

0	Introduction	<i>1</i>
0.1	General	<i>1</i>
0.2	Survival of the fittest	<i>1</i>
0.3	Innovation goes beyond technology	<i>2</i>
0.4	Innovation is not for all	<i>2</i>
0.5	Designing total experiences for products, services and processes	<i>2</i>
1	Scope	<i>7</i>
2	Normative references	<i>7</i>
3	Terms and definitions	<i>8</i>
4	Innovation, newness and an overview of the basics of innovation management	<i>14</i>
4.1	Flow chart of the complete innovation management framework	<i>14</i>
4.2	Planning beyond current horizons	<i>14</i>
4.3	Co-ordinating short-term and long-term work	<i>16</i>
4.4	Nature of innovation	<i>17</i>
4.5	Reasons to innovate	<i>19</i>
4.6	High productivity innovation	<i>20</i>
4.7	Degrees of newness	<i>21</i>
4.8	Sources of newness	<i>21</i>
4.9	The value chain	<i>22</i>
4.10	How change is introduced over time	<i>23</i>
4.11	Innovation and change management	<i>25</i>
4.12	Basis of effective innovation management	<i>28</i>
5	Managing innovation at the organization level	<i>30</i>
5.1	General	<i>30</i>
5.2	Assign responsibilities for innovation	<i>30</i>
5.3	Stage 1 – Review current innovation practices to determine potential for improvement	<i>32</i>
5.4	Stage 2 – Create future vision	<i>32</i>
5.5	Stage 3 – Draw up mission statement relating to innovation	<i>33</i>
5.6	Stage 4 – Distil innovation objectives and strategies from organization's overall objectives and strategies	<i>33</i>
5.7	Stage 5 – Determine the innovation highway	<i>33</i>
5.8	Stage 6 – Plan introduction of new approach to innovation	<i>34</i>
5.9	Stage 7 – Communicate essence of innovation mission, objectives and strategies	<i>35</i>
5.10	Stage 8 – Promote an innovation-nurturing culture	<i>36</i>
5.11	Stage 9 – Reinforce infrastructure and expertise to manage innovation	<i>37</i>
5.12	Stage 10 – Draw up master innovation programme	<i>38</i>
5.13	Stage 11 – Implement programme and support new approach to innovation	<i>39</i>
5.14	Stage 12 – Evaluate progress and contribution of master innovation programme	<i>41</i>
5.15	Stage 13 – Build distinctive competencies and competitive advantage through innovation	<i>42</i>
5.16	Stage 14 – Document, share, publicize and celebrate achievements through innovation	<i>43</i>

5.17	Stage 15 – Enhance organization’s reputation through innovation	43
5.18	Stage 16 – Review and refine overall approach to innovation	44
6	Operating the innovation management framework: Further detail	44
6.1	General	44
6.2	Identification of innovation leaders	44
6.3	Selection of core innovation team	45
6.4	Making time for the longer-term future	45
6.5	Job security	48
6.6	Managing innovation projects with clear stages and gateway reviews	48
6.7	Scope of review of current innovation practices	50
6.8	Top-level review and brainstorming sessions on innovation/Opportunity scanning	51
6.9	Forming innovative alliances	57
6.10	Innovation team brainstorming sessions and project reviews	58
6.11	Environmental dimension of innovation management	61
6.12	Legal dimension of innovation management	61
6.13	Resourcing the long term: Investment in innovation	62
6.14	Fast-tracking	65
6.15	Cannibalization	66
6.16	Plan product withdrawals and replacements	66
6.17	Evaluation of processes and infrastructure	66
6.18	Agility to exploit opportunities quickly and flexibility to change course as necessary	67
7	Tools and techniques for managing innovation	68
7.1	Recording and archiving ideas	68
7.2	Backcasting	68
7.3	Brainstorming	68
7.4	Customer-product experience cycles	69
7.5	Ethnographic research	70
7.6	Inclusive design	70
7.7	Intellectual property	71
7.8	Knowledge management	71
7.9	Rapid prototyping	72
7.10	Risk assessment	72
7.11	Scenario planning	75
7.12	The internet, intranets, extranets and wikis	75
7.13	User-centred design	77
7.14	Visualization	78

	Bibliography	80
--	--------------	----

List of figures

Figure 1	– Innovation self-assessment questionnaire – The organization	4
Figure 2	– Innovation self-assessment questionnaire – Products, services, processes and projects	6
Figure 3	– Overview of complete process for managing innovation at the organization level	15
Figure 4	– Innovation highway with milestones	16
Figure 5	– The innovation pipeline – Screening ideas through to launch	17
Figure 6	– Position of an organization on the change/innovation spectrum	18

Figure 7 – Spectrum of newness	21
Figure 8 – Opportunities to innovate throughout the value chain	24
Figure 9 – How change is introduced over time	25
Figure 10 – Hierarchy of change and innovation	26
Figure 11 – Impact on response to change	26
Figure 12 – Factors that affect stakeholders' response to change	27
Figure 13 – Risk and potential returns in balanced project portfolios	39
Figure 14 – Roles and responsibilities matrix	47
Figure 15 – Primary stages of design/innovation projects	49
Figure 16 – Key activities during top-level review, brainstorming and opportunity scanning sessions on innovation	52
Figure 17 – Length of the innovation highway	53
Figure 18 – Some financial aspects of the width of innovation highways	55
Figure 19 – Key activities during innovation team brainstorming sessions and subsequent project reviews	59
Figure 20 – Some basic questions when vetting proposals	60
Figure 21 – Characteristics of innovative projects and level of associated risks	74

Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 85 and a back cover.



Documents

Document Sharing Hub

© BSI 2008 • iii

Foreword

Publishing information

This part of BS 7000 is published by BSI and came into effect on 30 April 2008. It was prepared by Technical Committee MS/4, *Design management systems*. A list of organizations represented on this committee can be requested from its secretary.

Supersession

This part of BS 7000 supersedes BS 7000-1:1999, which is withdrawn.

Relationship with other publications

BS 7000, *Design management systems* currently comprises the following parts:

- *Part 1: Guide to managing innovation* (this part);
- *Part 2: Guide to managing the design of manufactured products*;
- *Part 3: Guide to managing service design*;
- *Part 4: Guide to managing design in construction*;
- *Part 6: Guide to managing inclusive design*;
- *Part 10: Vocabulary of terms used in design management*.

Other parts might be added.

The Technical Committee, MS/4, invites users to submit technical comments, observations and suggestions to the Committee Secretary at BSI (see address on back cover). This will assist the Committee when it reviews the standard in due course and when it considers the preparation of further parts of BS 7000.

Use of this document

BS 7000-1 takes the form of guidance and recommendations. It is conceived as a coherent whole. Yet, as a guide rather than a specification, the guidance need not be adopted in total. Effective use can be achieved through the smart selection of relevant clauses and adapting them to an organization's particular circumstances.

This revision incorporates many suggestions from users and non-users to make the standard more accessible and immediately useful. Research has revealed that a careful read through repays the time spent, for detail and relevance are missed when skimming through the text.

Users also reported value in re-visiting the standard after first use, say at intervals of a year, as organizations gain experience and become more adept at managing innovation, executives' needs and attitudes change, so they look for different guidance and gain fresh insights from the text after appropriate intervals.

Readers who restrict their attention to the project level might be able to take advantage of guidance quickly, however full benefits will not be gained as changes confined there rarely establish deep roots. Work at the organization level, especially by principals, is vital for success; so this needs to be planned in either at the start or fairly quickly thereafter.

As a guide, this part of BS 7000 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this part of BS 7000 is expected to be able to justify any course of action that deviates from its recommendations.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

The word “should” is used to express recommendations of this standard. The word “may” is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word “can” is used to express possibility, e.g. a consequence of an action or an event.

Notes and commentaries are provided throughout the text of this standard. Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

0 Introduction

0.1 General

This standard was developed to enable senior executives or principals of organizations to plan products, services and processes a significant time into the future: at least a generation after the generation currently under development.

NOTE 1 For brevity, the term “principals” is used in most instances to denote owner-managers, partners, board directors and other top executives in private sector organizations, as well as senior officers in public sector and not-for-profit organizations.

NOTE 2 In line with the convention adopted by British Standards, the term “product” also encompasses services, processes and business models.

It provides a richer language and framework of issues and procedures that organizations, especially those that are new, small or relative novices at innovation (see **3.13**), can adopt to upgrade their innovative performance then use as the basis of collaborative initiatives with suitable partners to promote innovation. All or selected clauses could form the basis of contracts between organizations. Several clauses could be used as bases for metrics to monitor and evaluate performance. These are highlighted for consideration with the following icon **METRIC?** in the margin.

Research has revealed that organizations that evolve a framework for long-term innovation react faster to threats or surprises, are more likely to take effective action, and are better at sustaining the momentum of change. As such, they are more likely to succeed.

Organizations also appreciated the generic and comprehensive guidance provided by this standard.

NOTE 3 Research was undertaken as groundwork for the original standard and again for this revision. This took the form of in-depth interviews with senior executives and others on the front line of innovation and use of standards in selected organizations throughout Great Britain offering a wide spectrum of products and services. All were considered to be innovative and many had won awards for design, technology or innovation. The largest employed 58 000 people around the world; the smallest consisted of just three individuals. Annual turnovers ranged from £1 000 to £8.4 billion.

0.2 Survival of the fittest

A key priority of an organization is to survive and prosper. Survival usually depends on the expansion of existing markets, withdrawal from stagnant markets and taking advantage of new opportunities.

The accumulation of market intelligence and a researched knowledge base of customer requirements are also critical when formulating realistic business strategies and delivering products that generate growth.

One reality in life is that not much remains the same for long. Customer needs and interest change so what was considered a highly desirable luxury at one time gradually becomes a mainstream feature, then a basic requirement for entry into a market. Consequently, organizations that fail to upgrade processes and develop their products and services are unlikely to remain viable, especially with increased competition world-wide that often has to be countered on uneven terms. Eventually they might be forced to cease trading.

0.3 Innovation goes beyond technology

Innovation is not confined to research and development in technology (often characterized as adding features and functions to products). It can occur in all parts of an organization, throughout the value chain, and at all stages of product/service lifecycles; research, design, manufacture, distribution and marketing, servicing, maintenance, withdrawal, the eventual disposal and recycling of products (see 4.9 and Figure 8).

NOTE *Worthwhile contributions through innovation will not necessarily relate to financial outcomes, particularly where public sector and not-for-profit organizations are concerned.*

0.4 Innovation is not for all

Although this standard is aimed at those who have determined that innovation is right for them and wish to innovate, it is important to underline that innovation might not be right for every organization, or for every product of innovative organizations. Furthermore, customers and markets do not always welcome innovation unless the benefits are obvious.

Typically, innovation takes longer, costs more, and is riskier than product improvement. Therefore, the continual improvement of products, and making licensing arrangements with innovators, might be preferable options.

Figures 1 and 2 (self-assessment questionnaires) and Figure 6 provides some insights into where an organization is positioned along the innovation spectrum.

0.5 Designing total experiences for products, services and processes

Customer satisfaction arises out of overall experiences with products and services, including the way organizations respond when contacted. Therefore, careful attention should be paid to all factors that contribute to these total experiences.

During the past decade, particularly in advanced economies, the proportion of gross domestic product deriving from services has risen dramatically, as has the proportion of people employed in the service sector. In several instances, both figures exceed 70%. Another strong trend has been the introduction of services by manufacturers to support their products. These complementary services provide more rounded offerings to customers and, often, give rise to competitive advantages. As such, they achieve higher margins and raise profitability.

Sensitivity analyses can help determine the priorities set by customers and users, and the effects of each component on the attractiveness of the total product.

It is also important to ensure continuity between generations of products and appropriate integration within product systems and ranges. Some organizations consider different generations of products as separate products, not least in terms of project management. However, the development of one generation into the next will suffer if there is no continuity in project team members, archiving of experience is inadequate or such archives are not referred to regularly.

Figure 1 Innovation self-assessment questionnaire – The organization

Where is your organization on these issues? Mark an 'x' in the relevant box on the scale.						
	1	2	3	4	5	
Innovation is inherently chaotic, so not amenable to management or planning	☐	☐	☐	☐	☐	Innovation is a powerful means of creating the future, so we make every effort to harness it for the benefit of our organization
It is very difficult to forecast the future so we concentrate on what can be done in the immediate future	☐	☐	☐	☐	☐	There is little that cannot be planned in the longer-term, so we ensure projects are sanctioned with sufficient information on the terrain to be covered
Change is inconvenient and too much of it is not good for us or our customers	☐	☐	☐	☐	☐	We pursue whatever change is necessary to deliver attractive competitive products
We concentrate on continual improvement of existing products	☐	☐	☐	☐	☐	We ensure that a fair proportion of turnover is generated from completely new products introduced in the last three years
Our time and energies are taken up entirely with fire-fighting, debugging and responding to what competitors do	☐	☐	☐	☐	☐	We have a reputation to sustain: stakeholders would be disappointed if we did not regularly introduce innovative offerings
We cannot afford failure so avoid it at all costs	☐	☐	☐	☐	☐	We accept failure as part of striving for newness and place great stress on learning from experience
We only consider short-term projects with quick paybacks because of our general aversion to risk	☐	☐	☐	☐	☐	We relish long-term challenges with clear aims and outcomes as important to profitable survival
We leave it to individual staff to deal with innovation as they see best	☐	☐	☐	☐	☐	We have a documented, rigorous yet flexible system for handling innovation
We focus on technical innovation on products	☐	☐	☐	☐	☐	Our holistic perspective seeks innovation in all aspects of the value chain
We plan no further than three years ahead and this horizon is shortening	☐	☐	☐	☐	☐	We invest considerable effort in gaining a long-term vision 10-plus years ahead to inform on what we do today
Product development and design are not identified during our planning cycle nor do they feature in plans	☐	☐	☐	☐	☐	Design/development of long-term products are clearly identified during the planning cycle and feature in plans at all levels
We do not deviate from agreed plans	☐	☐	☐	☐	☐	We pursue carefully conceived plans while developing our agility to take advantage of unforeseen opportunities

NOTE The term "product" encompasses services, processes and business models.

Figure 1 Innovation self-assessment questionnaire – The organization

Where is your organization on these issues? Mark an 'x' in the relevant box on the scale						
	1	2	3	4	5	
Innovation is the responsibility of specialists and happens lower down the organization	☐	☐	☐	☐	☐	Top executives acknowledge their responsibility in relation to innovation, communicate policy, drive activities and provide guidance
No budgets are allocated to innovation or long-term product development	☐	☐	☐	☐	☐	Special care is taken to ensure that we invest continuously in the long-term future and allocate funds specifically for innovation
All skills needed to succeed exist within our organization	☐	☐	☐	☐	☐	We constantly seek new skills, especially those relating to innovation, through skills audits
Our innovative work is undertaken in-house and we expect to retain control throughout; such work is tailored to what can be achieved with internal resources	☐	☐	☐	☐	☐	We bring together whatever skills are required by project briefs; alliances are established to harness expertise outside the organization, sharing responsibility and control
We do not use leading technologies so have no need to protect intellectual property	☐	☐	☐	☐	☐	We always look for intellectual property that might lead to competitive advantages, and make every effort to protect such assets
Staff do not go beyond their remits or stray across disciplines and responsibilities	☐	☐	☐	☐	☐	Staff feel a personal commitment to providing complete solutions seamlessly through generations
An elite core of individuals in R&D and design departments deal with our innovative activities	☐	☐	☐	☐	☐	All our staff are on the front line of innovation and contribute without prompting
Specifications for product updates are extrapolated from current models	☐	☐	☐	☐	☐	We strive to develop products that stretch customers just beyond their needs at launch
Opportunities to innovate are difficult to find and very few development projects progress through to launch	☐	☐	☐	☐	☐	We are never short of great opportunities to innovate, and it is rare for projects not to go successfully to launch
Our reliance on internal funds and difficulties in selling technological advances limit our innovative activities	☐	☐	☐	☐	☐	We rely on our ability to formulate convincing business cases to attract funds from a wide range of sources
Our engineers and sales teams come up with ideas for innovation; customers and suppliers are not involved	☐	☐	☐	☐	☐	Customers, suppliers, competitors, standards, research institutions, trade associations and legislation all provide triggers for innovation
We are not sure how to evaluate the impact of innovation and cannot afford that luxury	☐	☐	☐	☐	☐	Our master innovation programme incorporates formal reviews. It is essential for us to evaluate its contribution and continued relevance

NOTE The term "product" encompasses services, processes and business models.

Figure 2 Innovation self-assessment questionnaire – Products, services, processes and projects

Where is your organization on these issues? Mark an 'x' in the relevant box on the scale.						
	1	2	3	4	5	
We respond to ad hoc requests for change to existing products from our sales and engineering departments	☐	☐	☐	☐	☐	We map out horizons three generations forward for most products but will extend beyond that to exploit new technologies and markets
Staff rarely come up with innovative ideas; few are taken forward and most of those get dropped before launch	☐	☐	☐	☐	☐	Staff constantly generate innovative ideas, then follow most of them successfully through implementation to launch
New product briefs tend to be straightforward extrapolations of previous projects; innovation is a luxury we cannot afford	☐	☐	☐	☐	☐	Considerable effort goes into formulating project briefs, always challenging assumptions and previous work and highlighting the need for innovation
Changes are confined to the tangible product and these tend to be minor improvements	☐	☐	☐	☐	☐	Project briefs embrace appropriate changes throughout the value chain; relatively small changes can, together, constitute radical innovation
Project teams tend to be self-selecting as we do not have much choice. Staff are stretched and rarely volunteer for extra challenging work	☐	☐	☐	☐	☐	We ensure that project teams encompass the required skills and stakeholders selected from the best talent available, inside and outside
Project teams are left to get on with projects with little involvement from senior executives	☐	☐	☐	☐	☐	A top executive is assigned to champion each sanctioned project
Team members use whatever techniques they see fit to undertake their work	☐	☐	☐	☐	☐	A wide variety of techniques is used to help project teams to think 'outside the box'
Development teams review projects as resources allow; senior executives are rarely involved	☐	☐	☐	☐	☐	Our proven innovation management system enables us to monitor and review development projects rigorously in an enlightened way
Product development teams tend to respond to ideas for product changes from a few familiar sources	☐	☐	☐	☐	☐	We actively seek triggers for new development projects from a wide range of sources, within and outside our markets/industry
Our products are essentially commodities with no significant distinguishing features	☐	☐	☐	☐	☐	Our products have distinctive characteristics that are key to our positioning and reputation
We use familiar technologies and techniques with no proprietary intellectual property to protect	☐	☐	☐	☐	☐	Our products incorporate a fair deal of unique intellectual property, all of which is protected
We are not sure how to evaluate the impact of innovation and cannot afford that luxury	☐	☐	☐	☐	☐	All projects are set up with the express intention of evaluating performance and outcomes to enable us to improve performance

NOTE The term "product" encompasses services, processes and business models.

1 Scope

This part of BS 7000 gives guidance on managing innovation, specifically the design and development of innovative and competitive products that satisfy customers' perceived needs and aspirations in the long-term future. It stretches the planning horizon to at least two generations after that currently under development.

NOTE 1 In line with the convention adopted by British Standards, the term "product" also encompasses services, processes and business models.

Guidance covers the total experience and benefits of innovating, as well as the application of general principles and techniques to the management of innovation, from conception, creation, fabrication, delivery and sustenance in markets, right through to withdrawal, final disposal, recycling and the development of subsequent generations of offerings.

The standard applies to all types of organizations (not least small and medium-size enterprises that seek to grow) in manufacturing, process, service and construction industries as well as in the public and not-for-profit sectors.

The guidance in this standard covers all levels of staff and management. It dovetails with that in other design management guides: BS 7000-2, BS 7000-3, BS 7000-4 and BS 7000-6. Insights are provided into what can be attained at all levels of an organization.

This standard complements BS EN ISO 9001. Innovation is critical to sustaining customer satisfaction over the longer term, and considerable skill is required to design quality into products, services and processes. All innovation, bar none, is designed. No innovation can be implemented or brought to market without going through at least one design phase. Detailed guidance is provided, relating to innovation management systems, which help to achieve the desired quality and customer satisfaction (see Clauses 5 and 6). Notes throughout indicate clauses that facilitate fulfilling the requirements of this widely-adopted specification.

NOTE 2 See Bibliography for other documents providing guidance on general management techniques.

NOTE 3 Guidance on procedures needed to meet statutory requirements (such as health and safety, or product certification and liability) are not intended to be comprehensive.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 3811, *Glossary of terms used in terotechnology*

BS 4778-3.1, *Quality vocabulary – Availability, reliability and maintainability terms – Guide to concepts and related definitions*

BS 4778-3.2, *Quality vocabulary – Availability, reliability and maintainability terms – Glossary of international terms*

BS 6079 (all parts), *Guide to project management*

BS 7000-10, *Design management systems – Vocabulary of terms used in design management*

BS EN ISO 9000, *Quality management systems – Fundamentals and vocabulary*

BS ISO 10007, *Quality management – Guidelines for configuration management*

3 Terms and definitions

For the purposes of this part of BS 7000, the terms and definitions given in BS 7000-10, BS 3811, BS 4778-3 (all parts), BS 6079 (all parts), BS EN ISO 9000, BS ISO 10007 and the following apply.

Multiple definitions provided for some terms cover use relating to different aspects and traditions (e.g. engineering and industrial design). Awareness of these multiple interpretations, e.g. innovation and innovation leader, is critical when working in the multi-disciplinary teams essential to deliver innovative solutions.

3.1 3-Gen product

long-term product or service that becomes available, typically two generations after the generation currently being developed

3.2 backcasting

process by which attainment of a desired vision in the long-term future is plotted progressively back to the present through a series of milestone achievements which effectively map out the way forward

NOTE Could apply to markets, products, services, processes and organizations.

3.3 blue-sky thinking

unbounded exploration of ideas without concern as to their practicality, applicability or marketability

NOTE Thinking that seems impractical and without application can trigger insights that lead to successful innovations.

3.4 breakthrough innovation

change that breaches a previously perceived limit in configuration, performance or technology

NOTE Typically opens up important new options to deliver significant advances in outcomes.

3.5 corporate software

knowledge, skills, experience, intellectual property and other intangible attributes within an organization

NOTE Incorporates corporate memory and the folklore of an organization.

3.6 disruptive innovation

innovation with a significant adverse effect within and/or outside an organization that cannot be influenced or controlled in the short term

NOTE Often relates to organizations that exploit low-cost technologies, techniques and procedures in ways unfettered by conventional thinking and perspectives to enter a new field/market and displace established players.

3.7 empathetic design

variant of user-centred design where the ideas for change and innovation arise from careful observation of how target customers use currently available products in actual live situations

NOTE The findings of ethnographic research can form key inputs of such design.

3.8 envisioning

capacity to conceive a future state

3.9 expertise

accumulation of knowledge, skills and experience relating to a specific topic or field

3.10 “if only” analysis

prescription of what could or would be done if certain materials, processes or technologies were available, or specified events were to take place

NOTE 1 “If only” propositions are critical enablers of, or pathways to, the achievement of a new vision.

NOTE 2 Differs from “what if” analysis in that the starting point is a specified desired future state, not the present. See 3.41.

3.11 inclusive design

design of mainstream products and/or services that are accessible to, and usable by, people with the widest range of abilities within the widest range of situations without the need for special adaptation or design

3.12 incremental innovation

change that involves one or more relatively minor innovations that are predictable extrapolations from the present state

3.13 innovation

<ideas> successful exploitation of new ideas

NOTE 1 Definition widely promoted by the UK Government Department for Business, Enterprise and Regulatory Reform.

<process> introduction of changes that are significant departures from the usual way of doing things

<product> transformation of an idea into a novel product, operational process or new service

NOTE 2 Consists of all scientific, technological, commercial and financial steps necessary for the successful development and marketing of novel manufactured products, the commercial use of new or improved processes and equipment.

<techniques, materials> employment of design or construction techniques, or materials, that do not have a proven history of performance or are not covered by an organization’s current practice

NOTE 3 Applies mainly to the construction industry.

3.14 innovation brief

statement that describes the purpose, development and required characteristics (including performance) of a product, service or process, particularly how these will differ significantly from what exists currently.

3.15 innovation champion

person dedicated to the promotion of, and strategic thinking behind, innovative initiatives

NOTE Such individuals will be involved in, or influence, the formative stage of the process as well as the final decision-making. However, they might not be responsible for any aspect of work.

3.16 innovation highway

permissible route over which long-term future products and services will be planned

NOTE See also 3.27, 3.42 and Figure 4.

3.17 innovation leader

<activities> person who takes the lead in innovative activities

<authority> person accepted as being the key authority where matters relating to innovation are concerned

<driving> person who consistently drives innovation and has an acknowledged record of achievement through innovation

<initiation> person who is first to introduce a particular innovation

NOTE 1 Definition could also refer to organizations.

<trend-setting> person who sets trends in markets and industries and is acknowledged to be at the forefront of innovation practice

NOTE 2 Definition could also refer to organizations.

3.18 innovation management system

formal infrastructure encompassing objectives, strategies and processes, organizational structures and values by which an organization administers innovation

3.19 innovation philosophy

general stance of an organization towards innovation and the value attached to the contribution it makes to business performance

NOTE The innovation equivalent of a business mission that articulates the basic reason for innovating within the organization and formalizes its role.

3.20 innovation pipeline (or funnel)

supply of innovative ideas and opportunities that have been through a formal generation, vetting and sanctioning/filtering system for subsequent exploitation

NOTE A full pipeline, continuously replenished, is usually considered a healthy state.

3.21 innovation plan

sub-section of the overall business or corporate plan that brings together all elements relating to innovation whether dealing with inputs, outputs, processes or parts of an organization

3.22 innovation review

formal, documented, comprehensive and systematic examination of an innovation to evaluate its capacity to fulfil stated requirements, identify problems (if any) and propose the development of solutions

NOTE 1 Can take the form of meetings constituted of those most closely concerned with innovation, or affected by the innovations that arise; ideally chaired by an individual not directly connected with the project.

NOTE 2 Might take place several times during the progress of an innovative project. Aims are to:

- a) ensure the innovation continues to conform with set briefs;*
- b) modify (through the originator) the innovation brief to meet reasonable economic or practical difficulties wherever they might be perceived.*

NOTE 3 Can be conducted at any stage of the innovation process, and should definitely be conducted on completion of this process.

3.23 innovation spiral

process of building innovations effectively on their predecessors

NOTE This requires that:

- a) the innovations are exploited fully;*
- b) subsequent innovations develop from a more advanced foundation;*
- c) resources are not wasted retracing ground covered before.*

3.24 innovation strategy

chosen path formulated to achieve business and innovation objectives supported by an indication of how resources will be committed

3.25 innovative alliance

formal collaboration between two or more individuals and/or organizations in order to generate innovative ideas and/or exploit the opportunities that follow

3.26 lead (or expert) user

individual considered to be among the most competent users of a product, or who exploits the potential of a product most

NOTE 1 Potential could be as conceived by the originating organization, or extend beyond that with applications and ways of operating that were never imagined at launch.

NOTE 2 Could be an organization.

3.27 length of the innovation highway

period of time over which new long-term products and services are planned

NOTE 1 Extends from the time when existing products and services go into decline forward to three product generations ahead.

NOTE 2 See also 3.16, 3.42 and Figure 4.

3.28 master innovation programme

programme that integrates all innovation activities and investments to be undertaken by an organization over a specified period, broken down into stages, with resources to be committed and associated timescales

3.29 parametric product brief

limitations as specified in the length and width of an innovation highway

NOTE Includes products to be developed by the organization over a specified time. Also provides the primary determinants against which long-term new product and service ideas are vetted.

3.30 product generation

<advantage> advance that results in a significant competitive advantage

<attitude> advance that forces a significant change in perception and the way things are done

<organization> step advance for an organization or industry

<obsolescence> advance that makes old products obsolete

<platform> advance that establishes a new platform from which to build future output

<progressive change> integration of several changes introduced separately over time to offer a new, upgraded product that is perceived to be of higher value

<simultaneous change> change or cluster of changes incorporated into a product at the same time

<standard> advance that establishes a new standard that others adopt

<transformation> change that transforms a market (changes rules, direction, opens up new avenues, etc.)

3.31 radical innovation

innovation resulting in significant (sometimes step) changes that could not have been extrapolated from present state

NOTE 1 Could result in large and/or fundamental change in one or two factors; or from smaller changes in several factors that, together, lead to a surprising outcome that breaks the mould or sets a new benchmark

NOTE 2 Might relate to products, services, processes, techniques and technologies; to positioning, practices, performance, expectations and possibilities

3.32 risk assessment

process for identifying and estimating possible adverse project outcomes then, if they cannot be avoided or alleviated, balancing and covering for the impact they might have

3.33 road map (or route map)

description of an anticipated series of developments and milestones that provides guidance on the way forward to an envisioned future

NOTE 1 Roadmapping can be applied to products, services, processes, techniques and technologies.

NOTE 2 With judicious planning, new products, etc. can be conceived to use anticipated developments (technological, etc.) as they become available.

3.34 sensitivity analysis

<constituent factors> determination of the relative impacts of equal variations in different constituent factors on the situation under examination

NOTE Factors and constraints can be added or removed to produce “best”, “worst” and “most probable” cases.

<degrees of change> estimation of impact of different degrees of change in a particular factor on the overall situation (performance, outcomes, etc.) under consideration

3.35 serial innovation

group of interrelated innovations that need to be effected together in order to achieve desired innovative outcome

NOTE Often arises as a result of groundwork or follow-through necessary in the value chain to enable the target innovation.

3.36 serial innovator

person or organization with a successful record of several innovations that are not necessarily inter-related

3.37 user-centred

<experience> designing a product or service experience around the life and behaviour of consumers or users

<people> design approach that engages users and places them at the heart of the design process

NOTE Sometimes called “user-focused”, “human-centred”, “empathetic” or “co-design” (especially in architecture and planning).

3.38 user-friendly

outcomes incorporating features that are easily comprehensible, and operations that are intuitive and quickly mastered

NOTE Sometimes called “user-sensitive”, “age-friendly” or “disability-friendly”.

3.39 value chain

all factors and activities undertaken by, or on behalf of, an organization that contribute to the value of its products as perceived by stakeholders (particularly customers and users), from first conception through to final disposal and recycling

3.40 visual imagery

visual rendition of ideas and concepts

3.41 visualization

process by which ideas and concepts are expressed or represented more vividly, and with greater tangibility, using visual imagery

3.42 “what if?” analysis

exploration of a problem or opportunity to determine how performance and outcomes might alter should circumstances change, particularly if constraints and barriers could be removed

NOTE Differs from “if only” analysis in that they progress forward from the known present rather than a desired future state. See 3.10.

3.43 width of the innovation highway

parameters (including financial) to be met that might constrain future plans and the terrain to be covered when developing long-term products

NOTE See also 3.16, 3.27 and Figure 4.

4 Innovation, newness and an overview of the basics of innovation management

4.1 Flow chart of the complete innovation management framework

A framework for managing innovation is outlined in its entirety in Figure 3. In practice, iteration is likely between stages for clarification or as fuller information becomes available. Opportunities for concurrent processing should be considered, not least to reduce the time-to-market for new product introductions.

It is possible to implement all the stages of this framework immediately. The stages apply equally to small and large organizations, though the former might be able to compress stages due to fewer employees, simpler and flatter structures. The procedures adopted are similar except for differences in degree and scale.

Terms used in this framework (and elsewhere) are defined in Clause 3.

4.2 Planning beyond current horizons

Research revealed that there is very little that cannot be planned up to three product generations into the future. This span varies depending on the type of products, but might be ten or so years ahead. Many organizations in the United Kingdom and abroad already have processes in place for the management of their new products over that horizon. However they constitute a tiny proportion of the total.

This time span is not especially long. Most people would like to ensure the survival of their organizations as well as secure their employment for at least ten years into the future. This can only be achieved with a constant supply of well-designed products. Introductions and withdrawals need to be planned. Furthermore, new products need to be developed along an identified highway into the future. This sets the direction and terrain an organization will follow over a specified period as well as the milestones to be achieved in order to develop and launch those products to plan (see Figure 4 and 5.7, 6.8.2 and 6.8.3).

Figure 3 Overview of complete process for managing innovation at the organization level

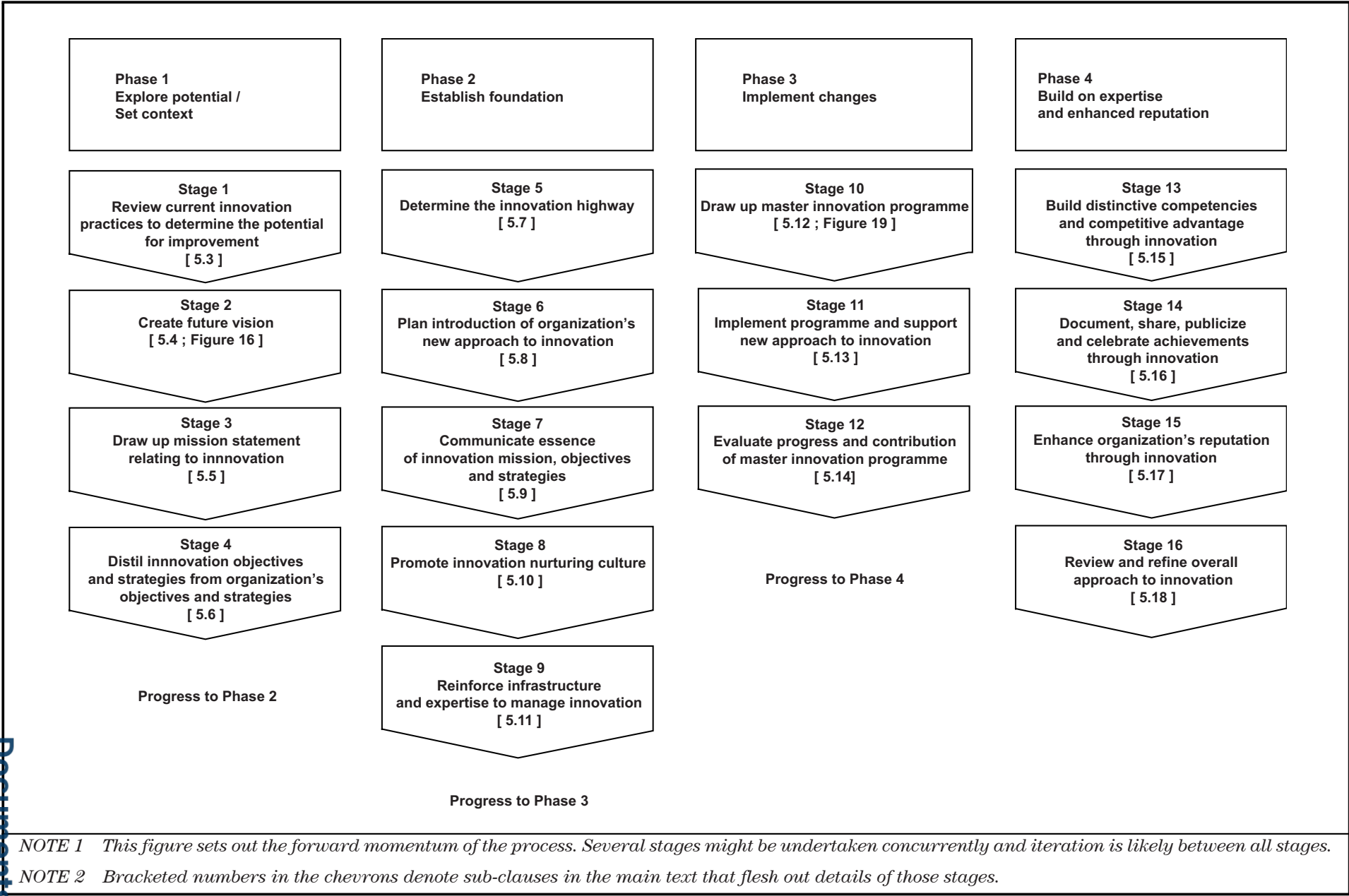
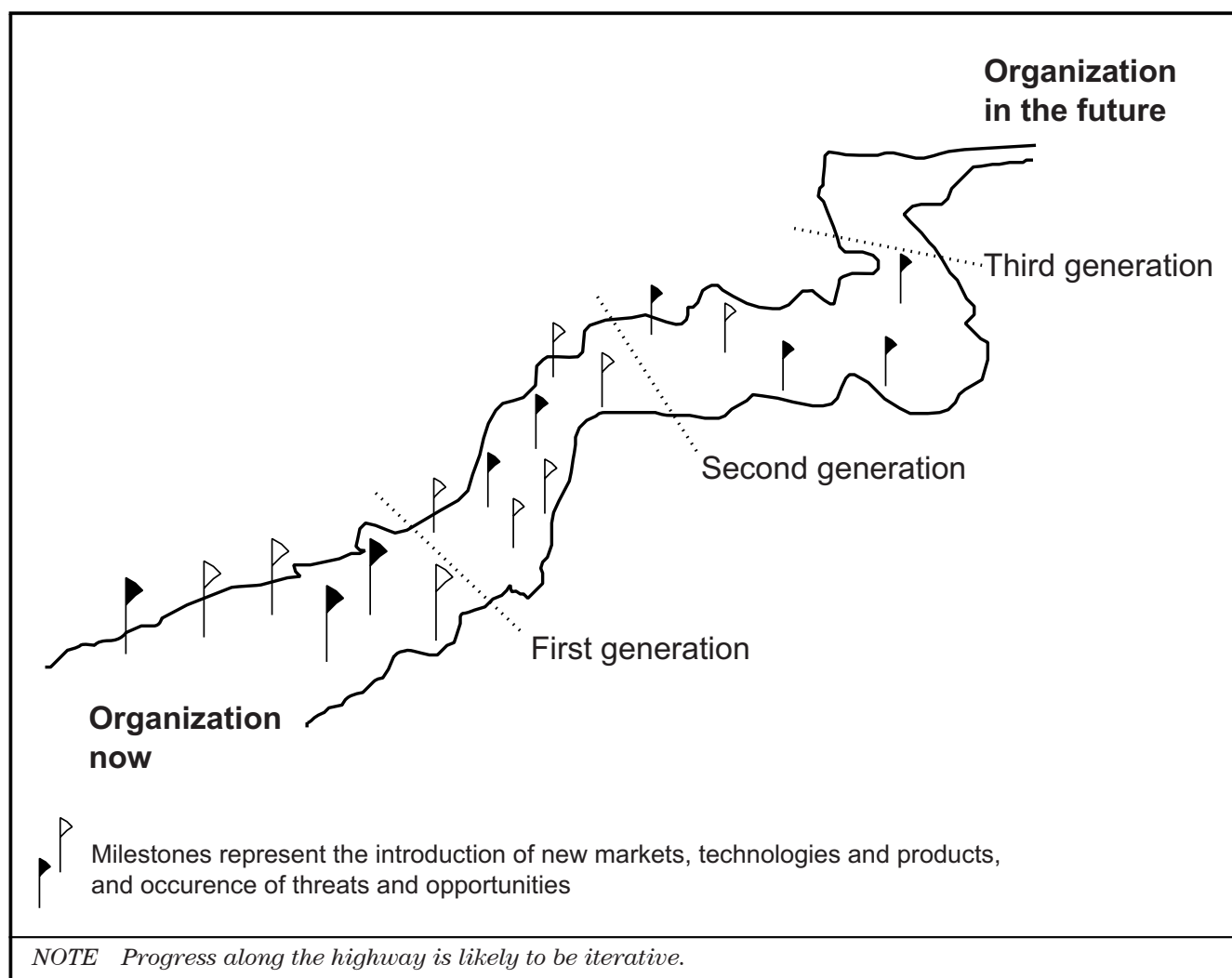


Figure 4 Innovation highway with milestones



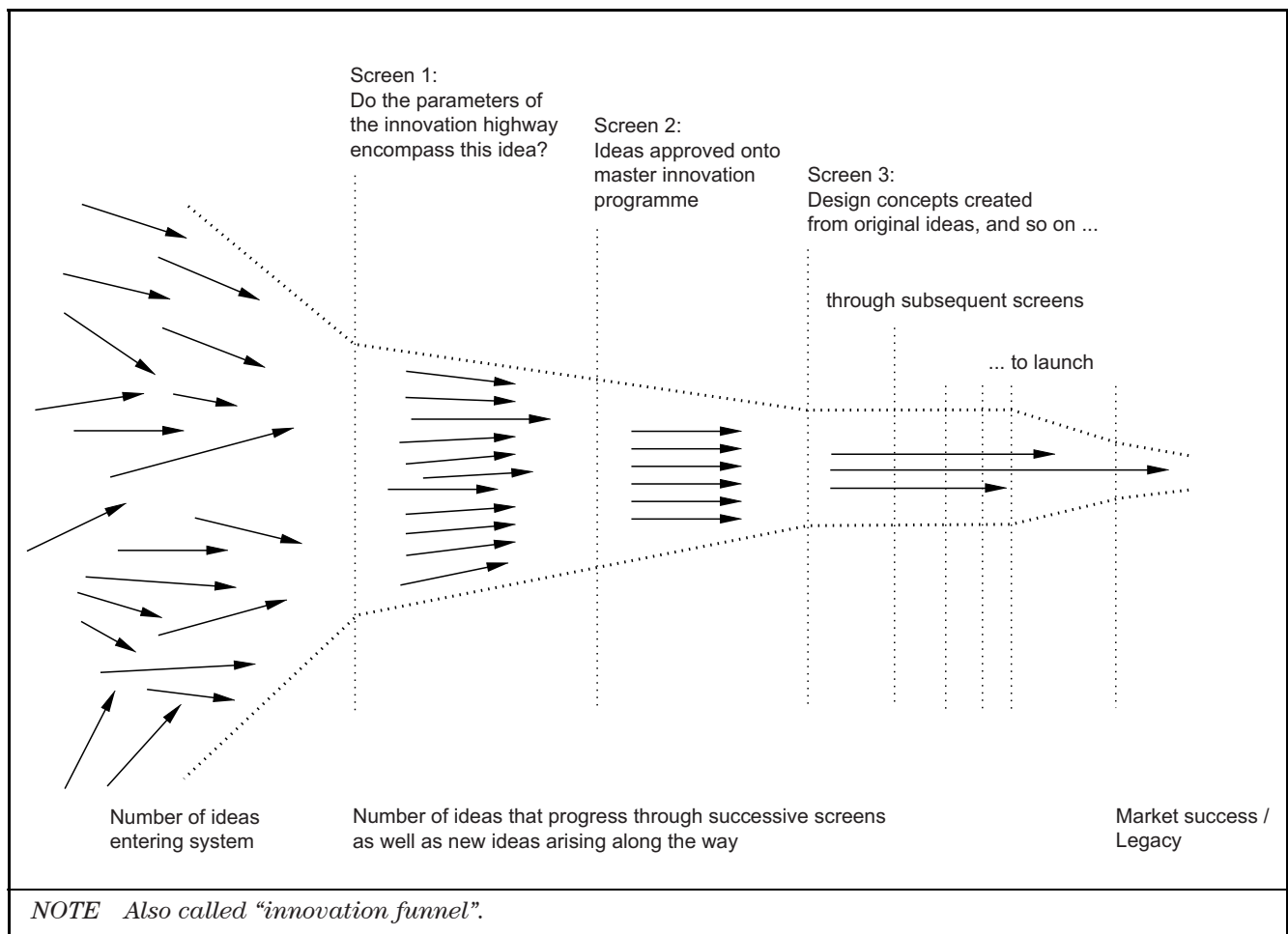
4.3 Co-ordinating short-term and long-term work

By ensuring a constant stream of ideas for innovation, principals help to ensure continuity and the sustainability of their organizations (see Figure 5).

Recent research indicates that organizations increasingly rate the agility to react to opportunities above the ability to see and prepare further into the future (see 6.18). Speed of reaction is influenced by where an organization positions itself along a spectrum that informs on its stance on innovation, the strategies likely to be adopted, response to proposals submitted, and so on (see Figure 6). Is the organization a self-starter that likes to be the first mover with innovations, getting to market first? Or does it prefer to be a fast follower, delivering innovations after checking market reactions to pioneers? Laggards that steer clear of innovation might find innovations imposed on them in due course, if they survive.

However, it is misleading to suggest that organizations raise their chances of survival by concentrating attention on the immediate future in response to the demands of markets and the financial community. Both the ability to anticipate change and the agility to react fast to change are developed through foresight.

Figure 5 The innovation pipeline – Screening ideas through to launch



Foresight is acquired through creativity in analysis, envisioning different future states over extended planning horizons, and the organization’s position within those states. This foresight then informs on appropriate strategies to get from the present to desired futures.

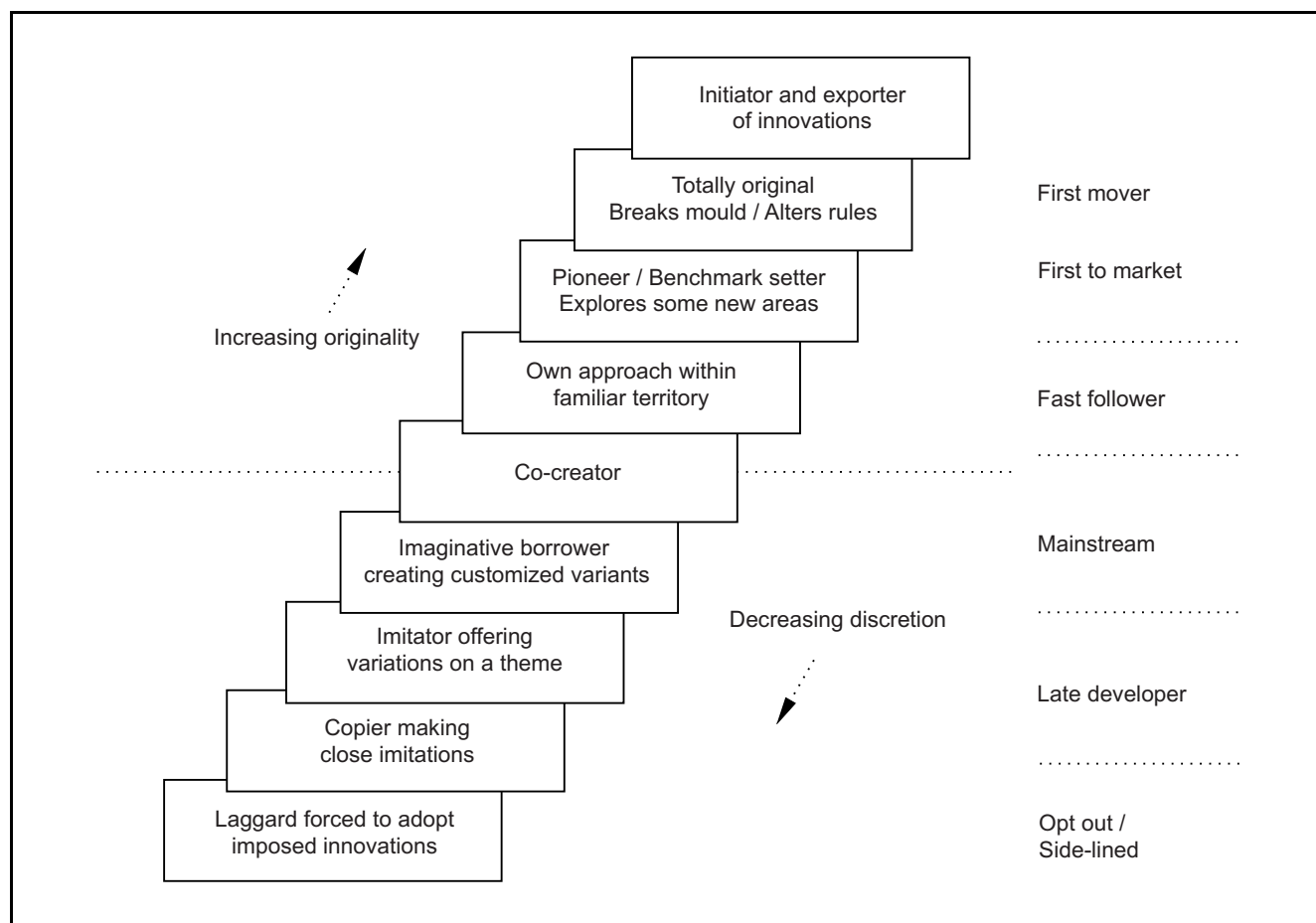
In reality, effectiveness over the short- and long-term is inter-linked and mutually-reinforcing. Organizations that concentrate on one, while ignoring the other, jeopardize their performance and survival. For example, by setting too short a planning horizon, organizations are likely to:

- miss opportunities that cannot be seen without a long perspective;
- reject opportunities as cannot be completed within the short time span available, or allow appropriate resources to be brought together;
- get a sub-optimal balance between short- and long-term projects (so transitions between, say, generations of products could be less convenient to customers, etc.).

4.4 Nature of innovation

Innovation is the creation of change that introduces a significant element of novelty in thought (for example, through blue-sky thinking) and action.

Figure 6 Position of an organization on the change/innovation spectrum



Changes brought about by innovation might relate to a wide spectrum of factors such as knowledge, perceptions, values, understanding needs, technology, design and business processes. They tend to be unusual, perhaps unexpected advances that are not always obvious when first encountered, though stakeholders affected might accept them quickly. Some arise as knock-on effects of what customers, competitors and suppliers do.

A close link between idea and action is essential. Ideas need to be interpreted into practical solutions, implemented and delivered successfully, then followed-through with refinements and subsequent developments. As such, success involves far more than a flash of inspiration. In all cases, the outcome should be seen to be beneficial to stakeholders, though the benefits need not be evaluated solely in financial terms.

An innovation might be a single step change or comprise an imaginative combination of changes, some involving a better use of existing knowledge and practices, new combinations of familiar elements, introductions of smaller evolutionary advances, mixes of all-new elements, as well as major leaps forward.

Innovation rarely results from operating in customary ways. It almost always involves doing things differently, with new perspectives and approaches leading to distinctive solutions. Innovation is frequently guided by new insights that enable a crucial restructuring of problems. Other differences can occur in the:

- people brought together to address problems;
- environment in which people work and how they interact;
- language, approaches and techniques used;
- presentation and implementation of solutions, and how their benefits are communicated;
- way solutions are launched and supported in markets.

Innovation might be the achievement of a critical cost reduction, hence price point, which opens up the market. It might lead to technical advances being brought to market much faster than anticipated, thus providing substantial competitive advantage.

Innovation might lead to the transformation of products and the redefinition of customer expectations. An organization might change the way it operates which, in turn, might lead to a restructuring of a market; new standards and legislation might also be brought in to elevate performance and safeguard users' and the general public's interests.

The step nature of radical innovations might result in uncomfortable discontinuities. However, even dramatic change can be brought about smoothly if planned properly. In most instances, success is determined by factors other than technical content, not least the manner in which an innovation is launched and supported after delivery.

In some instances, serial innovation might occur with complementary changes through the value chain, for example, in relationships with customers and suppliers. Resulting spirals of innovation should help reinforce technical and market leadership.

4.5 Reasons to innovate

Many reasons make innovation an imperative for organizations, particularly those of small and medium sizes. Its importance is linked to survival, sometimes expressed as the only sustainable strategy for growth. Others consider innovation a vital force that motivates staff and gives them a considerable sense of pride.

Research also confirms that the most frequent catalysts of innovation are customers and partners in the value chain. Addressing their needs, seeking to make life easier for them and helping to improve their businesses, all act as drivers of innovation. However, observed difficulties, declared requirements and complaints have to be translated into intelligence that helps generate sensible solutions.

The principal reasons why innovation should be among an organization's core competencies are summarized below:

a) To improve current situation:

- reduce costs and raise margins, hence profitability;
- protect market share and survive adverse operating circumstances;
- stimulate staff with interesting and challenging work;
- provide stability for the workforce.

b) To open new horizons:

- reposition and alter perceptions of an organization;
- exploit avenues with greater potential;
- gain competitive advantage and lead the market;
- reduce the influence of competitors.

c) To reinforce compliance:

- comply with legislation (current or anticipated);
- fulfil social and environmental responsibilities.

d) To enhance organization's profile:

- enhance reputation and raise its market profile;
- attract extra funding;
- to attract those with good ideas and potential alliance partners;
- to attract and retain higher calibre staff.

4.6 High productivity innovation

To gain competitive advantage in circumstances where resources are necessarily constrained, it is crucial for organizations to focus efforts on opportunities that yield greatest operational, psychological and financial benefits.

The curiosity of staff members, customer requests (or dissatisfaction), and competitive pressures all act as spurs to do things differently and better. However, special efforts should be made to generate high productivity innovations that:

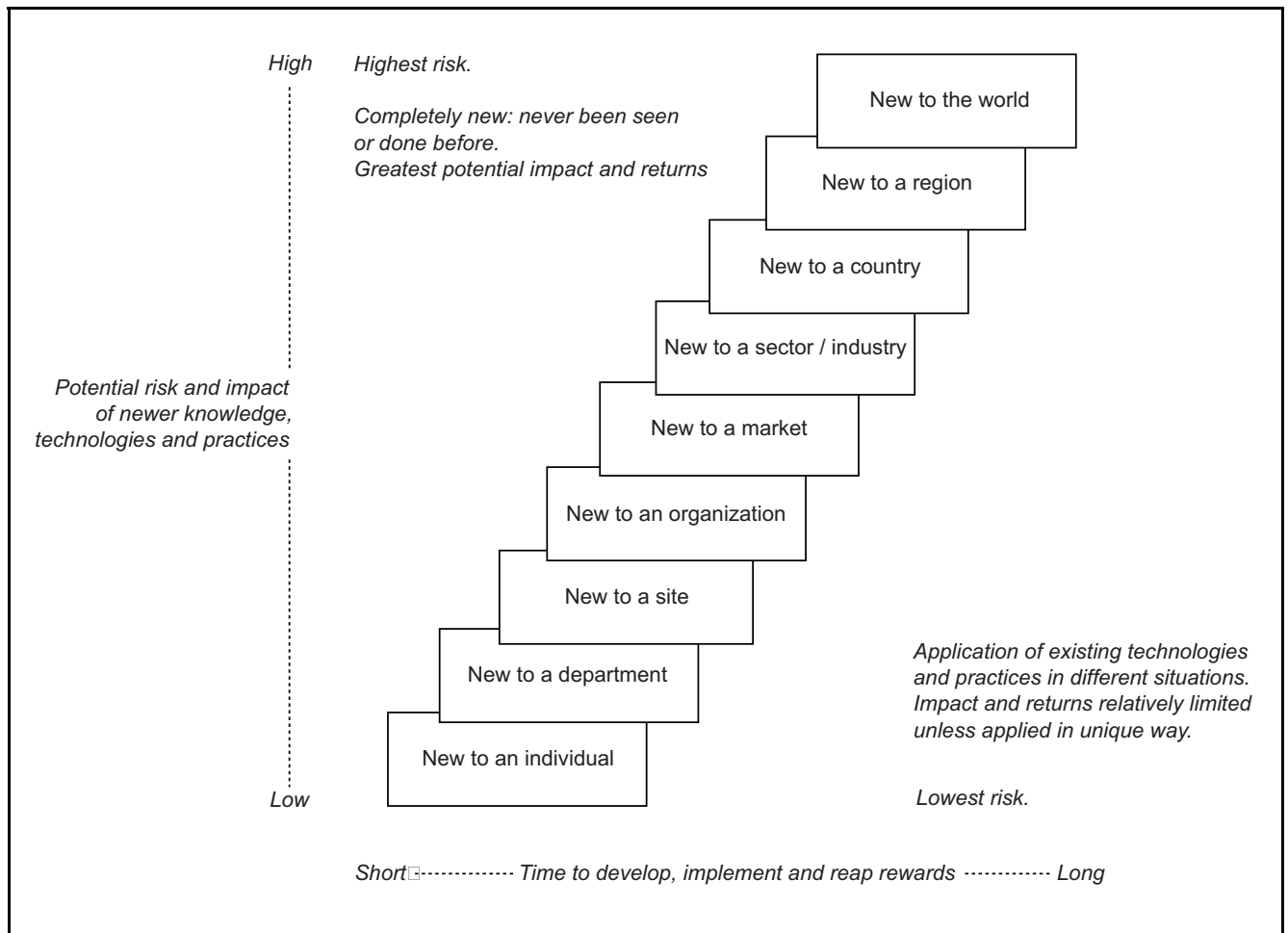
- a) solve more problems than originally envisaged;
- b) spawn further innovations;
- c) set new benchmarks, price points, etc. that competitors struggle to match;
- d) interest and inspire more people;
- e) are easy to sell, internally and externally;
- f) colleagues grasp quickly and make their own;
- g) present real and enjoyable challenges to those who develop them;
- h) arise out of trouble-free development;
- i) are more readily implemented and integrated into host organizations;
- j) have fewer shortcomings that are rectified easily at minimal cost.

METRIC?

4.7 Degrees of newness

The spectrum of changes that might be introduced through innovation extends from “new to the world” at one extreme through to “new to an individual” at the other (see Figure 7).

Figure 7 Spectrum of newness



The former encompasses changes that have never been seen or done before as far as can be ascertained. The latter might encompass existing technologies and practices that are familiar to others or common in different situations.

The former also holds the potential to generate the greatest impact and returns; while those arising out of the latter can be severely limited. As change in the former is relatively greater and less familiar, the risks in seeking and implementing such newness are considerably greater; those associated with the latter are commensurately lower. These are crucial factors when determining the kinds of innovations to be pursued.

METRIC?

4.8 Sources of newness

The sources of newness might be personal to individuals, relate to one or more groups within an organization, or derive from whole organizations.