

4th Edition

MANAGING INNOVATION

Integrating Technological,
Market and Organizational Change



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Chapter 1 Innovation – what it is and why it matters

Introduction

- Innovation is driven by the ability to see connections, to spot opportunities and to take advantage of them.
 - Robert Clifford with his Incat Company.



Introduction (cont.)

- Innovation can also offer new ways of serving established and mature ones.
 - Inditex, the Spanish company, has pioneered a highly flexible, fast turnaround clothing operation with over 2000 outlets in 52 countries.
 - Inditex philosophy is close linkage between design, manufacture and retailing.
 - Its network of stores constantly feeds back information about trends, which are used to generate new designs.

Introduction (cont.)

- Being able to offer better service – faster, cheaper, higher quality.
 - Citibank was the first bank to offer automated telling machinery (ATM)



Case study

- The changing nature of music industry
 - Emergence of MP3
 - Boom of the Internet
 - P2P (peer-to-peer) networking
 - 100 millions of iPods sold by Apple
 - Apple and Amazon can sell MP3 through the Internet

Strategic Advantages through Innovation

Mechanism	Strategic advantage	Examples
Novelty in product or service offering ค.ใหม่ idea	Offering something no one else can	Introducing the first . . . Walkman, mobile phone, fountain pen, camera, dishwasher, telephone bank, online retailer . . . to the world
Novelty in process วิธีทำของใหม่	Offering it in ways others cannot match – faster, lower cost, more customized	Pilkington's float glass process, Bessemer's steel process, Internet banking, online bookselling
Complexity เปลี่ยน ค. ของคนอื่น	Offering something which others find it difficult to master	Rolls-Royce and aircraft engines – only a handful of competitors can master the complex machining and metallurgy involved

Strategic Advantages through Innovation

Legal protection of intellectual property	Offering something others cannot do unless they pay a licence or other fee	Blockbuster drugs like Zantac, Prozac, Viagra
Add/extend range of competitive factors ช่วยให้แข่งได้หลายมุม	Move basis of competition, e.g. from price of product to price and quality, or price, quality, choice	Japanese car manufacturing, which systematically moved the competitive agenda from price to quality, to flexibility and choice, to shorter times between launch of new models, and so on – each time not trading these off against each other but offering them all

Strategic Advantages through Innovation

Timing ✎✎

First-mover advantage – being first can be worth significant market share in new product fields

Fast-follower advantage – sometimes being first means you encounter many unexpected teething problems, and it makes better sense to watch someone else make the early mistakes and move fast into a follow-up product

Amazon, Yahoo – others can follow, but the advantage 'sticks' to the early movers

Palm Pilot and other personal digital assistants (PDAs), which have captured a huge and growing share of the market. In fact the concept and design was articulated in Apple's ill-fated Newton product some five years earlier, but problems with software and especially handwriting recognition meant it flopped

↓
เห็นใครขยับขึ้น ก็ตาม
ไปได้อีก take over ละ

Strategic Advantages through Innovation

Design platform vs product design design vs product

Mechanism	Strategic advantage	Examples
Robust platform design	Offering something which provides the platform on which other variations and generations can be built	<p>Walkman architecture – through minidisk, CD, DVD, MP3</p> <p>Boeing 737 – over 40 years old, the design is still being adapted and configured to suit different users – one of the most successful aircraft in the world in terms of sales</p> <p>Intel and AMD with different variants of their microprocessor families</p>

Strategic Advantages through Innovation

<p>Rewriting the rules</p> <p><i>old way forms</i> <i>innovation</i></p>	<p>Offering something which represents a completely new product or process concept – a different way of doing things – and makes the old ones redundant</p>	<p>Typewriters vs. computer word processing, ice vs. refrigerators, electric vs. gas or oil lamps</p>
<p>Reconfiguring the parts of the process</p>	<p>Rethinking the way in which bits of the system work together, e.g. building more effective networks, outsourcing and coordination of a virtual company</p>	<p>Zara, Benetton in clothing, Dell in computers, Toyota in its supply chain management</p>

Strategic Advantages through Innovation

<p>Transferring across different application contexts</p>	<p>Recombining established elements for different markets</p>	<p>Polycarbonate wheels transferred from application market like rolling luggage into children's toys – lightweight micro-scooters</p>
<p>Others?</p>	<p>Innovation is all about finding new ways to do things and to obtain strategic advantage, so there will be room for new ways of gaining and retaining advantage</p>	<p>Napster. This firm began by writing software which would enable music fans to swap their favourite pieces via P2P networking across the Internet. Although Napster suffered from legal issues, followers developed a huge industry based on downloading and file sharing. The experiences of one of these firms – Kazaa – provided the platform for successful high-volume Internet telephony and the company established with this knowledge – Skype – was eventually sold to eBay for \$2.6 billion</p>

Old Question, New Context

- Organizations have always had to think about changing what they offer the world and the ways they create and deliver that offering

Case Study 1.2

- Kodak
- Founded around 100 years ago
- Digital photography has threaten Kodak for a few years.

Changing Context for Innovation

Context change	Indicative examples
Acceleration of knowledge production	OECD estimates that close to \$1 trillion is spent each year (public and private sector) in creating new knowledge – and hence extending the frontier along which ‘break-through’ technological developments may happen
Global distribution of knowledge production	Knowledge production is increasingly involving new players especially in emerging market fields like the BRIC (Brazil, Russia, India, China) nations – so the need to search for innovation opportunities across a much wider space. One consequence of this is that ‘knowledge workers’ are now much more widely distributed and concentrated in new locations, e.g., Microsoft’s third-largest R&D Center employing thousands of scientists and engineers is now in Shanghai

Changing Context for Innovation

Market fragmentation

Globalization has massively increased the range of markets and segments so that these are now widely dispersed and locally varied – putting pressure on innovation search activity to cover much more territory, often far from 'traditional' experiences, such as the 'bottom of the pyramid' conditions in many emerging markets³

Market virtualization

Increasing use of the Internet as marketing channel means different approaches need to be developed. At the same time emergence of large-scale social networks in cyberspace pose challenges in market research approaches, e.g., MySpace currently has over 100 million subscribers. Further challenges arise in the emergence of parallel world communities as a research opportunity, e.g., Second Life now has over 6 million 'residents'

Changing Context for Innovation

Rise of active users

Although users have long been recognized as a source of innovation there has been an acceleration in the ways in which this is now taking place, e.g., the growth of LINUX has been a user-led open community development.²⁷ In sectors like media the line between consumers and creators is increasingly blurred - for example, You Tube has around 100 million videos viewed each day but also has over 70 000 new videos uploaded every day from its user base.

(continued)

Changing Context for Innovation

TABLE 1.2 (Continued)

Context change	Indicative examples
Development of technological and social infrastructure	Increasing linkages enabled by information and communications technologies around the internet and broadband have enabled and reinforced alternative social networking possibilities. At the same time the increasing availability of simulation and prototyping tools have reduced the separation between users and producers ^{28, 29}

What is Innovation?

- Innovation is the successful exploitation of new ideas – Innovation Unit (2004) UK Department of Trade and Industry
- "Innovation . . . is generally understood as the introduction of a new thing or method . . . Innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services. Luecke and Katz (2003)

What is Innovation?

- "Often, in common parlance, the words creativity and innovation used interchangeably. They shouldn't be, because while creativity implies coming up with ideas, it's the "bringing ideas to life" . . . that makes innovation the distinct undertaking it is." Davila et al (2006)

What is Innovation?

- “Innovation is applied creativity; that brings about tangible improvements in service, process or product” Ovum (2006)

What is Innovation?

- ‘Industrial innovation includes the technical, design, manufacturing, management and commercial activities involved in the marketing of a new (or improved) product of the first commercial use of a new (or improved) process or equipment’ – Chris Freeman (1982)

Invention and Innovation

- Most famous inventions of the nineteenth century came from men whose names are forgotten.
 - The vacuum cleaner was invented by J. Murray Spengler and originally called an 'electric suction sweeper'. But W.H. Hoover sold them.
 - Elias Howe produce the world's first sewing machine in 1846. But Isaac Singer sold them.

2 + 98

2 คือแนวคิด ประดิษฐ์
จนเป็น prototype
98% คือ answers
ธุรกิจ business

model
effort 130%

A Process View of Innovation

- Process of turning ideas into reality and capturing value from them
- Four key phrases
 - Search – Bringing new ideas to the system
 - R&D, Eureka moments, copying, market signals
 - Select – select from the set of options
 - Which choice give us the best chance of standing out from the crowd?

A Process View of Innovation

- Implement – actually make it happen
 - Innovation challenge is about developing something which may never been done before
- Capture – How are we going to get the benefits from that?

Four Dimensions of Innovation Space

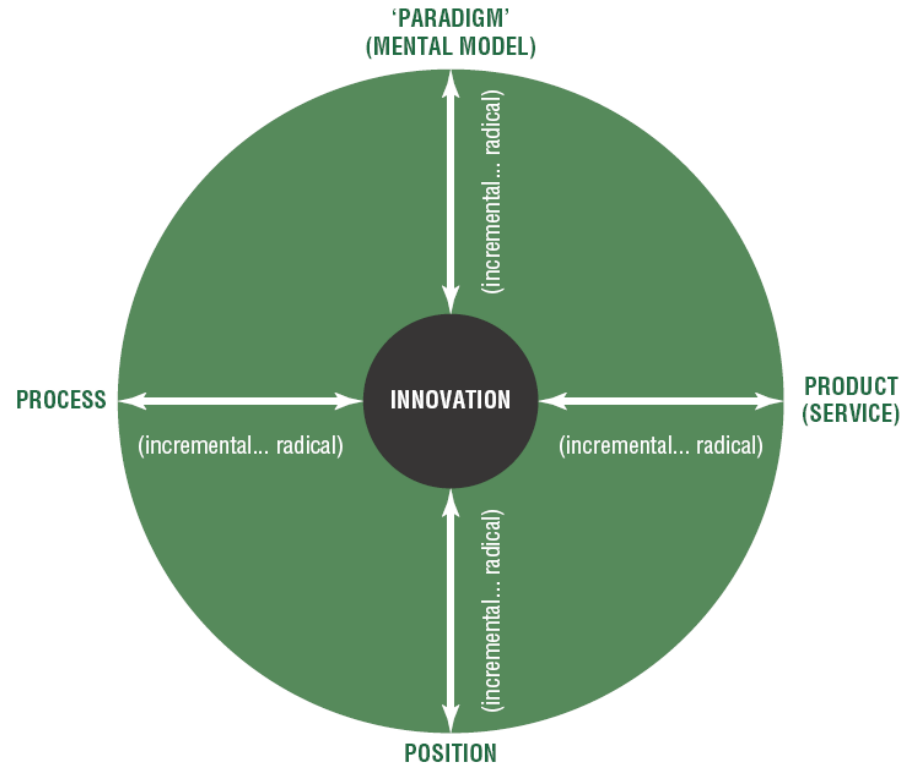


FIGURE 1.1: The 4Ps of innovation space

Four Dimensions of Innovation Space

- Product innovation – changes in the things than an organization offers.
- Process innovation – changes in the ways in which they are created and delivered.
- Position innovation – changes in the context in which the products/services are introduced
- Paradigm innovation – changes in the underlying mental models which frame what the organization does.

TABLE 1.3

Some examples of innovations mapped on to the 4Ps model.

Innovation type	Incremental – ‘do what we do but better’	Radical – ‘do something different’
‘Product’ – what we offer the world	<p>Windows Vista replacing XP – essentially improving on existing software idea</p> <p>VW EOS replacing the Golf – essentially improving on established car design</p> <p>Improved performance incandescent light bulbs</p>	<p>New to the world software, e.g., the first speech recognition program</p> <p>Toyota Prius – bringing a new concept – hybrid engines</p> <p>LED-based lighting, using completely different and more energy efficient principles (see Philips and lightbulb case studies available on the web)</p>
Process – how we create and deliver that offering	<p>Improved fixed-line telephone services</p> <p>Extended range of stock-broking services</p>	<p>Skype and other VoIP systems</p> <p>Online share trading</p> <p>eBay</p>



(continued)

TABLE 1.3

(Continued)

Innovation type	Incremental – ‘do what we do but better’	Radical – ‘do something different’
	Improved auction house operations	Toyota Production System and other ‘lean’ approaches
	Improved factory operations efficiency through upgraded equipment	Mobile banking in Kenya, Philippines – using phones as an alternative to banking systems
	Improved range of banking services delivered at branch banks	

Position – where we target that offering and the story we tell about it

Häagen Dazs changing the target market for ice cream from children to consenting adults

Low-cost airlines

University of Phoenix and others, building large education businesses via online approaches to reach different markets

Dell and others segmenting and customizing computer configuration for individual users

Banking services targeted at key segments – students, retired people, etc.

Addressing underserved markets, e.g., Tata Nano which targets the huge but relatively poor Indian market using the low-cost airline model – target cost is 1 lakh (around \$3000)

‘Bottom of the pyramid’ approaches using a similar principle – Aravind eye care, Cemex construction products

One laptop per child project – the \$100 universal computer

Microfinance – Grameen Bank opening up credit for the very poor

**Paradigm – how we
frame what we do**

Bausch and Lomb – moved from 'eye wear' to 'eye care' as its business model, effectively letting go of the old business of spectacles, sunglasses and contact lenses all of which were becoming commodity businesses. Instead it moved into newer high-tech fields like laser surgery equipment, specialist optical devices and research into artificial eyesight

Grameen Bank and other micro-finance models – rethinking the assumptions about credit and the poor

iTunes platform – a complete system of personalized entertainment

Rolls-Royce – from high-quality aero engines to becoming a service company offering 'power by the hour'

TABLE 1.3

(Continued)

Innovation type	Incremental – ‘do what we do but better’	Radical – ‘do something different’
	<p>IBM moving from being a machine maker to a service and solution company – selling off its computer making and building up its consultancy and service side</p> <p>VT moving from being a ship-builder with roots in Victorian times to a service and facilities management business</p>	<p>Cirque du Soleil – redefining the circus experience</p>

Exploring Different Aspects of Innovation

- Incremental Innovation – doing what we do but better
- Platform Innovation – being able to establish a strong basic platform or family which can be stretched and otherwise modified to extend the range and life of the product
- Discontinuity Innovation – what happens when the game changes

Triggers/ sources of discontinuity	Explanation	Problems posed	Examples (of good and bad experiences)
New market emerges	Most markets evolve through a process of gradual expansion but at certain times com- pletely new markets emerge which can- not be analysed or predicted in ad- vance or explored through using con- ventional market research/analytical techniques	Established players don't see it because they are focused on their existing markets May discount it as being too small or not representing their pre- ferred target market – fringe/cranks dismissal Originators of new prod- uct may not see potential in new markets and may ignore them, e.g. text messaging	Disk drives, excavators, mini-mills. ⁵³ Mobile phone/SMS where market which actually emerged was not the one expected or pre- dicted by originators

New technology emerges

Step change takes place in product or process technology – may result from convergence and maturing of several streams (e.g. industrial automation, mobile phones) or as a result of a single

Don't see it because beyond the periphery of technology search environment

Not an extension of current areas but completely new field or approach

Ice harvesting to cold storage⁵²

Valves to solid-state electronics⁵⁷

Photos to digital images

(continued)

Triggers/ sources of discontinuity	Explanation	Problems posed	Examples (of good and bad experiences)
	breakthrough (e.g. LED as white light source)	Tipping point may not be a single break- through but conver- gence and maturing of established technologi- cal streams, whose combined effect is underestimated	
		Not-invented-here effect – new technol- ogy represents a differ- ent basis for delivering value, e.g. telephone vs. telegraphy	

New political
rules emerge

Political conditions
which shape the
economic and social
rules may shift dra-
matically, e.g., the
collapse of commu-
nism meant an
alternative model
(capitalist, competi-
tion as opposed to
central planning) –
and many ex-state
firms couldn't
adapt their ways
of thinking

Old mindset about how
business is done, rules
of the game, etc. are
challenged and estab-
lished firms fail to
understand or learn
new rules

Centrally planned to
market economy, e.g.,
former Soviet Union

Apartheid to post-
apartheid South Africa
– inward and insular to
externally linked⁵⁸

Free trade/globalization
results in dismantling
protective tariff and
other barriers and new
competition basis
emerges^{58, 59}

Running out
of road

Firms in mature
industries may
need to escape the
constraints of
diminishing space
for product and
process

Current system is built
around a particular tra-
jectory and embedded
in a steady-state set of
innovation routines
which militate against
widespread search

Medproducts⁶⁰
Kodak
Encyclopaedia
Britannica²⁶

(continued)

innovation and the
increasing competi-
tion of industry
structures by either
exit or by radical
reorientation of
their business

or risk-taking experi-
ments

Preussag²⁵
Mannesmann

Sea change
in market
sentiment or
behaviour

Public opinion or behaviour shifts slowly and then tips over into a new model, e.g., the music industry is in the midst of a (technology-enabled) revolution in delivery systems from buying records, tapes and CDs to direct download of tracks in MP3 and related formats

Don't pick up on it or persist in alternative explanations – cognitive dissonance – until it may be too late

Apple, Napster, Dell, Microsoft vs. traditional music industry⁶¹

Deregulation/
shifts in regula-
tory regime

Political and market
pressures lead to
shifts in the regula-
tory framework and
enable the emer-
gence of a new set
of rules, e.g., liberal-
ization, privatization
or deregulation

New rules of the game
but old mindsets per-
sist and existing player
unable to move fast
enough or see new
opportunities opened
up

Old monopoly posi-
tions in fields like
telecommunications
and energy were dis-
mantled and new play-
ers/combinations of
enterprises emerged. In
particular, energy and
bandwidth become
increasingly viewed as
commodities.
Innovations include
skills in trading and
distribution – a factor
behind the consider-
able success of Enron
in the late 1990s as it

emerged from a small gas pipeline business to becoming a major energy trade³⁴ – unquantifiable chances may need to be taken

Fractures along
'fault lines'

Long-standing issues of concern to a minority accumulate momentum (sometimes through the action of pressure groups) and suddenly the system switches/tips over, e.g., social attitudes to smoking or health concerns about obesity levels and fast foods

Rules of the game suddenly shift and then new pattern gathers rapid momentum wrong-footing existing players working with old assumptions. Other players who have been working in the background developing parallel alternatives may suddenly come into the limelight as new conditions favour them

McDonald's and obesity
Tobacco companies and smoking bans
Oil/energy companies and global warming
Opportunity for new energy sources like wind power, cf. Danish dominance⁶²

Unthinkable events	Unimagined and therefore not prepared for events which – sometimes literally – change the world and set up new rules of the game	New rules may disempower existing players or render competencies unnecessary	World Trade Center – 9/11
Business model innovation	Established business models are challenged by a reframing, usually by a new entrant who redefines/reframes the problem and the consequent rules of the game	New entrants see opportunity to deliver product/service via new business model and rewrite rules – existing players have at best to be fast followers	Amazon Charles Schwab ⁶¹ Southwest and other low-cost airlines ^{34, 61, 63}

Shifts in
'techno-
economic
paradigm' –
systemic
changes which
impact whole
sectors or even
whole societies

Change takes place
at system level, in-
volving technology
and market shifts.
This involves the
convergence of a
number of trends
which result in a
'paradigm shift'
where the old order
is replaced

Hard to see where new
paradigm begins until
rules become estab-
lished. Existing players
tend to reinforce their
commitment to old
model, reinforced by
'sailing ship' effects

Industrial
Revolution^{64–66}
Mass production

Architectural
innovation

Changes at the level
of the system archi-
tecture rewrite the
rules of the game for
those involved at
component level

Established players de-
velop particular ways of
seeing and frame their
interactions, e.g., who
they talk to in acquiring
and using knowledge to
drive innovation –
according to this set of
views. Architectural
shifts may involve re-
framing but at the com-
ponent level it is diffi-
cult to pick up the need
for doing so – and thus
new entrants better able
to work with new archi-
tecture can emerge

Photolithography in
chip manufacture^{54, 67}

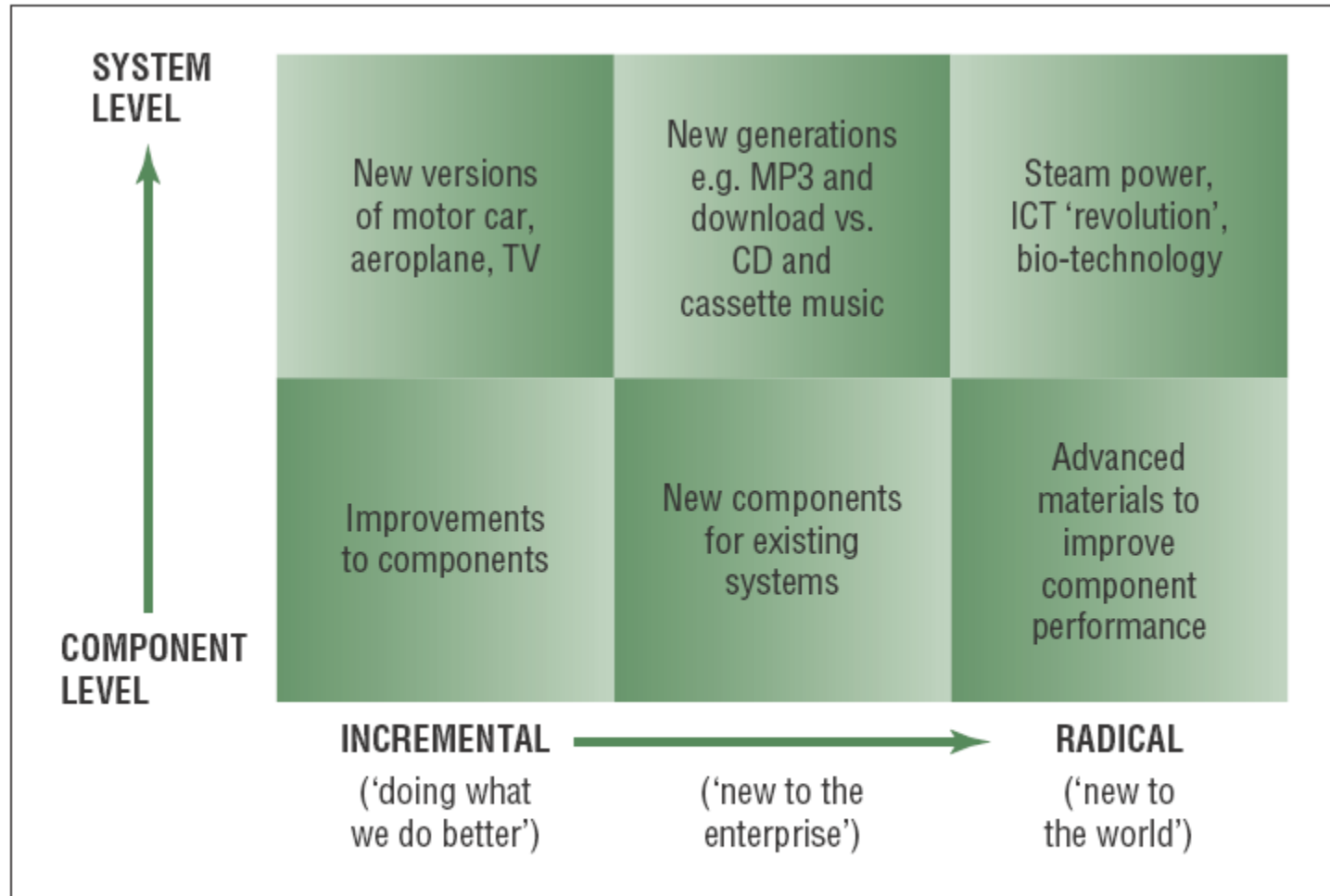


FIGURE 1.4: Dimensions of innovation

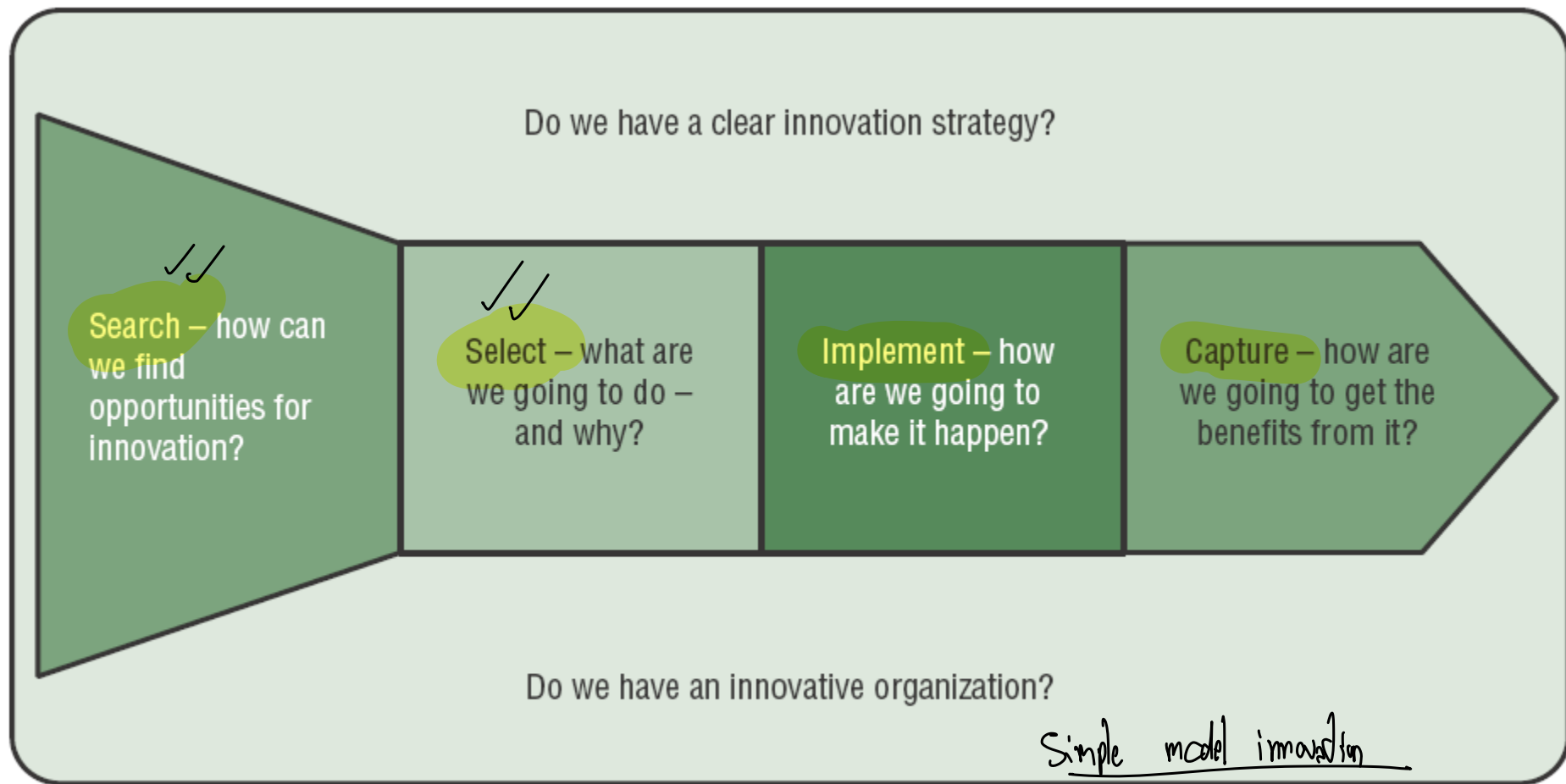


FIGURE 1.7: Simplified model of the innovation process