Management of Technology & Innovation MKTG5603 & Biotechnology Commercialisation MKTG5604

Workshop 1 Part A: Business Model & Innovation Strategy

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MOTI MKTG5603
BC MKTG5604

UWA Business School

MBA Program
M Biotech Program

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## Program Structure

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<td>Mazzarol &amp; Reboud (2020) Chapters 6, 7 &amp; 9. Class notes</td>
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<td>Individual assignment 1 DUE</td>
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<td>Class notes</td>
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<td>Individual assignment 2 DUE</td>
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<td>Individual assignment 3 DUE</td>
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<td></td>
<td>Group Project Part B DUE</td>
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Introductions

Family

Interests

YOU

Business

Background

Anything Else!!!!

Expectations
QUIZ: Which of the following are Australian inventions?

- Atomic absorption spectrophotometry
- Black Box flight recorder
- Bionic Ear
- Cardiac pacemaker
- Ice maker
- Microsurgery
- Orbital engine
- Penicillin
- Xerography – leading to Xerox photography
- X-Ray crystallography

Source: Ferris (2001)
Common Problems in Commercialisation

Some of the most common problems are:

• Inappropriate business models
• Inadequate management skills
• Insufficient market assessment & testing
• Poor team building or structure
• Poor management of intellectual property
• Lack of clear exit strategy
• Inadequate knowledge of venture capital process
• Lack of networking & strategic partnering
The innovation-productivity nexus

A study of the relationship between patents registered, productivity and GDP growth in Australia over the period 1901 to 1997 found:

- Increases in domestic patenting activity lead to increases in both labour productivity and economic growth.
- Part of the decline in productivity in Australia during the 1970s and 1980s can be attributed to the fall in patenting activity in the 1960s.
- The foreign sourcing of patents does not offset the fall in locally generated patents.
- Cuts to R&D tax concessions are likely to lower economic growth.
Elements of a National Innovation System Capacity Framework

A National Innovation System is a network of interconnected public and private sector organisations that create and share knowledge, transfer technology, and enhance innovation.

Common Innovation Infrastructure

- Cumulative technological sophistication
- Human capital and investment for R&D
- Resource commitments & policy choices

Source: Adapted from Porter & Stern (2001)
Main functions of a National Innovation System

- Create new knowledge
- Focus national scientific R&D
- Assist market creation & development
- Generate positive ‘spillovers’
- Enhance access to resources & funding

Source: Adapted from Johnson & Jacobsson (2000)
Australia’s performance in the global innovation stakes

- Ranked 22nd out of 127 countries, rated an “inefficient innovator”.
  - Australia’s key strengths:
    - Regulatory systems quality
    - Ease of starting up a business
    - University rankings & research output, citations
    - Enrolments into post-secondary education
    - Access to credit for business
  - Australia’s key weaknesses:
    - Government funding to education
    - STEM graduates produced
    - GDP/unit energy use
    - Protection of minority investors
    - Knowledge diffusion (patents, IP rights royalties)
    - ICT business models created
    - University-industry collaboration
    - GERD financing from overseas
  - Australia performs below the OECD average:

Despite the volatility in the national collaboration rate, international comparisons have consistently shown relatively low rates of collaboration. Even if we crudely accounted for the difference in reference periods by tripling the rate of collaboration, Australia would still rank well below the OECD average (DIISR 2016, p. 61).
Australia ranks in the middle for R&D investment, and compares to Canada and Spain.

Nationally our total R&D expenditure is only slightly more than that of many large companies such as Samsung, Google, VW and Microsoft.

Source: GII 2019
Australia lags other OECD nations in relation to Innovation inputs and outputs.
Australia ranks well in the OECD in terms of innovation “inputs” with good “academic impact” from peer reviewed publications and ranking of its universities.

Australia’s gross expenditure on R&D (GERD) as a % of GDP is average in the OECD but has fallen in recent years.

Higher education R&D expenditure (HERD) is above OECD average, with good research quality.

However, commercialisation outputs remain low by OECD standards, in particular patents, high-tech exports, trademarks, and new product development.

Sources: GII (2019); OECD (2017)
A healthier national innovation system is needed.

All actors must be engaged and helped to connect via enhanced knowledge and networking.

Connectivity between them is weak due to gaps and disconnects in the system.
Sources: adapted from Cheever (2015)

- Advanced Materials Manufacturing
- Advanced Electronics
- Medical Diagnostics
- Medical Therapeutics
- High-risk R&D intensive scale-up challenge

**Research-Led Innovation**
- Advanced Enterprise Processes
- Innovative Designed Products
- Digital Services B2B
- Low-risk “noisy” start-up community

**Design-Led Innovation**
Key elements of commercialisation

- Development of new products
- Development of new processes
- Application of technology
- Diffusion into markets
- Application of knowledge
- Transfer of technology and knowledge
- NPD and commercialisation activities
Some Background

• **Research commenced in France 2002**
  - M. Santi of HEC Paris and S. Reboud CEREN Burgundy School of Business, Dijon with INPI French intellectual property council.

• **Objective:**
  - How to assist entrepreneurs from SMEs engaged in innovation commercialisation projects.

• **Initial research case studies in France.**

• **Pilot study in WA with major study of 567 cases across 11 OECD countries.**

• **Work continues with longitudinal cases and development of support tools.**
567 Cases
11 OECD Countries

- Firms range across all sizes
- Average firm:
  - Employed 70 people
  - Annual t/o = €15.7m
  - Established 24 years

Growth rates over 3 years
employment up by 13.4
turnover up by €3.5m

Source: Mazzarol & Reboud (2011)
• 50.6% of firms had commercialised at least 1 innovation prior to survey.
• 43% had commercialised over six.
• Average level of investment in innovation was 22% of annual turnover.
• Included all types of innovation with new products or services comprising the most common type.
• Successful innovations were:
  – 72% new products or services
  – 16% new process technologies
  – 6% market development innovations
  – 3% marketing innovations
  – 1.2% administrative innovations
  – 1.6% other

Source: Mazzarol & Reboud (2011)
Managing Innovation

Inputs
• People
• Physical & financial resources
• Tools

Knowledge Management
• Idea generation
• Knowledge repository
• Leadership

Innovation Strategy
• Strategic orientation
• Leadership

Organisation & Culture
• Culture
• Structure

Portfolio Management
• Risk/return balance
• Optimisation tool use

Project Management
• Project efficiency tools
• Communications
• Collaboration

Commercialisation
• Market research
• Market testing
• Marketing & Sales

The most challenging but least understood element

Source: Adams, Bessant & Phelps (2006)
An information assembly line

The Innovation Management Process is about Reducing Risk

Acceptable level of risk to launch product

Risk

Information
Product Lifecycle

- **Sales and profits ($)**
- **Product development stage**
- **Losses/investment ($)**
- **Introduction**
- **Growth**
- **Maturity**
- **Decline**

- **Sales**
- **Profits**

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Crossing the Chasm

EARLY MARKET

Technology Enthusiasts 2.5%
Visionaries 13.5%

The Chasm

MAINSTREAM MARKET

Pragmatists 34%
Conservatives 34%

Mainstream Production

Early Stage Commercialisation

For every dollar needed to take the product forward at least $5 more may be needed to get it into the market.
A Marketing Perspective

Source: Phillip Lay, Making Partnering Work Along the Technology Adoption Life Cycle, Software Developer & Publisher, July/August, 1997)
Financial Measures for Risk Assessment

• **Discounted Cash Flow (DCF)** (the **TIME** Value of Money)

  • Money you deposit today, earns interest

  • For money you receive in future, you deduct (i.e. discount) interest

  • Future cash flows are discounted to present value

  • **Net Present Value (NPV)** = future cash flow – interest

• **First Chicago Method**

  • Based on Discounted Cash Flow Valuation Method, and in addition:

    • Consider likelihood of R&D succeeding

    • Predict 3 market outcomes
      1. Best Case
      2. Most likely Case
      3. Worst Case
However, they all require financial data

SMEs & start-up entrepreneurs typically lack the ability to prepare robust financial models

- **SMEs** and new innovating enterprises need help to:
  - Assess the potential rate of return from their innovations
  - Make choices over the most optimal (internal or external) way of developing the innovation
  - Develop an appropriate strategy of intellectual protection

- This model can also be used to analyse other situations: innovation in big firms, evaluation of an innovations or patents portfolio…

Source: Santi and Reboud 2003
Commercialisation decision process for Innovative Small Firms

Initial assessment of the Potential Innovation Rent:
- Shrimp
- Champion
- Gadget
- Joker
- Flash in the Pan A
- Oasis A
- Flash in the Pan B
- Oasis B

Customer & Supplier Perceived Benefits & Sacrifices in adopting innovation

Technological, Commercial & Substitution Risk

Ability to create strong Isolating Mechanisms

Volume

Rate

Length

Final assessment of the Appropriable Innovation Rent:
- Shrimp
- Champion
- Gadget
- Joker
- Flash in the Pan A
- Oasis A
- Flash in the Pan B
- Oasis B

Phase 1: Assess the potential rent from the innovation

\[ \text{RENT} = \text{Volume} \times \text{Rate} \times \text{Length} \]

Isolated or Systemic?

Compatible or New Market?

Phase 2: Insert the innovation into the environment

Assessment of Competitive Market Forces.

Assess firm’s resources & complementary capabilities

Bargaining power of key Suppliers & lead Customers.

Phase 3: Assess the rent that can be appropriated from the innovation

Proceed alone
Seek partnerships
Delegate to others
Transfer ownership
Hold or withdraw

Source: Mazzarol et al. (2020)

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Progressive erosion of the rent

Kind of innovation

Potential Rent may be generated by the innovation

“Entrepreneurial Rent” (created under conditions of uncertainty)

Insertion of the innovation into the environment

Residual Rent, progressively eroded when inserted:
- into a business
- in the competitive game
- and taking into account the competencies and resources of innovator

“Quasi Rent” (created under conditions of risk)

Insertion into the business and taking account of strengths and weaknesses of the innovator

Appropriable Rent, possibly caught by the innovator

“Ricardian Rent”
OR
“Schumpeterian Rent”

Source: Santi & Reboud (2003); Alvarez (2006); Hang-Do, Mazzarol, Volery & Reboud (2014)
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Step 1: Estimating the Potential Rent
Rent: a profit linked to an abnormal competitive situation (assets or market monopoly) in favour of an actor over a long period of time.

Rent and innovation: Innovation allows the creation of a competitive advantage, generating a potential rate of profit that is greater than the norm.

Economic Rent: The residual left for the fixed resources of a firm after the variable resources have been paid amounts equal to their alternative costs; or the proportion of earnings in excess of the minimum amount needed to enter a particular industry.

Innovation Rent: The returns that arise from the existence, discovery and successful commercial exploitation of entrepreneurial opportunities, that are in excess of the opportunity costs of all resources used.

The generation of innovation rent is typically achieved within uncertain task environments due to the unknown value of the resource combinations.

Sources: Hang Do, Mazzarol, Volery & Reboud (2014); Hang Do (2014)
Types of RENT

**Ricardian Rent:** a rent derived from a bundle of tangible and intangible assets over which the firm has ownership and control.

**Schumpeterian Rent:** a rent derived from a firm’s ability to develop unique capabilities rather than the control and ownership of assets.

The components of the Rent

Source: Santi and Reboud 2003

Length: duration of the exploitation of innovation

Rate of margin: profit thanks to the innovation

Volume: sales over a year

Amount of Rent = Volume x Rate x Length
### Factors influencing the potential Rent

<table>
<thead>
<tr>
<th>Components of RENT</th>
<th>Indicators</th>
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</table>
| **VOLUME: (potential annual sales)** | - Size of industry or market sector  
- Geographic diffusion potential  
- Size of end-user markets  
- Limits due to prior patents |
| **RATE: (potential profit margin)** | - Type of innovation process involved  
- Type of innovation involved  
- Level of prior protection for intellectual property |
| **LENGTH: (potential life-cycle)** | - Technological basis of innovation  
- Innovation intensity of the user centre  
- Legal and technical protection of intellectual property |

Source: Santi and Reboud 2003
Key issues

• How quickly will the market adopt the innovation?
  • What is the demand from customers? – impacts on Volume.
  • Where does the innovation fit within the customer’s value chain? – impacts on Rate of profit.
  • Are there substitutes available? – impacts on Length.
  • Are there any complementary actors who can assist the market adoption?
  • Are there barriers in the form of government regulations or lobbying?

• How much experience do the target customers have with adopting new ideas, products and services?

• What is the technological basis of the innovation?
  • Is it complex and difficult to replicate or relatively easily copied? – impacts on Length.

• What is the innovative intensity of the target market?
  • Is it rapidly changing or stable? – impacts on Length.

• Does the small entrepreneurial firm have the resources to fully commercialise without outside help?
  • If commercialisation can take place alone this is likely to be best.
  • If commercialisation cannot take place alone the firm will need to find partners, complementary actors and/or strategies for sharing the rent (e.g. licencing, joint ventures).
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Source: Mazzarol and Reboud 2011
1. Shrimp

The innovation has a **Shrimp** configuration

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**Shrimp**: is usually an incremental innovation that can be readily developed by the SME without significant planning or outside support.

**Key Questions:**

Is the innovation isolated?

<table>
<thead>
<tr>
<th><strong>Isolated innovation</strong></th>
<th>existing market or market to be created</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development</strong>: autonomous development is possible but may be of no interest if returns too low. <strong>Protection</strong>: no interest except as a “smoke screen”</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Systemic innovation</strong></th>
<th><strong>Existing market</strong></th>
<th><strong>New market</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development</strong>: abandon, except in “Meccano” type, if the architect of the system is convinced by the innovation. <strong>Protection</strong>: General case: publish the invention, in a local media, to hinder any appropriation. <strong>Meccano case</strong>: “smoke screen” patent geographically limited and sell it to the architect</td>
<td></td>
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</tr>
<tr>
<td><strong>Development</strong>: abandon (Development: with no interest in comparison to the risk and possibilities of success). <strong>Protection</strong>: no interest. But by security, publish in a local media, to hinder any appropriation</td>
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Source: Santi and Reboud 2003
## 3. Gadget

The innovation has a **Gadget configuration**

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**Gadget:** first make sure that the rate will remain high and then analyse the capacity of the firm to quickly exploit the market opportunity.

### Key Questions:

**Is the innovation isolated?**

- **Isolated innovation**
  - **Commercialisation:** ideal configuration for an autonomous development strategy, but a partnership could be interesting insofar as it creates an amplification and commercialisation effect
  - **Protection:** essential: patent or secret are compulsory, possibly allied protections. Patent in first Australia to be extended rapidly to Europe, USA, Japan

**Is it systemic?**

- **Systemic innovation**
  - **Commercialisation:** it is a difficult partnership development configuration: the length is short, you have to react very quickly, which is very difficult when you want to construct operate a network
  - **Protection:** the natural length of the rent being very short, no more than a protection "smoke screen" is necessary. Patent in one only country (+ branding if possible) possibly PCT procedure for interesting countries. Accept the principle of crossed licences with complementary actors to help the new system to emerge.

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**Source:** Santi and Reboud 2003
The innovation has an **Oasis configuration**

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**Oasis**: first make sure that length will remain long and check if the rate is low (Oasis A) or high (Oasis B) then continue to commercialise.

### Key Questions:

**Is the innovation isolated?**

<table>
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### Is it systemic?

<table>
<thead>
<tr>
<th>Systemic innovation</th>
<th>Existing or new market</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercialisation</strong>: ideal configuration for partnership development, assuming the leadership of the system if low dependency from complementary actors, transmitting leadership to a dominant complementary partner if strong dependency. <strong>Protection</strong>: protection is compulsory: patent or secret, and even protection of every possible part of innovation (drawings, brand, ...). Play a cross licence game with complementary firms to help the new system to emerge. <strong>Patent in one country, rapidly extended</strong> (PCT) to a maximum number of countries; after 30 months only keep interesting countries.</td>
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Source: Santi and Reboud 2003
5/7. Flash in the Pan

The innovation has a *Flash in the Pan* configuration

Flash in the Pan: first make sure that the volume will remain high, then check the real rate of profit – low Flash IP (A) or high Flash IP (B) before examining the competitive environment.

**Key Questions:**

<table>
<thead>
<tr>
<th>Is the innovation isolated?</th>
<th>Is it systemic?</th>
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<tbody>
<tr>
<td><strong>Isolated innovation</strong></td>
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<tr>
<td><strong>Recommendations</strong></td>
<td><strong>Recommendations</strong></td>
</tr>
<tr>
<td>Commercialisation:</td>
<td>Commercialisation: in partnership at the beginning (“create the niche and the standard”, prove) – then most quickly delegated or sold</td>
</tr>
<tr>
<td>Commercialisation:</td>
<td>Protection: “illusion” patent with possibly anticipated publication; the real patent in one then as many as possible countries.</td>
</tr>
<tr>
<td>existing market</td>
<td>30 months to negotiate the licence agreements and protect only in selected et countries; if no agreement inside the 30 months, abandon.</td>
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<tr>
<td>market to be created</td>
<td>30 months to negotiate the licence agreements and protect only in selected et countries; if no agreement inside the 30 months, abandon.</td>
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<tr>
<td>Protection: patent</td>
<td>Protection: smoke screen, anticipated publication and geographically extended protection</td>
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<tr>
<td>with anticipated publication, original region and developed countries</td>
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<tr>
<td>Protection: smoke screen, anticipated publication and geographically extended protection</td>
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| Source: Santi and Reboud 2003 |
4. Joker

The innovation has a **Joker** configuration

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**Joker**: proceed with the whole process.

### Key Questions:

**Is the innovation isolated?**

**Is it systemic?**

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<td><strong>Protection:</strong> super protection compulsory: patent + other IP rights and maximum geographic coverage</td>
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<td><strong>Protection:</strong> super protection compulsory: set of patents (+ other IP rights if possible and useful) on a maximum of countries (PCT). Direct patent in USA. Partial licences or cessions.</td>
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Source: Santi and Reboud 2003
2. Champion

The innovation has a **Champion** configuration

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**Champion: proceed with the whole process.**

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**Existing market**

Commercialisation: in partnership at the very beginning to prove and valorise (volume, network of complementary firm), then delegate or sell, if you can’t grow.

**Protection:** super protection compulsory: set of patents (+ IP rights if possible and useful) on a maximum of countries. Direct patent in USA. Partial licences or cessions.
Anticipated Rent Configurations

- Champion was most common type.
- Initial tests (ANOVA, Chi-square) found:
  - No relationship by size of firm
  - No relationship by industry type
  - No relationship by country
  - No relationship by type of innovation

Source: Mazzarol & Reboud (2011)
Step 2: Estimating the Residual Rent
<table>
<thead>
<tr>
<th>Key issues for the innovation</th>
<th>Indicators</th>
<th>Potential impact on RENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>An <em>isolated</em> or <em>systemic</em> innovation</td>
<td>Can the innovation work alone or does it need to be integrated into a system?</td>
<td>The <em>isolated</em> innovation can proceed to commercialisation without the need to adapt it to incumbent systems, as would be required if it were <em>systemic</em>. The latter will require consideration of or collaboration with incumbent firms.</td>
</tr>
<tr>
<td>A <em>substitute</em> or <em>new market</em> innovation</td>
<td>Does the innovation substitute for an existing product, or will it create a new market?</td>
<td>A <em>substitute</em> product will need to displace the incumbent and thereby require resources and capabilities to do so. However, a <em>new market</em> innovation will require significant resources for full commercialisation.</td>
</tr>
<tr>
<td>A <em>compatible</em> or <em>new system</em> innovation</td>
<td>Is the innovation compatible with existing products and processes, or does it create a new dominant design or new system?</td>
<td>A <em>compatible</em> innovation is likely to be more easily diffused within a market than one that requires the creation of a <em>new system</em> or industry standard.</td>
</tr>
</tbody>
</table>

Sources: Santi et al. (2003); Mazzarol & Reboud (2020).
Analysis of the external market

• **Customer Value Proposition (CVP)**
  - The innovation must bring a significant benefit to the customer.
  - This benefit must be noticeable and useful.
  - The CPV is a trade-off between benefits offered and cost/risk of adoption:

\[
\text{CVP} = \text{perceived benefits} - \text{perceived sacrifices}
\]

• **Erosion Effects**
  - Caused by external environmental influences that remove the innovation’s advantage.
### Customers’ perception of value

<table>
<thead>
<tr>
<th>Key issues for sales volume</th>
<th>Perceived benefits low</th>
<th>Perceived benefits high</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived sacrifices high</td>
<td>No way CVP¹</td>
<td>Fall in love CVP</td>
</tr>
<tr>
<td></td>
<td>This option is unlikely to generate any worthwhile volume</td>
<td>This option is likely to require a strong marketing and</td>
</tr>
<tr>
<td></td>
<td>of sales and may suggest the innovation will not be adopted.</td>
<td>sales effort to win new customers. It can be a danger for</td>
</tr>
<tr>
<td></td>
<td>Unless the innovation can be redesigned it might not be</td>
<td>small firms. Redesign of the innovation to reduce sacrifices</td>
</tr>
<tr>
<td></td>
<td>worthwhile.</td>
<td>may be needed.</td>
</tr>
<tr>
<td>Perceived sacrifices low</td>
<td>Wet firecracker CVP</td>
<td>Maximum CVP</td>
</tr>
<tr>
<td></td>
<td>This option suggests that the innovation lacks a strong</td>
<td>This is the ideal option and suggests that the innovation</td>
</tr>
<tr>
<td></td>
<td>CVP and may struggle to gain market adoption. The innovation</td>
<td>will be well received by potential customers and quickly</td>
</tr>
<tr>
<td></td>
<td>may need to be redesigned to make it more attractive to</td>
<td>adopted within the market.</td>
</tr>
<tr>
<td></td>
<td>potential buyers.</td>
<td></td>
</tr>
</tbody>
</table>

¹ Customer Value Proposition (CVP)

Sources: Santi et al. (2003); Mazzarol & Reboud (2020).
External Environmental Factors influencing commercialisation

- **Pressure, regulations, lobbying**
  Possible effect on the 3 components of rent

- **Substitutes**
  Possible effect on rent’s length

- **Value chain**
  Possible effect rent’s rate

- **User Market**
  Possible effect on rent’s volume

- **Complementary Actors**
  Possible effect on rent’s volume and rate of

Source: Santi and Reboud 2003
Supplier-Buyer Bargaining Power

<table>
<thead>
<tr>
<th>Key issues for rate of profit</th>
<th>Bargaining power favours the business</th>
<th>Bargaining power favours customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bargaining power favours the business</td>
<td>The best option</td>
<td>Customer dominated</td>
</tr>
<tr>
<td></td>
<td>This option should enable the firm to negotiate a premium price for its innovation from either customers or suppliers. It can generate high rates of profit.</td>
<td>This option suggests that the innovation is dominated by the customer and as such any future commercialisation will require a close association or alliance with the lead customer. There will be some erosion of profit margins in the customers’ favour.</td>
</tr>
<tr>
<td>Bargaining power favours key suppliers</td>
<td>Supplier dominated</td>
<td>Stuck in the middle</td>
</tr>
<tr>
<td></td>
<td>This option suggests that the innovation is dominated by the supplier and as such any future commercialisation will require a close association or alliance with the key suppliers. There will be some erosion of profit in the suppliers’ favour.</td>
<td>This option sees the bargaining power lying with both the suppliers and the customers. In this case the firm will be dominated by both sides and is likely to find its profit margins squeezed. It may be worthwhile withdrawing and seeking an alternative position in the value chain.</td>
</tr>
</tbody>
</table>

Sources: Santi et al. (2003); Mazzarol & Reboud (2020).
## Substitution threats and risk

### Key issues for the length of lifecycle

<table>
<thead>
<tr>
<th>Technological risk is low</th>
<th>Technological risk is high</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercial risk is high</strong></td>
<td><strong>Marketing challenge</strong></td>
</tr>
<tr>
<td>In this option there is low technological risk but high commercial risk that can reduce the chance for a long lifecycle. Success here will require a strong investment in marketing and sales that might be difficult for small firms.</td>
<td><strong>Stop now</strong></td>
</tr>
<tr>
<td>In this option both the technological and commercial risk is high. Any attempt to commercialise in this situation will be high risk and unless these risks can be mitigated it is best to withdraw and reconsider the project.</td>
<td></td>
</tr>
</tbody>
</table>

| **Commercial risk is low** | **Happy place** |
| In this option both technological and commercial risk is low, providing an ideal market environment in which to proceed with commercialisation. It should also provide for a long lifecycle for the innovation. | **Technical challenge** |
| In this option the commercial risk is low, but the technological risk is high. This will require a substantial investment in R&D to keep the innovation competitive before it is substituted by newer technologies. Small firms may lack the technical resources. |

Sources: Santi et al. (2003); Mazzarol & Reboud (2020).
Step 3: Estimating the Appropriable Rent
Commercialisation pathways

Innovation (Product/Process)

- Autonomous Development
  - Requires all resources to be controlled by firm
- Develop in partnership
  - Joint Venture
- Delegate development
  - License Agreement
- Transfer development
  - Trade Sale
- Withdraw
  - Abandon the project

Risk & Return

- High
- Low

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Innovation (Product/Process)

Control all required resources

Autonomous Development

Arbitrage value

Effective isolating mechanisms

Develop in partnership (Non-Heirarchical)

Develop in partnership (Heirarchical)

Ineffective isolating mechanisms

Develop in partnership (Heirarchical)

No isolating mechanisms

Projects that can be pursued alone should be undertaken without outside involvement, but strong “isolating mechanisms” (e.g. IP rights protection) are essential to securing any equality in bargaining power with third parties.
### Strategic decisions checklist in the commercialisation process

<table>
<thead>
<tr>
<th>Key stages of commercialisation</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1: Technical issues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the firm have the technological resources and competencies to commercialise alone?</td>
<td>Greenlight for technical development</td>
<td>Self-develop, partner or delegate</td>
</tr>
<tr>
<td></td>
<td>Proceed with technological development.</td>
<td>Can the firm buy or develop these?</td>
</tr>
<tr>
<td></td>
<td>Yes – proceed alone</td>
<td>Yes – proceed alone</td>
</tr>
<tr>
<td></td>
<td>No – seek partnership, but if partnership is not possible delegate, sell, hold, or stop.</td>
<td></td>
</tr>
<tr>
<td><strong>Stage 2: Marketing issues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the firm have the marketing resources and competencies to commercialise alone?</td>
<td>Greenlight for market development</td>
<td>Proceed with insertion into the market.</td>
</tr>
<tr>
<td><strong>Stage 3: Financial issues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the firm have the financial resources and competencies to commercialise alone?</td>
<td>Greenlight for commercialisation</td>
<td>Proceed with full commercialisation.</td>
</tr>
<tr>
<td><strong>Stage 4: Strategy issues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the firm have the strategic management competencies to commercialise alone?</td>
<td>Greenlight for commercialisation</td>
<td>Proceed with full commercialisation.</td>
</tr>
</tbody>
</table>

Sources: Santi et al. (2003); Mazzarol & Reboud (2020).
Other considerations

Do you need to collaborate with others to complete the commercialisation?

Factors influencing the bargaining power of complementary actors:

- Complexity of the collaborative network to be created (e.g. few partners or many partners).
- Impact of the total complementary partners on the created value.
- Power of complementary partners in relation to innovator firm.

Factors influencing the external market environment:

- Existing or anticipated regulation likely to impact on the innovation.
- Licences or compliances required in order to bring the innovation to market.
- Technical standards that must be met and Norms operating within the industry that is to be targeted.
Innovation Diagnostic Diamond

**Market Index**
- Assessed customer benefits
- Pricing strategy
- Customer understanding
- Customer test/trial pre-buy
- Customer post-buy evaluation
- Compatibility with systems
- Customer risk perceptions
- Opportunities for customer
- Collaborate with customer
- Customer ready to go

**Strategy Index**
- Have formal business plan
- Assessed buyer power
- Assessed supplier power
- Assessed substitution threats
- Assessed competitor reaction
- Assessed complementary actors
- Assessed government regulation
- Secured compliances & licences
- Conducted risk assessment
- Developed financial model

**Resource Index**
- Technological resources
- Commercialisation competencies
- Project management experience
- Know outside expertise
- Adequate staff resources
- Adequate physical resources
- Explored government support
- Explored Venture Capital options
- Have management board

**Innovation Index**
- Have NPD process
- Innovation is key strategic goal
- Can develop prototype alone
- Innovation independently tested
- Explored IP management issues
- Have IP rights protection in place
- Use NDA agreements
- Involve customers in NPD
- Involve employees in innovation

Source: Mazzarol and Reboud 2011
Measuring Systematic Innovation Management
“Innovation Diagnostic Diamond”

Source: Mazzarol & Reboud (2011)
Hi and Low R&D Intensity Firms and the IDD

Source: Mazzarol & Reboud (2011)
Group Discussion

Working in teams

- Review the firm’s innovation diagnostic report.
- Consider the “anticipated” rent and the challenges facing its future commercialisation.
- Highlight major areas for future action and focus.