



Aalto University
School of Business

Capital Budgeting (22E12000)

R & D investments

March 19, 2024

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Content

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NPD investment study by Huikku and Kolehmainen (2024)

What are R&D investments?

R&D investments and New product development (NPD) terms often used synonymously

NPD: a process of bringing a new product or service to market

NPD: An extension of an existing product or a true product innovation

Crucial factor in the survival of a company: In fast changing industries firms must continually revise their design and range of products

Co-operation with universities, state agencies, and other firms

What kinds of firms are R&D intensive?

Firms selling
e.g.:

Medicine

Scientific
instruments

Safety-critical
mechanisms
(e.g., aircraft)

High technology
military
armaments

High-tech
products

What are the typical features of R&D investments?

Intuition and strategic aspects involved in decision-making

Estimates of cash flows subject to high degrees of uncertainty

- Financial calculations difficult to make

Terminal value may play a major role

Risk of failure

Potential for great success

Projects can be very long

Stage gate approaches used

What is the Stage gate model?

Product, process, system development process is divided into *stages* separated by gates

At each gate, the continuation of the development process is decided by a manager or a steering committee

The decision is based on the information available at the time, including e.g., business case, risk analysis, availability of necessary resources (money, people with correct competencies)

The Role of Net Present Value Calculation in the Development of Experience of Knowing in Strategic Investment Decision-Making Process

“The Learning-Oriented use of NPV”

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Background



NPV is among the most extensively applied management accounting techniques



Conventionally, it is used to inform the valuation of investment proposals



Interestingly, NPV is also commonly used in highly uncertain contexts, where its capability to inform decision-making can be considered to be dubious



Why is NPV adopted so widely also in contexts of high uncertainty?



Could it be that in highly uncertain contexts NPV becomes used as a mechanism for enhancing organizational learning?

Purpose of the study & research question

PURPOSE:

- To shed light on the potential learning-oriented use of NPV

RESEARCH QUESTION:

- How are NPV calculations involved, in an interplay with other sources and uses of information, in the development of the experience of knowing in a long decision-process, featured by high uncertainty

Definitions

LEARNING-ORIENTED USE OF ACCOUNTING

- the use of accounting for the generation, sharing and accumulation of knowledge

ORGANIZATIONAL LEARNING

- the generation, sharing and accumulation of knowledge; draws on the conceptualizations by Huber (1991) and Crossan et al. (1999)
- Similar conceptualizations applied also in the accounting literature (Chenhall, 2005; Huikku, 2011; Kloot, 1997)

Research material and method

Target company

- Single case study in a European pharmaceutical company
- Several major on-going drug development projects
- Uses NPV intensively for valuation and learning purposes

Data collection

- 49 theme interviews between 2012 and 2017; 40 within the company and 9 with national regulatory authorities and financial analysts
- Main actors, such as CFO, SVP for R&D, SVP for Proprietary Products; VP for Research, VP for Development and Business/R&D Controller interviewed multiple times
- 67 hours of recorded and transcribed material
- Project-specific material, NPD handbook, investment guidelines, other internal and external material, informal discussions

Data analysis

- Thematic analysis; abductive approach
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Characteristics of pharmaceutical NPD investments

Decisions about new drug development projects are very critical to company performance

- 12-15 years from idea to market
- Successful development of a new product (new chemical entity = NCE) typically costs several hundred million euros
- Only very few new molecules/products will enter clinical studies (=drug is given to people), and only about 1/10 of the molecules that reach this stage will finally get marketing approval
- Although the industry's R&D spending has increased dramatically, the number of new drugs receiving market authorization has decreased during the last decade

NPD: Evaluation of profitability

At early stages the emphasis is on

- Abstract level ideas about possible target diseases
- Technical feasibility including IPR
- Focus not yet on profitability calculation due to HUGE uncertainties, but there has to be some kind of rough idea about market potential and NPD expenses

NPV is calculated only when development costs and sales forecasts can be defined to somewhat reliable degree

- When the final target disease has been decided (entering clinical phase, DP3)
- When the development program design is becoming clearer
- When the partnering strategy is getting clearer
- Yet, NPV must be “sufficiently” positive all the time
- Sales figures drive the calculation!

NPV calculation in the Case Company (1)

SVP for R&D: *“The only thing that we know with certainty is that the NPV is wrong.”*

- NPV used in **a learning-oriented** way rather than for giving an “exact answer” (“answer machine” purposes)
- NPV provides multifaceted insight
 - sensitivity analysis
 - scenario analysis
 - complete non-financial data
- Continual use of NPV
 - many versions & updates per Decision Points
 - local use (e.g., by the business/project managers)

NPV calculation in the Case Company (2)

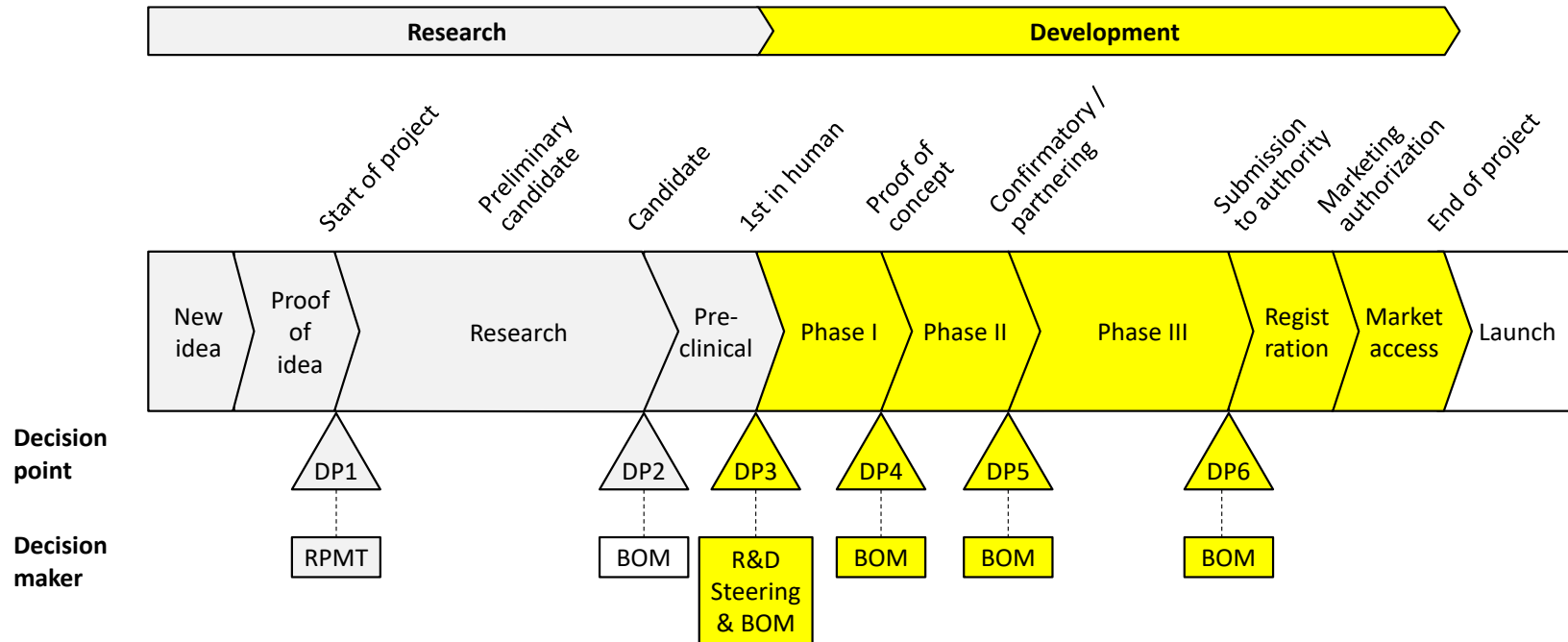
- **NPV facilitates extensive dialogue around NPV:**
 - Platform for bringing personnel representing different knowledge bases and frames of cognition together
 - Facilitates in-depth discussion, and the mobilization, sharing and accumulation of knowledge
- **Simplified accounting language and form:**
 - Hurdle rates stable
 - No probability or real option approaches,
 - Focus on substantial issues (e.g., sales)

The development of experience of knowing about financial and non-financial perspectives in drug development decision-making

	Research (for DP-2)	Pre-clinical (for DP-3)	Phase I (for DP-4)	Phase II (for DP-5)	Phase III (for DP-6)	Registration, market access, Launch
Perspectives						
Medical functioning	X	X	XX	XXX	XXXX	XXXX
Sales volume	X	X	XX	XX	XXX	XXXX
Sales price	-	X	X	XX	XX	XXXX
Net sales	-	X	X	XX	XX	XXXX
Strategic aspects	X	XX	XXX	XXX	XXX	XXXX
Competition	X	XX	XX	XXX	XXX	XXXX
Sales license	X	XX	XX	XXX	XXX	XXXX
Partner options	-	-	XX	XXXX	XXXX	XXXX
Funding	-	X	X	XXX	XXXX	XXXX
R&D cost	X	XX	XX	XXX	XXXX	XXXX
COGS	-	X	XX	XXX	XXXX	XXXX
Sales and marketing costs	-	X	X	XX	XXX	XXXX
Administration costs	X	X	XXX	XX	XXX	XXXX
NPV	-	X	X	XX	XXX	XXXX
The degree of experience of knowing about the perspectives in the NPD decision:						
None or Trivial: -, Low: X, Moderate: XX, High: XXX, and Very high: XXXX						

Stage gate model

NPD process in pharmaceutical industry (Huikku & Kolehmainen, 2024)



RPMT = Research portfolio management team

BOM = Board of managers

* BOM decisions precede recommendation from R&D Steering and the Business Team