

Product Development and Marketing

< 1. Opportunity Identification >

① Def. Ansoff's growth matrix.

<u>model</u>	Current Products	New Products
Current markets	Market penetration strategy	Product development strategy
New markets	Market development strategy	Diversification strategy

1) Market penetration strategy (渗透)

在现有市场上 increasing the volume of sales of 现有产品

2) Market development strategy

make products available to new markets

3) Product development strategy

improved products to existing markets

4) Diversification strategy

Moving into new market base from exist knowledge

5) Risk increases the further the strategy moves away from known quantities.

② Opportunity identification process (six-steps)

1) Establish a charter (章程)

- Charter set the goals of organisation and boundary conditions for an innovation effort.

2) Generate & Sense many many opportunities.

- internal, external sources
- passively, proactively
- potential clients, customers, competitor, R & D.

3) Screen opportunities

- eliminate 不能创造价值的, focus on 值得进一步 investigation 的

4) Develop promising opportunities (有潜力的)

- 进一步 invest, resolve the greatest uncertainty at the lowest in time and money.

5) Select exceptional opportunities

- 选出少数几个值得投入大量资金的.
- "Real-Win-Worth-it" problem.

6) Reflect on the results and the processes.

< 2. Product Planning >

Goal: 确定 pursue 的 some project 以及 time period.

① 产品类型

- 1) new product 新产品
- 2) New Product Platforms 旧产品
- 3) Derivatives of platforms
- 4) improvement of products.

② 5-step product planning process.

Output: Product plan and Mission Statements

1) Identify Opportunities

2) Evaluate and prioritise projects → Some projects.

- Decide which project to pursue.

因素: Competitive strategy (科技, Cost, 用户).

Market segmentation, Technological Trajectories.

Product platforms: Set of assets share across set of products

- prioritise 因素: Competitive, technology,

3) Allocate Resources and Planning → Product Plan.

- Resource Allocation (避免 Over commitment, 支持 Aggregate Planning)
- Project timing: determining timing and sequence of project.

Product plan: approved 的 项目, sequenced in time ...

4) Complete Pre-project planning → Mission Statements.

- Mission Statements: Document, clear guidance for product development organisation.
- 内容: 产品描述, 商业目标, 目标市场, 约束, Stakeholders, Budgets

5) Reflect on the results and the process.

<3. Concept Development>

Def : A concept is a description of form, function and features of products.
Concept : - - - - -

关于 Concept Development 的流程:

① Identifying customer needs

② Establishing target specifications

需要有具体的 metrics 和 benchmark 来衡量.

将 customer needs 转化为 technical terms.

③ Concept generation

目的: explore the space of concepts that may address the customer needs

output: 10-20 concepts with sketch and brief descriptive text.

创新问题 - 外部搜索 Existing 技术 Explore
 - 内部搜索 New 技术 systematically → Reflect.

④ Concept selection

Def : product concepts are analysed and sequentially eliminated
Concept selection : to identify the most promising concepts

有很多 screening 方法, Customer, Technical, Business 等等, 并使用 Weighted check list 进行打分和筛选.

Factor	Weight	Idea 1		Idea 2	
		Score	weighted score	Score	weighted score

ex: Technical
 R&D balance
 market stability

哪个 Idea 拥有较高的 score 便进入下一阶段.

⑤ Concept testing

主要是与 Customer 沟通, 使用一些 survey format (Face to face, e-mail)

得到 user response, response 就是 Test 的结果, 根据 response 选择

接受 concept 还是丢弃.

⑥ Setting final specifications (constraint, limitation, cost and performance 等等)

⑦ Project planning (schedule, resource, budget ...)

<补充> 整个 Concept development process 中一直进行的工作:

Perform-Economic analysis, Benchmark of competitive products

Build models and Prototypes

<4. System-level Design>

Aim : Development of the architecture and the decomposition into functional & physical elements

① Chunks & Architecture

Def : The physical elements of a product are typically organised into several major building blocks - called chunks.

Def : The plan by which the functional elements of product are arranged into physical chunks and by which the chunks interact in interaction.

有了 Architecture, physical blocks 才可以下发并同时开发.

② Architecture 的分类.

1) Modular architecture

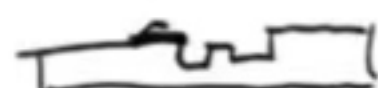
每个 chunk 实现一个或比较少的 function, Form:

interaction between chunks are well defined

- Slot-modular (所有 chunk 接口不同)

- Bus-modular (接口相同, 接 Bus)

- Sectional-modular (所有接口相同, 但是 chunk 通过接口模块连接, 而不是直接连接)



2) Integral

多个 chunk 实现一个功能, 互为一体, 一般表现是 cost 少.

③ Architecture 的影响.

Product change (是否好更改);

Product variety (模块化的多样性增加)

Component standardisation (实现同一功能的模块标准化)

Product development management

product performance

④ 如何构建 Architecture.

1) 画产品 schematic (diagram representing the understanding of the component elements of the product)

2) Assign the elements of schematic into chunk (cluster)

如何 cluster: 类似功能, 可一起标准化的, 可自给自足的单独 chunk 类似制造过程, 共享功能模块.

3) Create a rough geometric layout

4) Identify the fundamental and incidental interactions

两种交互, fundamental, 即正常的, 我们设计的交互.

incidental, 由于物理因素引起的交互, 比如发热, 振动.

output → geometric layout, chunk 描述, interaction.

< 5. Testing, Ramp-up and product Launch >

① Testing and Refinement

involves the construction and evaluation of multiple product versions of the product. 还有从用户得到 feedback 再改进.

② Production ramp-up & Product Launch

purpose: train the work force and to work out any remaining problems in the production process

在 production ramp-up 到 on-going production 中间, 产品 launched.

1) 4 种生产类型 (系统)

- Process - production system: 相似流程线一块 (超市, 超市)
- product - production system: sequence of required operations (flow line)
- Cellular - production system: mini product layouts, 有相似需求的产品, 放在一起
- Fixed - production system: 产品 fixed, 工人, 材料, 设备移动

总之, 为 use space efficiently, max equipment utilization, smooth flow of work... convenient, safe, simplify

2) Product Launch

Def product launch: A process of bringing a new or updated product to market.

Def MVP

In product development, the minimum viable product is a product which just enough features to satisfy early customers, and to provide feedback for future development.

minimum viable product (MVP) 产品, 已经足够细节.

有了 MVP, 就是 Time to Market (TTM).

② Robust Design (一种思想, 贯穿整个流程)

Def Robust product

A Robust product is one that has robust performance, i.e. it performs as intended even under non ideal conditions

Robust Design 的流程中需要一直 part, 来考虑 Design criteria 以及选择参数.

Def robust setpoint

一种 Robust Design 规则, 很多参数组合都可以 meet all of our design criteria, 但我们要选 least overall sensitivity 的一组参数.

用 variance 的方差法来设计 Robust.

1) 细节, Robust design process

确定 control factors, noise factors & performance metrics

建立 Objective function

设置 test plan → full factorial (全部参数组合法一遍). 成本高.

运行 test (交互法顺序随机, 防止时间因素).

分析 test (使用 Objective function)

选择 factors (减少 variance).

反思 (经典改善).

总之, 建立交互法分析的流程, 不以死记硬背.

< 补充 > 回顾整个 product development process.

Phase 0: Planning (Mission Statement)

Phase 1: Concept development (理解产品需求产生 Concepts)

Phase 2: System-level design (product architecture)

Phase 3: Detail Design (Complete specification, control document)

Phase 4: Testing and refinement

Phase 5: Production Ramp-up & Launched.

< 6. Digital Transformation and Digital Products >

① 三种不同数字化转型定义.

- 1) Digitisation: Convert information from analog to digital
- 2) Digitalisation: using digitised information to make established ways of working simpler and more efficient.
- 3) Digit transformation: The ability of the organisations to build and services through software

② Digital Transformation 种类.

- 1) Process Transformation (优化生产流程及 efficiency)
- 2) Business Model Transformation (商业模式转变)
- 3) Domain Transformation (用 new technology 开拓新 domain)
- 4) Cultural Transformation (通过文化改变推动 digital transformation)

③ Digital Product 开发流程.

- 1) Discovery, Ideate } Brainstorming, Prototyping, 问题 如何解决

2) test: gathering data, refining and improving idea, gather more data

lean validation process = validate } problem, market, product, willingness to pay
精益验证.

4) Execute: develop the ~~next~~ minimum Viable Product (MVP)

5) Launch, 三种发售方式 } Soft Launch: limited segment of market
(发售的是 MVP) } Hard Launch: full market

Dark Launch: 部分用户暗发, 用来搜集 reaction

6) Grow } Collecting and Analyse feedback
(based on feedback from MVP) } preparing to scale
Test and more test.

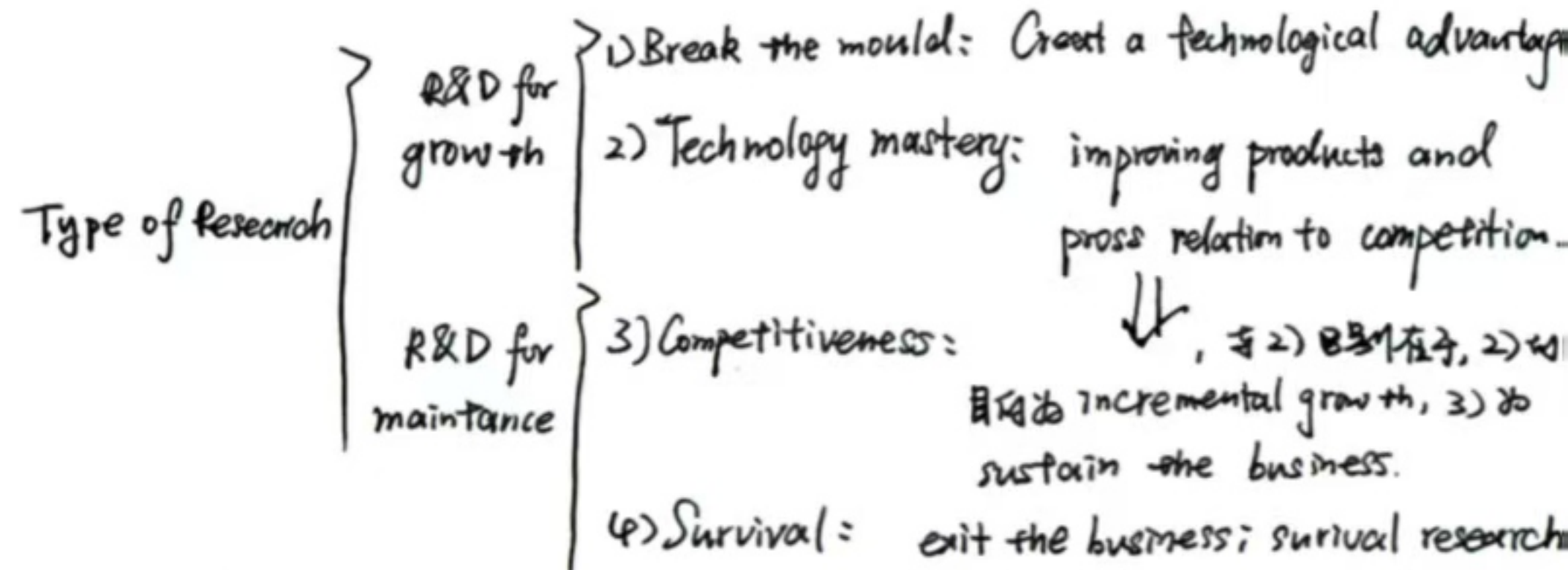
产生问题, 那么, test 验证后再执行, 反馈, 执行甘特图.

< 7. R&D >

① 定义及分类.

Def R&D

Research and experimental Development (R&D) comprises creative and systematic work in order to increase the stock of knowledge and devise new applications.



② R&D 需要考虑的因素.

Environmental, cost, Risk, Strength, weakness

可以使用 PEST Analysis 或 Porter's 5 Forces model 进行分析, 确定 Strategy.

Allocating Funds 对 R&D 是很重要的因素.

1) Evaluation Criteria: Based on industry, 经验性质 (决定 R&D 的开展及资源)

2) 除了 1), 还可以考虑: Competitors, objectives, stability, Cost.

< 8. Intellectual Property >

① IP 定义及重要性.

Def IP

Intellectual Property (IP), is an intangible asset created by human intellectual or inspirational activity.

IP 意识存在于产品开发的方方面面, 可以让人 own creativity and innovation, 并且可以从使用中 rewarded. 可以促进更多的 innovation.

② IP 的种类.

首先, 关于 IP 的 protection, 大部分是 Registered rights, 少部分是无 registered rights

1) Patents (发明专利)

交申请费, 公开发明细节, 可收取 Return On Investment (ROI).

a. Requirement for Patents.

- Novelty (does not from one part of "State of the art")
(在申请 patents 之前, idea 不能公开)
- Non-obvious
- Industrial application (专利的最初作用是应用)
(理论, 科学性, 技术性的方法或 paper 不叫 patent)

b. 好坏

benefits: ROI, 能赚钱; criticism: Annual fees, defend (侵权时)

<过程: 申请专利 6 步法>

① Formulate a strategy and plan.

主要是 timing, type (Regular, Provisional), scope

② Study prior inventions

a) may infringe b) 有相似专利, 判断成功率 c) 新灵感

③ Outline claims

describe characteristics of the invention.

④ Write the description of the invention.

detail, 即常说的字专利, 有固定格式.

⑤ Refine claims (细化 claims).

Def The claims are a set of numbered phrases that precisely define the essential elements of the invention.

必须对 patents 中所有 element (claim) - 致才不 infringe.

⑥ Prepare application.

按照 ① 中的 type 进行申请.

2) Registered Designs

可能不 novel, 但是 design (外观) 是 new 的.

Protect the complete appearance of the Objects (并不保护内在 idea).

3) Registered Trademarks.

Def

Trademark

Trademark is a distinctive name, mark or symbol that is identified with a company's products.

From Trademark 与企业的 business image, goodwill, reputation 相关.
设计 Trademark 时, 在保护一切不侵权, 不混乱前提下: Distinctive!

4) Copyright. ©

Right to creative individuals; Automatic, 无须申请.

一般有 3 种 type: 原始作品; 播出的节目; layout of a published edition.
必须是 ~~完整~~ 完整作品, 单独 title, idea 不享 Copyright.

<补充> Creative Commons ©

支持知识共享, encouraging others to reuse

总结 介绍了 4 种 IP: patents, Registered Design, Trademark, copyright.

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1. Opportunity Identification.

2. Product Planning

3. Concept Development.

4. System-level Design

5. Testing, Ramp-up and Product Launch

6. Digital Transformation and Digital Products

7. R&D

8. Intellectual Property (IP).

通过 ④
关系断
有那些
elements