

藥品開發生命週期

評估與管理

中國醫藥大學生醫所臨床試驗課程

公司名稱：永昕生物醫藥股份有限公司

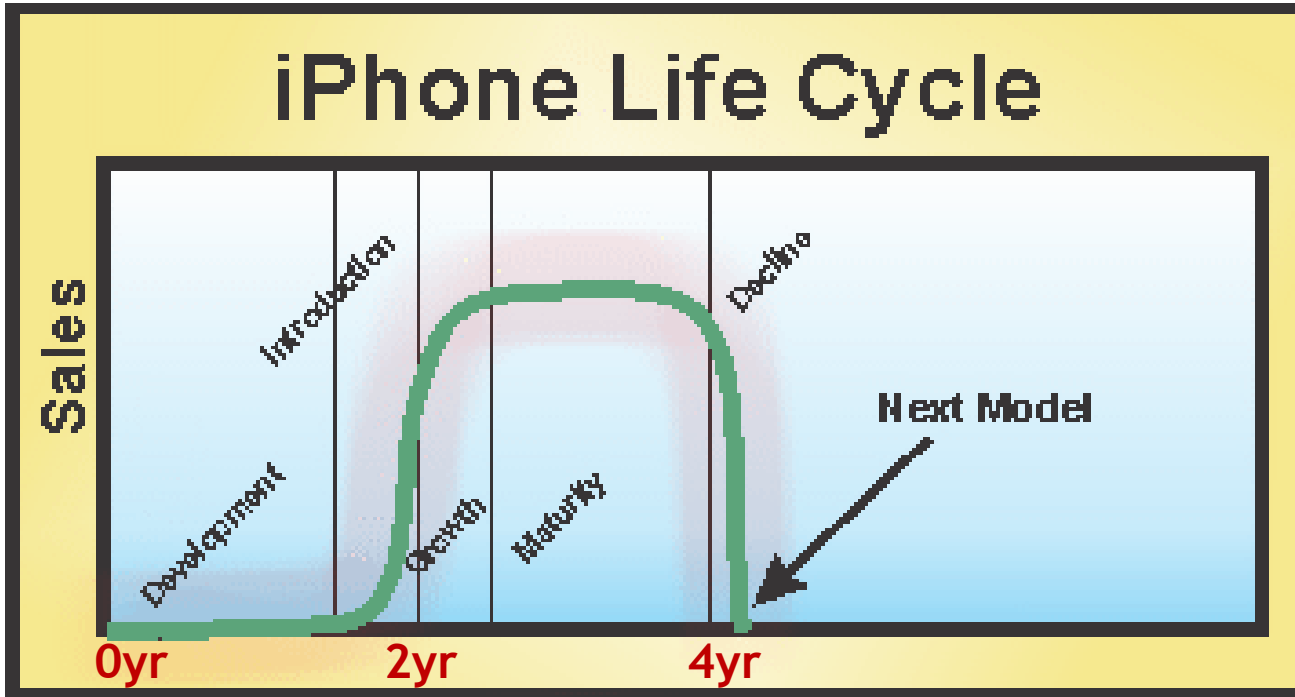
主講人：葉子菱

Outline

- What is Life Cycle Management (LCM)?
- Why Life Cycle Management Matters?
- Back to the Basic - How to Manage a LCM Project?
- How to Close the Project by Out-licensing?

What is Life Cycle Management (LCM)?

iPhone Life Cycle



iPhone 11

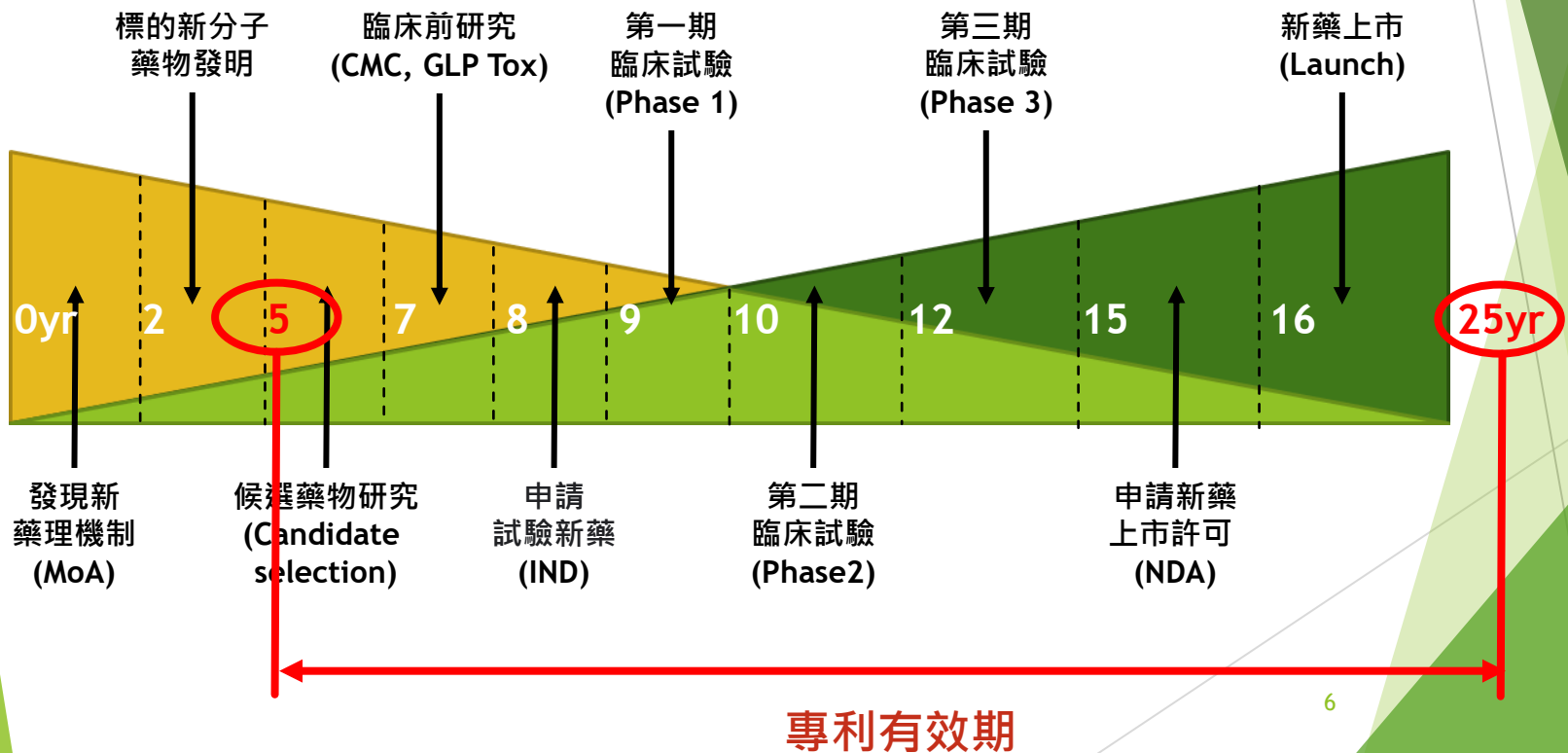
iPhone 12

iPhone ???

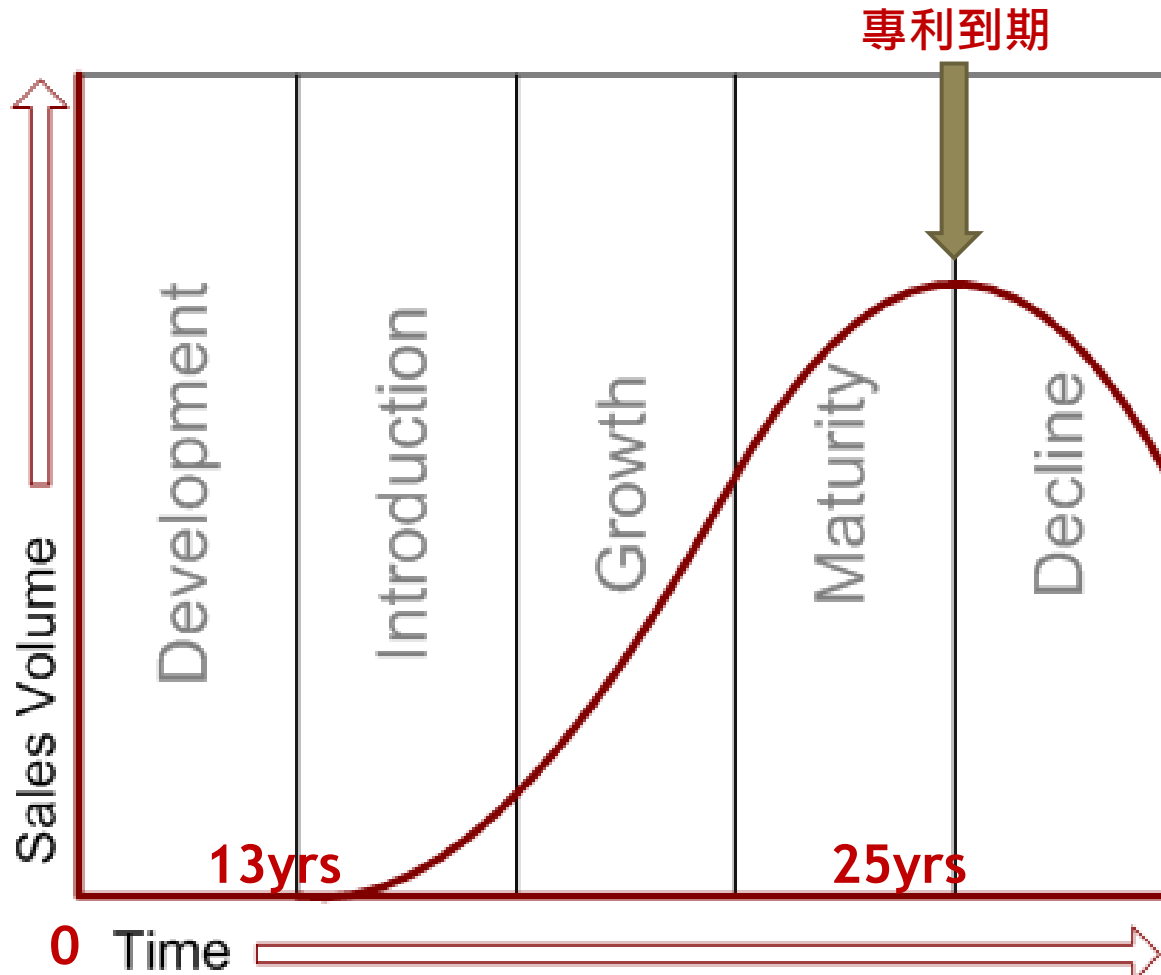
新藥開發產業價值鏈

新藥開發風險

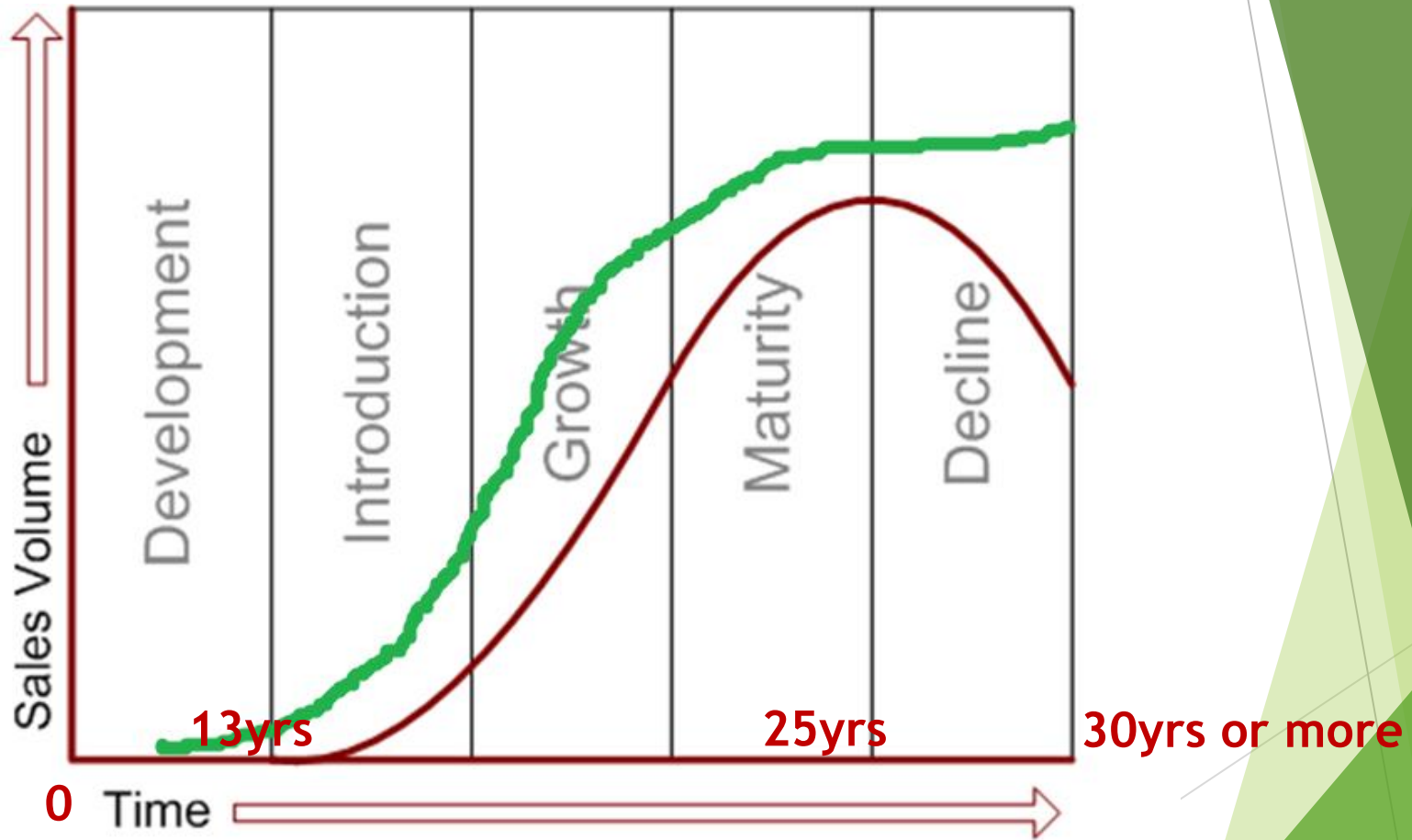
授權產品營收



Product Life Cycle

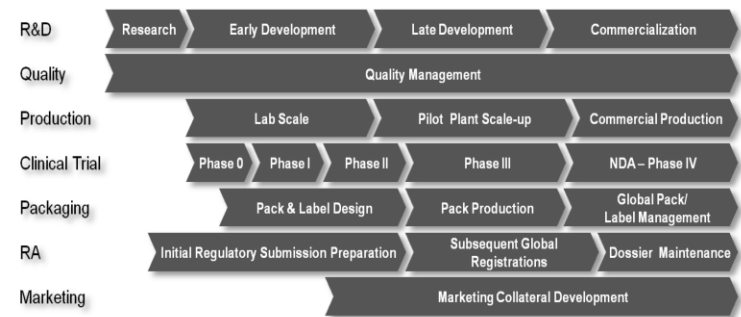


Product Life Cycle Management



Development Phase

- ▶ **Risk Mitigation → 增加成功率**
 - ▶ Multiple candidates (backup compounds)
 - ▶ Suitable first indication (and multiple indications)
- ▶ **Project Management → 減少資源耗損**
 - ▶ Requirements management and traceability
 - ▶ Integrated drug development, portfolio and resources management
 - ▶ Global product registration strategy
- ▶ **Partnership → 分攤風險/共享利潤**
 - ▶ Manufacturing partner
 - ▶ Clinical trial partner
 - ▶ Out-licensing at early stage
 - ▶ Out-licensing in part of territories
 - ▶ Joint venture

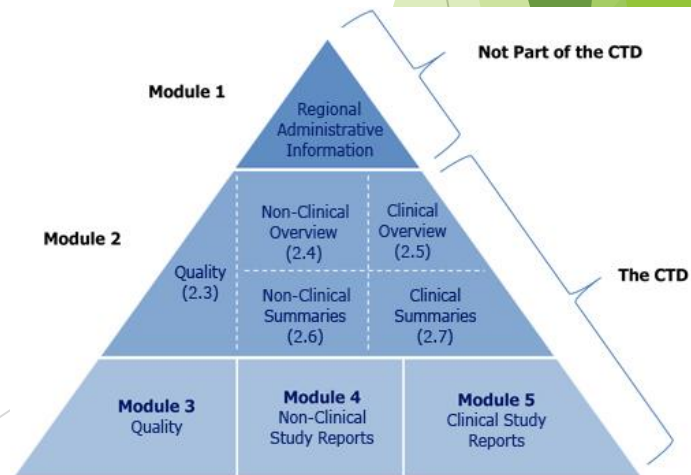


Introduction Phase

Time-to-market!

▶ Cross Function Collaboration

- ▶ Active drug development archiving and design dossier management
- ▶ Ability to registry in different countries (regulatory strategy)
- ▶ Technology transfer and external collaboration
- ▶ Marketing



Growth Phase

- ▶ **Driving greater efficiencies in delivery → 整合資源**
 - ▶ Integrated clinical supply
 - ▶ Change control management
 - ▶ Establish platform ability
 - ▶ Integrated knowledge management

- ▶ **Increase market share → 市場擴張**
 - ▶ New indications
 - ▶ New formulations
 - ▶ New dosing regimens

	病患族群相同	病患族群不同
醫師科別相同	適應症相同，不同進程階段、亞型、或轉為一線治療用藥	相關適應症
醫師科別不同	以相同適應症，延伸至不同年齡層，如兒童、青少年	完全不同的適應症

Maturity Phase

▶ Product Optimization → 精進與優化

Any product modification or improvement to the production process

▶ Patent exclusivity: Patent + Patent Term Restoration (in US)

- ▶ 1/2 of IND time plus full NDA time
- ▶ Maximum period
 - ▶ Five years
 - ▶ Fourteen years of effective patent life

$$\text{Extension}^* = \frac{1}{2}(\text{IND Period}) + (\text{NDA Period})$$

↑ Clinical Trials ↑ FDA Review

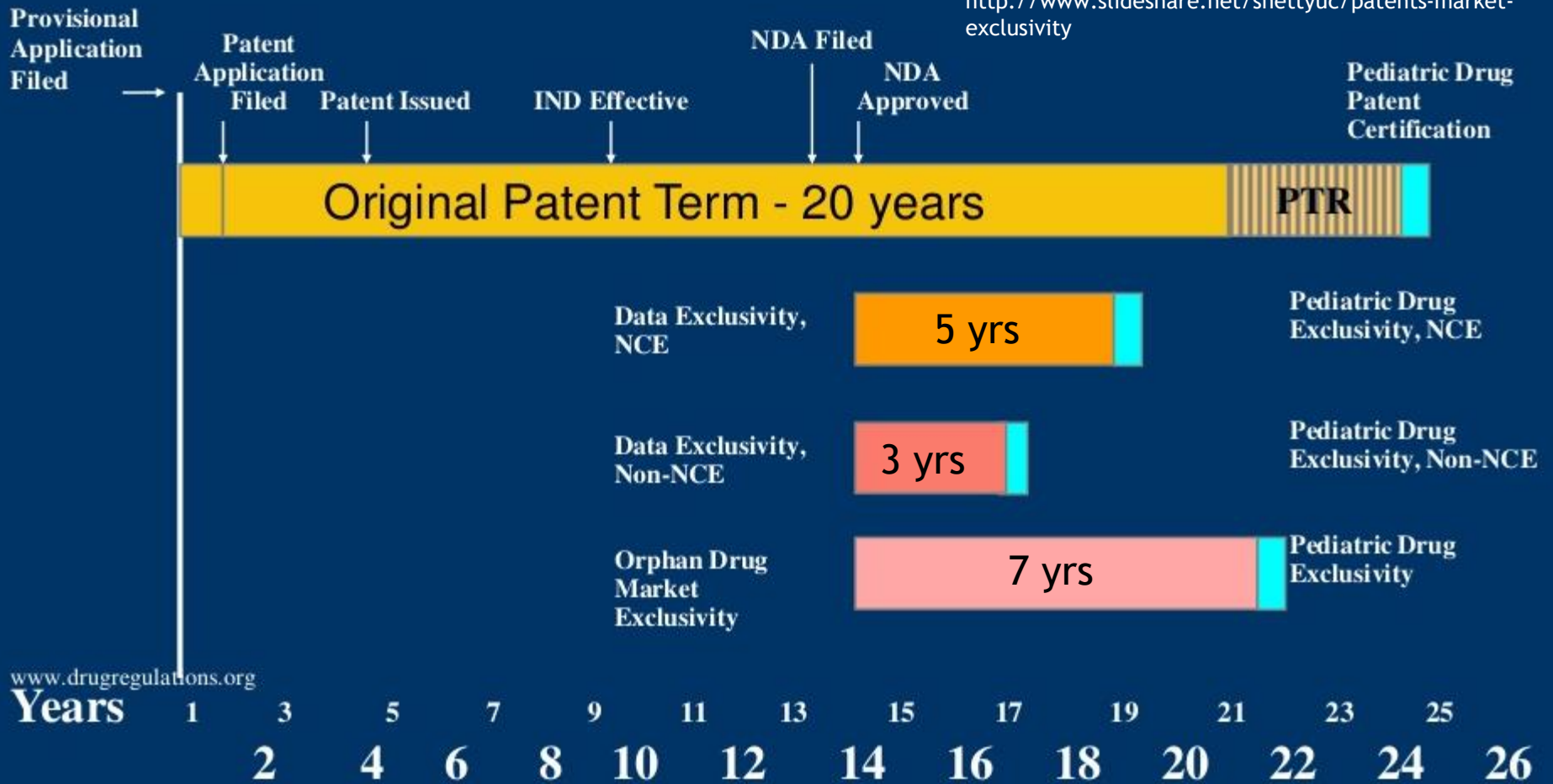
*Extension cannot exceed 5 years in length
Extension cannot extend beyond 14 years after NDA Approval

▶ Non-patent exclusivity: Data Exclusivity (in US)

- ▶ The Hatch-Waxman Act:
Create incentives for new R&D and Make available more low cost generic drugs
 - ▶ 7 years for orphan drug
 - ▶ 5 years for new molecular entity
 - ▶ 3 years for new use essential clinical data
(e.g. new indication, new formulation, dosing regiment, OTC switch, new combination...)
 - ▶ 6 months additional for pediatric indication
- ▶ 10 years for antibiotic exclusivity (GAIN Act)
- ▶ 12 years for biologics exclusivity (351(k) of PHS Act)

Patent & Data Exclusivity

<http://www.slideshare.net/shettyuc/patents-market-exclusivity>



www.drugregulations.org

PTR: Patent Term Restoration

■ : Pediatric Drug Exclusivity

Decline Phase

- ▶ Branding / Advertising
- ▶ Strategic pricing changes
- ▶ Patent litigation
- ▶ Authorized generic
 - ▶ Data exclusivity for 6 month: 1st generic challenging listed drug's patent
- ▶ Explore new markets
- ▶ Next-generation products

Back to the Basic - How to Manage a LCM Project?

Introduction of Project Management

專案的定義 - 1/2

1. 專案是指一項暫時性的任務與配置，以開創某獨特性的產品與服務。並且...

- ▶ 暫時性
- ▶ 獨特性
- ▶ 明確定義範圍

1. 舉辦一場婚禮?
2. 制訂SOP?
3. 經營一家新創公司?

→ 每個LCM專案都是任務型的配置，必須有其明確定義的範圍與目標。

例如：於2021年12月31日，
新增並取得台灣脊髓損傷適應症的上市許可證明。

專案的定義 - 2/2

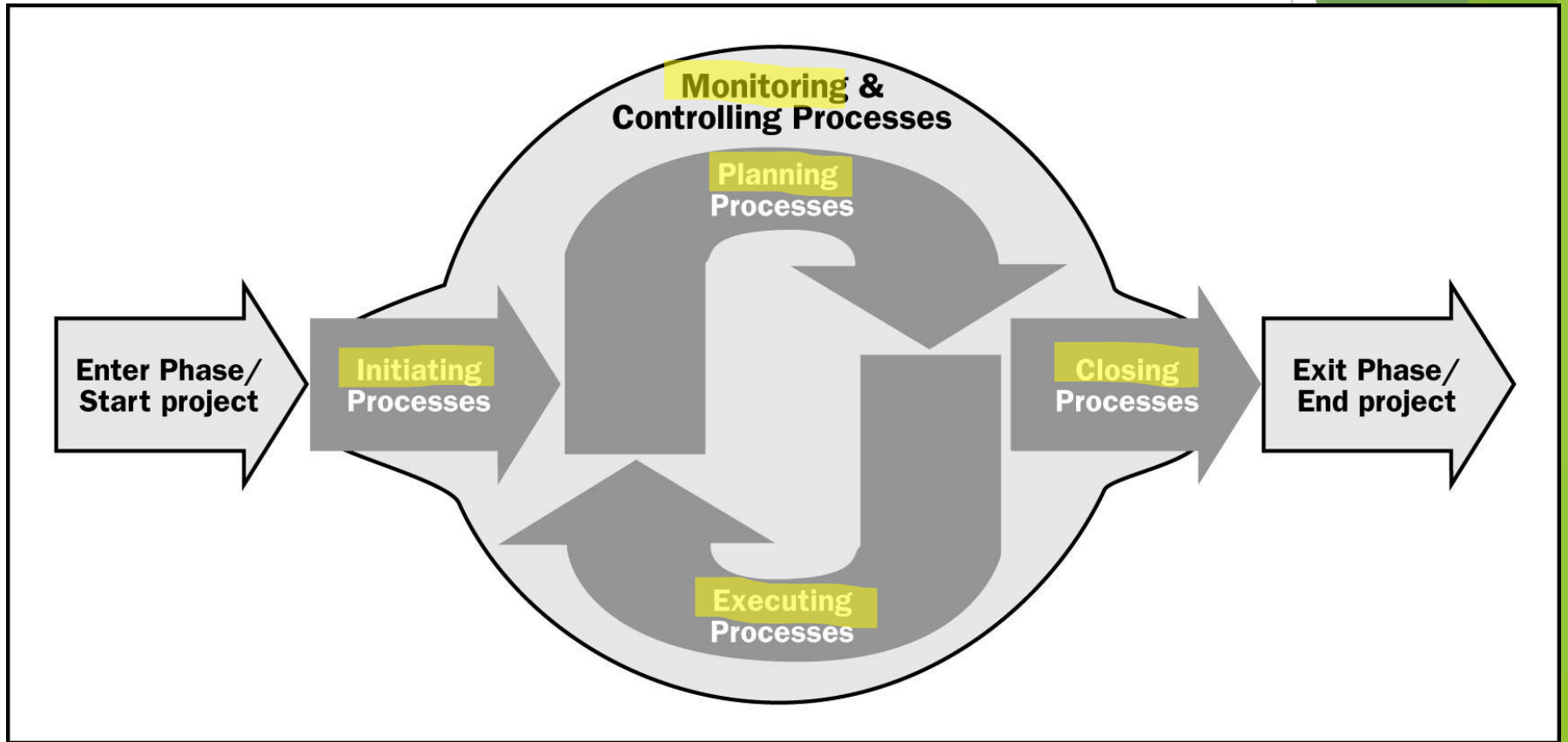
2. 在一次性的工作中必須同時完成PCTS的要求。

- ▶ **P: Performance** 特定成果的展現
- ▶ **C: Cost** 成本控制
- ▶ **T: Time** 明確的完成時間
- ▶ **S: Scope** 明確規範工作範疇之大小

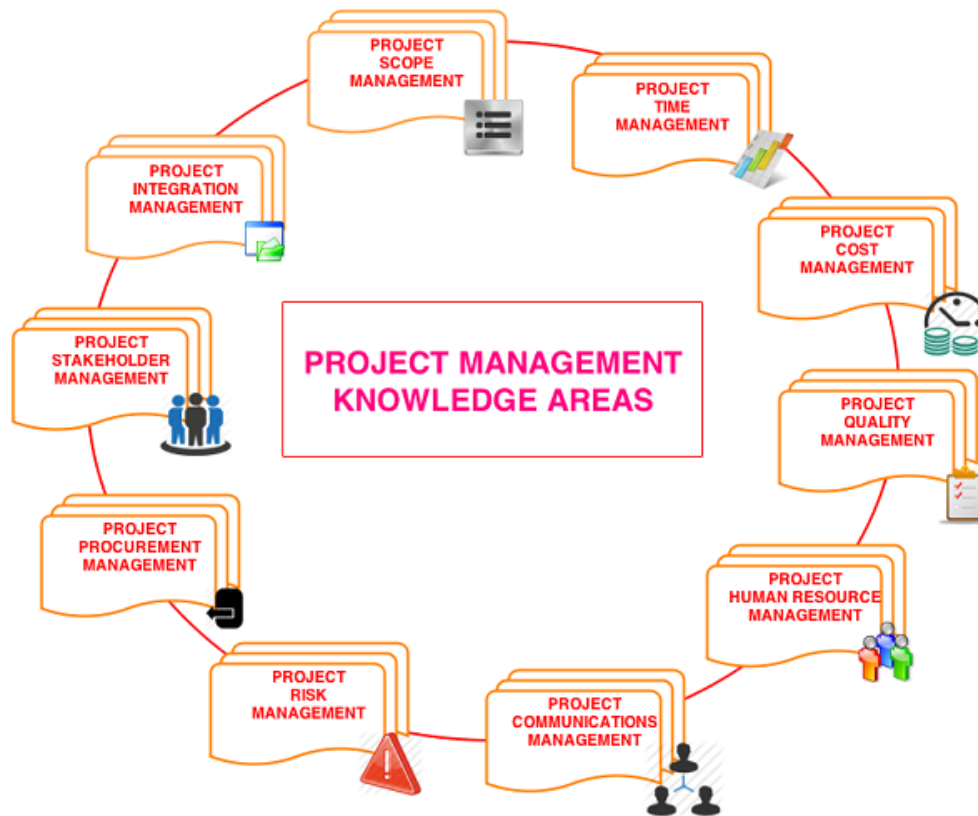
→ 於2021年12月31日，新增並取得台灣脊髓損傷適應症的上市許可證明。

- ▶ **P:** 取得上市許可證明
- ▶ **C:** 預算\$100,000,000
- ▶ **T:** 2021年12月31日前
- ▶ **S:** Product X之台灣脊髓損傷適應症

專案管理五大管理流程



專案管理10大知識領域



專案的管理

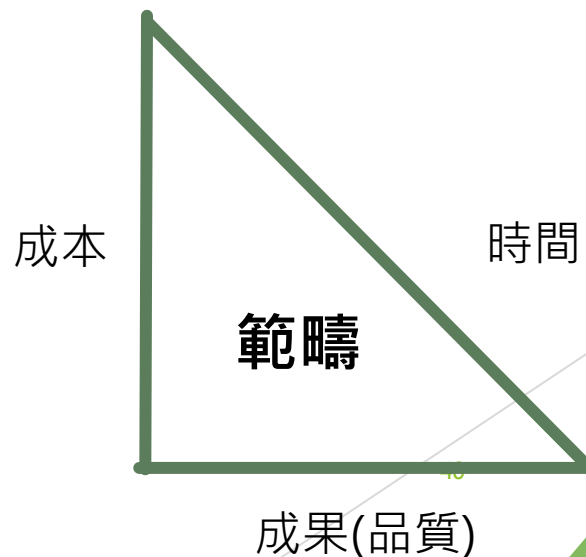
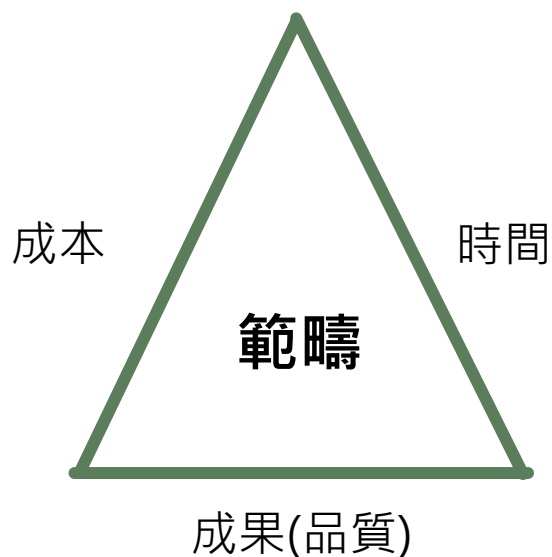
- ▶ 專案管理是應用知識、技能、工具與技術來**規劃活動**，以**達成專案的需求**。
- ▶ 為了要達到專案目標，將相關的所有計畫、進度以及控管等行動，使之**流暢地銜接**，就是專案管理。
- ▶ 專案管理是**藝術也是科學**，包括人與人之間合作關係的掌握以及專案工具與技巧的掌握。

專案管理的重要性 - 1/2

- ▶ 商場的決定性關鍵!

時間與成本

而這也是專案管理所關心的目標之一 (PCTS)。



專案管理的重要性 - 2/2

▶ 如何明定範疇? SMART原則

▶ **S: Specific**

是否明確指出最終目標應該做到什麼?

▶ **M: Measurable**

能如何測量最終專案的完成情況?

▶ **A: Attainable**

在規定時間內最終目標是不是合理能夠實現?

▶ **R: Realistic**

最終目標是否很務實?是否很有價值?是否值得進行?

▶ **T: Time-limited**

能夠對整個專案時間進行追蹤嗎?

▶ 討論:

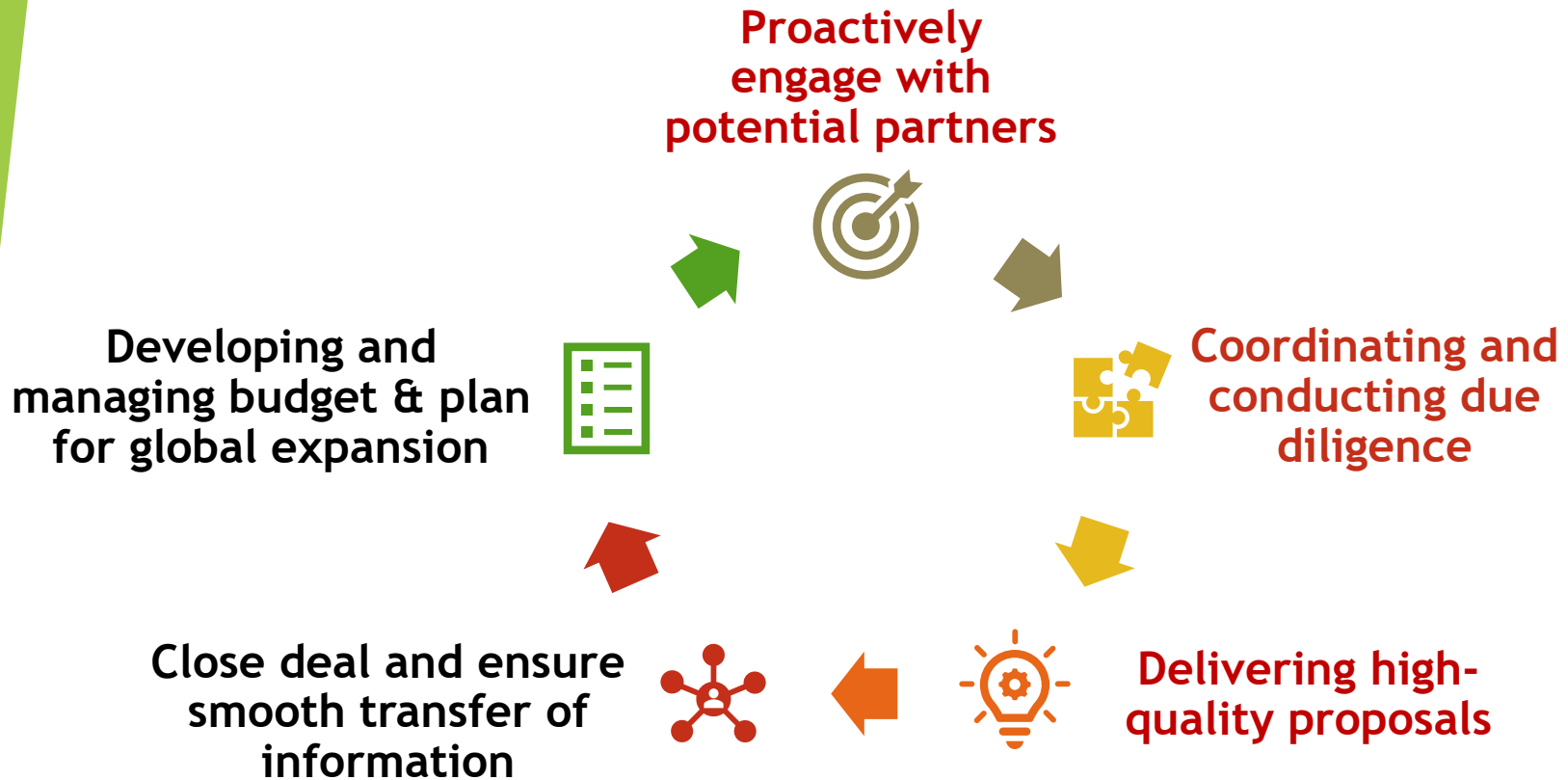
於2021年12月31日，新增並取得台灣脊髓損傷適應症的上市許可證明→SMART?

How to Close the Project by Out-licensing?

BD vs. Sales

- ▶ A process of *generating revenue* with the product in the chosen market segment.
- ▶ A process of finding the match between a product and a segment in the market.
- ▶ The priority is to generate transactions.
- ▶ The priority is to generate qualified opportunity.
- ▶ The focus is on a proven and documented market.
- ▶ The focus is on long-term partnership.

Circle of Business Development



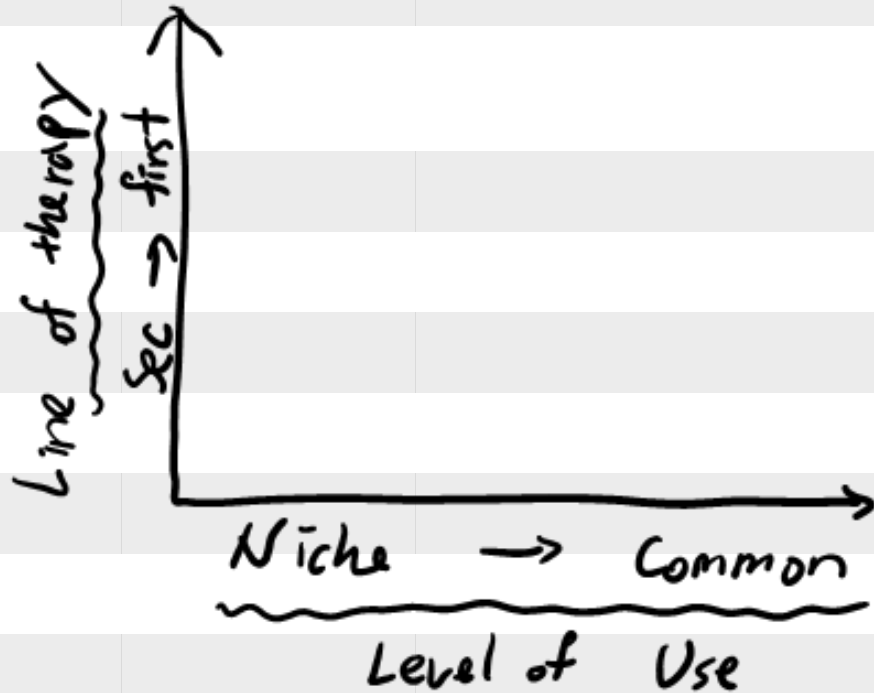
Proactively Engage with Potential Partners

- ▶ **Collect information → *Don't forget medical device***
 - ▶ Disease background knowledge (<https://emedicine.medscape.com/>)
 - ▶ Competitors (<https://reference.medscape.com/drugs>)
 - ▶ News (<https://www.fiercebiotech.com/>; <http://www.pharmcube.com/>)
 - ▶ Potential Partners (<https://www.linkedin.com/feed/>)
 - ▶ Others: KoLs, Website, Reports, Database and BioX
- ▶ **Product positioning and competitor analysis**
 - ▶ Step 1: Comparative target product profile (cTPP)
 - ▶ Step 2: Two-dimensional analysis (2D analysis)

Product Positioning and Competitor Analysis

Comparative Target Project Profile

ITEMS	TARGET	PRODUCT X	PRODUCT Y	PRODUCT Z
Indication and Usage				
Dosage and Administration				
Dosage Forms and Strengths				
...				
...				
RA/Clinical Strategy				
Other advantages...				
IP Status				
CoG				
Market Forecast				
BD Strategy				



Coordinating and Conducting Due Diligence - as a BD role

- ▶ Working closely with your functional teams
 - ▶ Provide feedback promptly
 - ▶ Brief background info & potential issues to your team before meeting with potential partners
 - ▶ Prioritize potential partners and help your team in time-management
- ▶ Be prepared! We will never know how fast the progress will be. Don't let your potential partners wait!
- ▶ Full due diligence (DD) includes finance DD, IP/legal DD and technical DD.

Delivering High-quality Proposals

- licensing/co-development deal

- ▶ Based on market approach:
 - ▶ Make sure you know the deal better than the potential partner.
 - ▶ It might also imply you are the second in the market. Be sure your project has niche position or more promising than the benchmark.
- ▶ Based on rNPV:
 - ▶ Calculate both you and your partner's rNPV, depends on
 1. Cooperation model, e.g. who pay for what and how much development cost?
 2. Milestone design: Development, regulatory and sales milestone fee
 3. Sublicensing is needed or not
 - ▶ Switch your position and reconsider if those payments sounds fair and promising.
 - ▶ General business deal structure: exclusive negotiation fee, upfront, milestone fee, royalty fee, clinical drug supply, commercial drug supply...
- ▶ Others: IP ownership, data ownership, warranty, termination...

Ensure Smooth Transfer of Information to Account Management Team

- ▶ Kick-off meeting internally
 - ▶ Go through the agreement
 - ▶ Disclose issues should be noted
 - ▶ Confirm communication plan internally and externally
- ▶ Kick-off meeting externally
 - ▶ Committee establishment
 - ▶ Project introduction by licensor
 - ▶ Preliminary project plan introduction by licensee
- ▶ Suggest BD to join the functional team meeting at least quarterly

Where the challenges,
where the opportunities



Thank you.