Notes for the exam - 15th of January 2024

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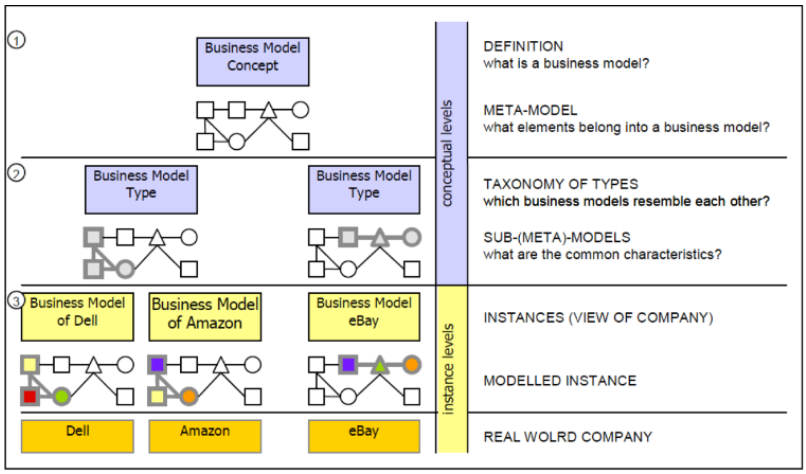
Chapter 1: Digital Business Models

Business Model

- Described as the blueprint of how a company does business, translating strategic positioning and goals into a business functioning model.
- Describes the rationale of how an organization creates, delivers, and captures value
- **Business model concept hierarchy**:



- **Business Models vs. Business Process Modeling**: while a business model is usually a view of the firm's logic for creating and commercializing value, a business process model is more about how a business case is implemented in processes.
- **Business Model vs. Business Strategy**: a business model is the blueprint of how a company does business, translating strategic positioning and goals into a conceptual model. A strategy is an integrated plan of objectives, policies and actions. Its the pursue of a fit between the internal capabilities and the external environment. Its the development of a sustainable competitive advantage.
    - The business model as a system shows how **the pieces of a business concept fit together, while stategy also includes competition and implementation**.

Definition

- A business model is a conceptual tool comprising elements and relationships, expressing a firm's business logic.
- It includes the architecture of the firm and its network of partners for creating, marketing, and delivering value.

Building Blocks - The Business Model Canvas

Pillar	Business Model Building Block	Description
Product	Value Proposition	• Overall view of a company's bundle of products and services • The reason why customers turn to one company over another
Customer Interface	Target Customer	• Customer segment(s) the company wants to offer value to • Heart of any business model • In order to better satisfy customers, a company may group them into distinct segments with common needs, common behaviors, or other attributes
	Distribution Channel	• Various means of the company to get in touch with its customers • Touch points that play an important role in the customer experience
	Relationship	• Kind of links a company establishes between itself and its different customer segments • The customer relationships called for by a business model deeply influence the overall customer experience
Infrastructure Management	Key Resources	• Most important assets required to make a business model work • Physical, financial, intellectual, or human
	Key Activities	• Most important things a company must do to make its business model work • Production, problem solving, platform/network

	Partner Network/Key Partnerships	• Network of cooperative agreements with other companies necessary to effiently offer and commercialize value
		• 4 types of partnerships:
		  ◦ Strategic alliances between non-competitors
		  ◦ Coopetition between competitors
		  ◦ Joint ventures to develop new businesses
		  ◦ Buyer-supplier relationships to assure reliable supplies

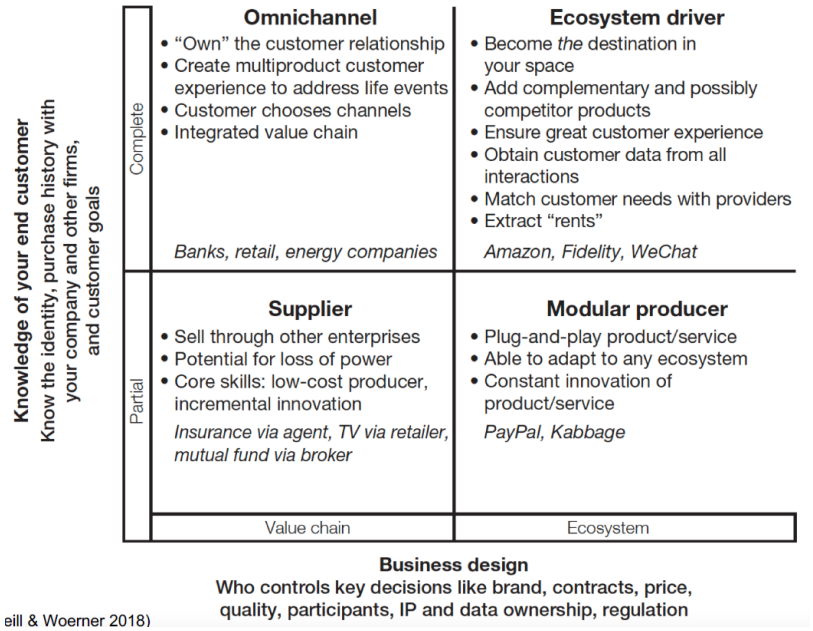
Financial Aspects	Revenue Model	• How a company makes money through a variety of revenue streams • Two types of revenue models: transactional revenue from one-time customer payments and recurring revenue from ongoing payments.

	Cost Structure	• Monetary consequences of the means employed to execute a company's business model

Digital Business Models

- Emphasizes that digital transformation is about change, not just technology.
- Three types of digital transformation:
  - **New Entrants**: different business model and superior digital capabilities - enter an existing market offering a new value proposition.
    - Example: Uber, Airbnb.
  - **New business model for traditional players**: existings companies adopt a business model that is more appealing to their customers.
    - Example: Nordstorm transition to an omnichannel business model.
  - **Crossing industry boundaries**: companies that are successful in one industry use digital tactics to enter another industry or domain.
    - Example: Apple entering the music industry with iTunes.
- **Creating the Next Generation Enterprise**: Every other enterprise can use digital technologies to create, thus they don't necessarily offer a competitive advantage; The key is to differentiate the business by offering something new and compelling through digital vehicles.
- **Two Dimensions of Digital Business Models**:
  - Moving from controlled value chains to complex networked systems.
  - Transitioning from less familiarity with customer needs to better understanding and engagement.

The DBM Framework



eill & Woerner 2018)

Types of Digital Business Models

1. Suppliers: Partial knowledge of end customers, operating in the value chain of another enterprise.
   - As digitization progresses, suppliers are likely to lose power and be pressured to reduce prices.
   - Move up in the DBM framework by learning more and connecting with end customers.

- Example: P&G.

2. Omnichannels: Provide access to products across multiple channels, focusing on understanding the end customer.
    - Move up in the DBM, acting on increased knowledge of end customers and their life events, and reducing customer churn.
    - Companies use big data and analytics, social media, sentiment analysis, and other tools as avenus for increasing their understanding of customers.
    - Example: Citibank.
3. Modular Producers: Offer plug-and-play products or services adaptable to various ecosystems.
    - To thrive, they need to constantly innovate their products & services ensuring that they are among the best options in the market.
    - They operate in a hypercompetitive environment, as it's usually easy for customers to switch to another provider, and the whole point of being a modular producer is being plug-and-play.
    - Example: Paypal.
4. Ecosystem Drivers: Establish a digital ecosystem, offering a range of services to meet customer needs.
    - Use their brand strength to attract participants, ensure a great customer experience, and offer a one-stop shopping.
    - Like omnichannels, they also inspire to "own" the customer relationship but more importantly, they want to become the destitation for a subset of their customers.
    - Example: Apple, Google.

Moving Up & Right in the DBM Framework:

- Digitization is the vehicle for moving up and right in the DBM framework:
    - Create a strong connection with end customers (move up), and
    - with other companies and suppliers that they partner with (move right), to meet more of the customers' needs.

Chapter 2: Key Features of the Digital Economy

Information Goods

- **Information Good**: Anything that can be digitized.

Stage	Characteristics	Implications
Production	- High fixed, near zero marginal costs. - Unlimited capacity	Pricing on **value**
Distribution	- Cheaply copied and distributed. - Enforcement of rights is challenging.	Manage rights for **value**, not protection.
Search	- Fast, ubiquitous, and cheap to access	Attention: find what is of **value**, avoid the rest.
Fruition	- Experience good	Experience to **value**.

Differential Pricing

- **Differential Pricing**: How to price on value?
    - **Group Pricing**: pricing as a function of observables; student, zip code, assets
    - **Versioning**: people self-select
    - **Personalization**: perfect discrimination; theoretical ideal

Category	Example	Why (can they) do it?
Personalized	Elsevier and Universities	- Know the demand curve - Large B2B contracts – easier to charge different prices to different customers
Grouping	Spotify - countries, families, students	- Customer characteristics are observable and correlated with demand behaviour - Characteristics are unchangeable - No resale
Versioning	Netflix - basic, standard, premium	- Customers with different willingness-to-pay value features differently

Rights Management

- **Rights Management**: How much free use maximizes value?

Example of goods	Example of strategies to maximize value	Categories of strategies to maximize value
News Media	Freely share a certain number of articles	Give away part, sell the rest
Magazines	Limited free views per month	Limit demand for repeated views
Anti-Virus	Free version with limited features	Give away similar, but not identical, products
Books, magazines	Easy to browse, hard to print online versions	Give away similar, but not identical, products
Elsevier (outside subscription)	Free browse and search, charge for content	Sell complementary goods
McAfee 1989	Free with full functionality	Pay whathever the user thinks it is worth

Attention Economics

- **Attention Economics**: How to facilitate getting to the most valuable goods?

Example of goods	Example of strategies	Categories of strategies
Digital Media Purchases	- Reccomenender systems - may not be customized. e.g., top sellers - Personalized contents	Recommenders and personalisation – based on profile, historical and similar profiles

Experience Good

Experience Good: How to facilitate evaluation of goods?

Example of goods	Example of strategies	Categories of strategies
Musicians' new albums	Free song	**Preview and browse** - access to parts, for a limited time. for free or at a promotional price
Amazon Books	Look inside, sample chapter	**Preview and browse**
News Media	Promotional pricing	**Preview and browse**
Software	Free trial	**Preview and browse**
Streaming Platforms	Temporary free access	**Preview and browse**
TripAdvisor	Analogous Reviews	**Reviews** - testimonials, influential reviews
Film critics	Influential Reviews	**Reviews**
News Media	Brand Reputation	Branding and reputation – What are we known for? What is that associated with (image, logos)? Leverage that association.

Example: Spotify

- Differential pricing – versioning with freemium, grouping with countries, students, families
- Rights management – free streaming with limited functionality and adds
- Attention economics – customised content for free (related to advertising) and premium users
- Experience good – free streaming, free trial

Information Technology

- **Information technology**: infrastructure that deals with information goods (store, search, retrieve, copy, filter, manipulate, view, transmit, receive)

Examples	Characteristics	Implications
Smartphones	High switching costs and lock-in	Tension between buyers and sellers on **value** capture
Browsers	Importance of complementors	
Game consoles		Tension between buyers and sellers on **value** capture; Achieving critical mass for **value**
Music Players		Achieving critical mass for **value**
DBMS (Database Management Systems)	Strong Network effects	

Switching Costs and Lock-In

Examples	Difficulties in Switching	Categories

Mobile phones	2-year contracts	Contractual commitments
Game consoles	Learning interface, incompatible gaming hardware, incompatible games	Complementary investments – durable purchases followed by complementary purchases*, specific training, asset creation
Web browser	Effort to set up same functionality	Transaction costs – time and effort to change
Search engine	Find and evaluate other engines	Search costs – time and effort to find and evaluate, risk of new
Mobile phones	Loyalty benefits	Loyalty programs – benefits increase with longevity

Example	Categories of switching costs
Google Chrome	• Change computer settings – complementary investment, asset creation • Unknown quality of alternatives – search costs • How to use effectively – complementary investment, training
Facebook	• List of friends – complementary investment, asset creation • Learning the interface – complementary investment, training
iPhone	• Software – complementary investment, complementary purchases* • Learning the interface – complementary investment, training

Phase	Buyers	Phase	Suppliers
Before	☐ Introductory offers ☐ Increase ex-ante bargaining power ☐ Ensure full specification and long-term protection	Get	(Dealing with others' switching costs) ☐ Discounts, lower prices, better conditions ☐ Sell to influential customers
After	☐ Dual sourcing ☐ Avoid full commitment in complementary purchases* ☐ Acquire information for ex-post bargaining ☐ Leverage bond for ex-post bargaining	Keep	☐ Offer more value-added information services ☐ Proprietary improvements to extend cycle and reaffirm choice at selection ☐ Loyalty programs and cumulative discounts
		Grow	☐ Offer full range of products and services ☐ Complementary products ☐ Sell access to installed base

Example: MS Windows

- Licensed lock-in - long term licensing contracts
- User lock-in - pre-installation, learning and complementors
- Lock-ins link benefits with switching costs, with a reflex on the extension of recurring revenues

Network Effects

Examples	Benefits	Network Effects
Communication technologies	Users inherently care about other users	Direct network effects
Internet		

Email		
Video Conferencing		
Eletric vehicles and charging stations	Users care about complementary goods	Indirect network effects
Gaming consoles and games		

- When value of format or system depends on the number of users, **achieving critical mass** is a key challenge.

Nature of the challenge	Methods to address the challenge
• Low early value • Certain homing costs (product, training, etc.) • Uncertain current and **future** benefits	• Introductory discounts • Direct management through announcement of products, services or features • Internalisation of externalities by users (co-create benefits, bear costs) - invite relationships • Leverage small networks - instituions, geographies, segments...
	Assemble group of partners* (with different degrees of openness) • Go-it-alone - compete to become standard (Microsoft - MS Office) • Formal standards - compete within standard (Ericsson, IBM - Bluetooth) • Open parts of the "standard" - intermediate position (Adobe - PDF)

> "*"Complementors - strengthen netowrk effects adding directly to initial base and managing expectations

Example: Waze

- Same-side network effects - the users contribute to the value proposition directly
- Data network effects - the users contribute to the value proposition indirectly through smarter algorithms
- Critical mass - free app drives faster user acquisition

Change

Change	Implications

In Information Goods
• Everything is being digitized
• Changes in degree - change in kind
	• Cheaper or free to produce information, through:
	  ◦ User-generated content
	  ◦ Machine-generated content
	  ◦ Support to understand and prediction

In Information Technology
• Exponential improvements
  ◦ Computation
  ◦ Communication
  ◦ Sensing
	• Pattern recognition and beyond
	• New areas of the economy and society where the economics of information will apply

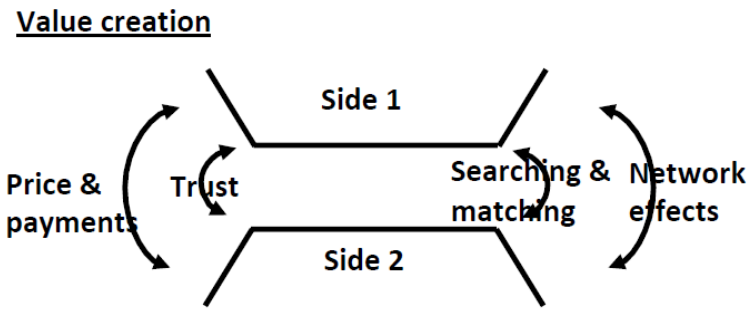
In Innovation	• Combining through the possibilities ◦ More eyeballs

- Informatiuon goods and technologies foster recombinant innovation
- Each development is a building block for future innovation
    - Leverage increased computation, communication and data

Chapter 3: Platform Strategies

- A platform is a product or a service that enables two or more customer groups to interact or transact.

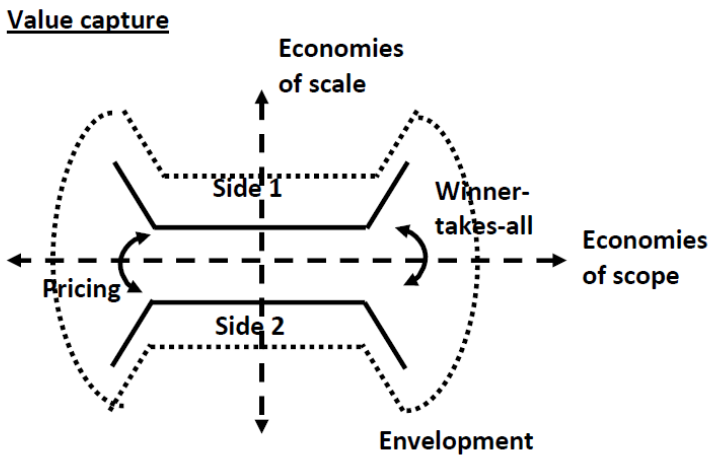
Value Creation



Example	Searching & Matching	Price & Payment	Building Trust	Network Effects
Ridesharing	Automatically matches drivers and riders	Set by platform	- Background and criminal checks - Service transparency - Refusual "insurance" - Privacy	- Driver availability - Stream of rides - Data improves algorithms
eBay	Customers search and sellers accept by default	Set by sellers or through auctions	Buyers rate seller's quality	Direct access to large base of buyers, fast and convenient purchases
Airbnb	One side expresses interest, both sides have to affirm acceptence	Set by sellers	Property damage insurance	Local accomodation availability, stream of guests
Upwork	One side expresses interest, both sides have to affirm acceptence	Initial quote, adjusted during service provisioning	Buyers and sellers rate each other's quality	Direct access to large base of freelancers, stream of projects
Categories	• **Centralized** automated by proprietary algorithms; assumes known preferences and substitutabilty • **Decentralized** - search participants, select	• **Set by platform** - requires enough relevant information; minimum friction and hassle • **Set by seller** - costs differ; sellers	• **External or internal screening** - occupational licensing, checks • **Online rating system** - useful but is a hassle and may be	• **Direct** - same side network effects • **Indirect** - cross-side network effects • **Data** - positive feedback loop with quality of service

Example	Searching & Matching	Price & Payment	Building Trust	Network Effects
	preferred, acceptence by default or affirmative	have superior information; auctions • **Bilateral bargaining** - buyers and sellers better positioned to know value (Evolve to platform with data)	biased, manipulated or faked • **Protection** should something go wrong - protect from transactions in which bad things happen	

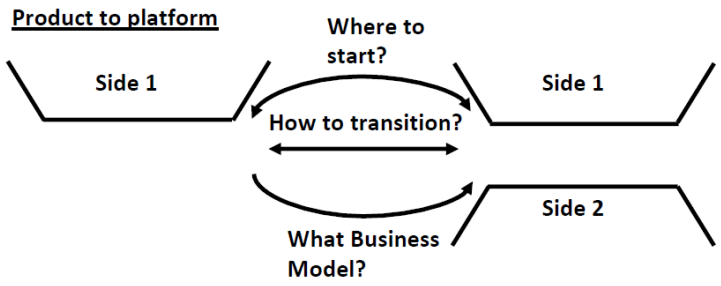
Value Capture



Example	Pricing	Winner-takes-all	Scale & scope economies	Envelopment
Xbox, Playstation	Charge both sides, subsidize customers – console price below cost, leverage switching costs	High: high switching costs; strong cross- and same-side network effects	New consoles are a huge investment	Amazon, Apple
YouTube Premium	Subscription – align how users experience with how they pay	High: strong cross-side and data network effects; moderate-high same-side network effects; moderate-high switching costs	• YouTube's original user base and capabilities valuable in this scenario • Leveraging investment in proprietary algorithms	Enveloper
Uber Eats	Commission	Moderate-high: network effects saturate locally;	• Uber's user base and capabilities	Enveloper

Example	Pricing	Winner-takes-all	Scale & scope economies	Envelopment
		moderate costs to using multiple platforms	valuable in this scenario • Leverage investment in proprietary algorithms	
Categories/Conditions	• Who to charge and/or who to subsidize? Charge both sides and/or subsidize one side? • When to charge? Charge before and/or with the transaction? • What behaviours are incentivized?	• High multi-homing costs • Strong network effects • Neither side values specialized feature (niching)	• Large investments in value creation features • Increase variety of products & services	Functionality included in multiplatform bundle • Change Business Model – e.g., focus on higher-margin*larger-volume segment • Find "bigger brother" – partner with threatened players • Sue – antitrust

Product to Platform



Where to start?	What business model?	How to transition?
• Defensible product – enough value rooted on unique core competences, to keep users from defecting to competition • Critical mass of users – enough frequent users • Flexible? Side with weaker need for other side	• Hybrid – product remains primary attraction; keep open mindset, turn hacks into opportunities • More of the same – product does not remain primary attraction – mixed for 3rd party – more customers, less costs, rival control (favouring own offerings) • Something different – more may be infeasible; may require more investment on capability and users (value and trust)	• Rapid customer conversion – adequate value; brand consistency; involve users in improvements; communicate closely • Lead company "conversion" – cultural reeducation to serve two different sets of customers • Avoid competitor "conversion" – manage scope of control/offer; exclusivity with "choking" partners; continue to add value to platform

Where to start?	What business model?	How to transition?

• Valve (game producer) > Steam (digital game distributor): popular game producer with proprietary updating and rights management system
• LinkedIn > LinkedIn Jobs - passive candidates are interesting, but not interested
• Google Search mid-90s > Search advertising 2000
	• Valve and Steam (from product feature as patch distribution to platform as game distribution): initially hybrid, increasingly more of the same.
	• iPhone jailbreaking and App Store
	• Google after search engine
		• Valve and Steam
		  • Value and consistency as online software distributor; marketplace to interact and trade game items
		  • Adding digital game distributor to traditional game producer
		  • Proprietary software; items marketplace

Example: Amazon -> Amazon Marketplace

Value Creation

- Searching & Matching: Customers search (A9, Google-like sophisticated system to connect shoppers with relevant products as quickly as possible) and sellers accept by default.
- Price & Payment: Sellers set the prices, but Amazon monitors them. Payments with debit and credit cards through Amazon's proprietary payments platform.
- Trust – Price monitoring, business name and address required, customer reviews.
- Network effects:
  - Value proposition for sellers: Direct access to massive consumer base not otherwise available; ability to access consumers without third-party sellers and potential to retain higher margins returns
  - Value proposition for buyers: Convenient purchase process; fast and reliable delivery; customer service
  - Data: Recommendation system

Value Capture

- Pricing – Sellers are charged fixed and variable closing fees, as well as referral fees; subscription available for purchasers
- Winner-takes-all – Moderate-high – relevant network effects, niching possible, multi-homing costs may be higher for sellers, lower for buyers
- Scale & scope economies – Huge for Amazon
- Envelopment – Amazon is the enveloper

Transition

- Where to start? Online store with huge scale and scope economies, strong value proposition, huge mass of users, with online store having weaker need for the other side.
- What business model? Hybrid, more of the same, rival control (central in US and EU investigations into Amazon)
- How to transition?
  - Conditions for rapid conversion – adequate value, brand consistency.
  - Sellers who were suppliers and competitors are now customers and there are two sets of customers – Amazon's obsessive customer focus required reeducation
  - Amazon continued to add value to the platform

Chapter 4: Ecosystem Dynamics

- **Digital Ecosystems**: interacting organizations that are digitally connected and enabled by modularity, and are not managed by hierarchical authority:

Enablers

Enablers	Capabilities	Economic Possibilities	Apple iOS & App Store
Digital Connection	• Connect a broad set of firms to deliver solutions to a broad set of customers	Variety attracts variety: • Customers value variety and ability to choose • Firms want to offer solutions for broad sets of needs (rather than focusing on one segment at a time) • Focal firms need to find complementors to offer services where the focal firm is not active	• Hardware and software where a set of apps can be downloaded, executed and interact • Notes, organisers, planners, editors, publishers, workflow, teamwork… <-> self-employed to corporate staff, students to faculty, junior to senior staff… • Apple cannot do it all alone, e.g., communication with Skype and WhatsApp came early • App developers can do the same, e.g., with complements to share, store, access and process different kinds of information goods

Modularity	• Create interdependent sets of offerings that can add value to the final customer	• An ecosystem orchestrator curates and manages a limited menu:
		  • defines the architectural arrangement where interchangeable and independently operating modules come together
		  • decides on rules of engagement and complementors to define the boundaries of the basket from which final customers choose
		  • ensures that interdependencies are dealt with, and common objectives are met
		• Final customers have some choice in picking from a limited menu
			• Embedded in iOS SDK; review safety, performance, business, design, legal guidelines; advance standards for specific areas, e.g., medical, home, car
			• Choice driven according to the different customers segments, e.g.: business, education, entertainment, kids, shopping, travel; medical, home, car sub-segments

How to Organise Economic Activity

Examples	Arrangement	Dynamics	Trade-offs
DARPA's battlefield mobile solutions	Market-based, arms-length procurement	• Final customers chooses and combines products, services and complements	• High flexibility/variety • High cost, slow (additional affort at integration)
Apple iOS & App Store	Ecosystem-based structure	• Final customer chooses from a curated set of ecosystem core components and complements • Orchestrator gives critical components; sets the terms of engagement; decides who can complement; does not fully own them • Organizations come together by co-specializing with each other, creating bonds that engender collaboration, without excluding competition	• Retain flexibility
Apple iOS pre-App Store	Purchase via integrated firm or supply chain	• Final customer buys package • System integrator or main supplier selects, pays and integrates complements or components	• Lower flexibility/variety • Inexpensive, fast (no additional effort at integration)

Complementor Relations

Categories	Sources of strength	Downsides	Assumptions	Apple iOS & App Store
Hard-power – inducements or coercion to get what you want	• Typically based on traditional sources of strength, such as market share, brand equity, control of distribution channels, or cash. • Reduce your dependence on complementors by producing some or all strategically significant complements in-house.	• Resource requirements • Discouragement of deep cooperation • Inspire backlash	• Extensive resources • Narrower range of complements (affordable cost) • Lower risk from specialization	• Strict guidelines; thorough review and blocking • Aggressive cut on payments • Epic Games lawsuit: Apple mostly won; may have lost on payment steering; halved the cut for small developers
Soft-power	• Use intangible resources to build legitimacy and trust • Provide complementors with market intelligence or	• Slower, more diffuse, and more cumbersome to wield • Precise effects can be difficult to	• Weaker resource requirements • Broader range of complements	• Apple Events align shortterm vision and hint at longer-term vision • Within its secrecy obsession, Apple shares

Categories	Sources of strength	Downsides	Assumptions	Apple iOS & App Store
	information about future product plans to foster cooperation. • Support institutions that serve an industry or professional community. • Enter strategic commitments to further a common goal, such as establishing a new standard or jointly developing a new technology.	trace	• High risk from specialization	private details with closer complementors • Part of +30 trade associations • Apple is hardly devoted to free and open standards; however, it uses them strategically, e.g., OpenCL (leverage a mix of types of processors), WebKit (a standard-compliant browser engine that became a standard)

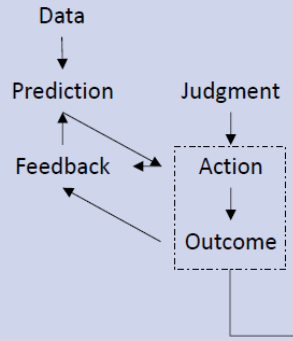
Key Strategic Questions

<table>
<tr><th>Participants</th><th>Interests and roles</th><th colspan="3">Key strategic questions</th></tr>
<tr><td>Customers</td><td>Desire for variety
Ability to choose</td><td rowspan="3">How is my sector being transformed as a result of digital ecosystems?</td><td colspan="2"></td></tr>
<tr><td>Firms</td><td>Desire for variety
Impossible to have all potential complements in-house</td><td rowspan="2">What pain point am I resolving for the final customer? How do I compare to others from the vantage point of complementors?
How can data and analytics capabilities improve value propositions (through better knowledge of customers, complementors, and bundles)?</td><td>What are my roles and goals in each ecosystem?</td></tr>
<tr><td>Orchestrator</td><td>Define architectural arrangement where modules come together
Decide on rules of engagement and complementors to define boundaries of basket from which final customers choose
Ensure that interdependencies are dealt with, and common objectives are met</td><td>How can I make sure that I am forming a true ecosystem rather than an ego-system (myself at the centre)?</td></tr>
</table>

Chapter 5: AI-Based Business Models

Creating value from AI

- AI enablers and capability
- Patterns and dynamics of opportunities
- Managerial implications

Change and AI	Prediction and judgement in tasks			
Enablers • Lower cost – exponential improvements in information technology • Higher value – data availability from increasing digitisation **Capability** • Prediction – abundant and inexpensive – incursion into ever more challenging problems		**Ease of description**	**Example**	**Moving target**
		High	Language translation	
		Partial	E-mail automation	Full
		Low	Medicine	Partial
Managerial challenges • Automation is more than just prediction – data collection, judgment, action • Value in tasks that are complementary to prediction – judgment, e.g., ethical judgment, emotional intelligence, creativity • Valuable managerial talents and expertise – how best to apply AI – current and future opportunities for prediction • Shift training, assess change and pace the shift, develop hybrid processes				

Examples	Data and prediction	Judgment and decision making	Outcome and feedback	Expaning prediction
Language tranlation	• Multiple translations of the same text • Propose translation of new text	• Light and focused review • Correct specific parts of translation	• Appropriate translation adopted • Feedback of corrections	• Learning from context and specific corrections
E-mail automation	• E-mail response exchanges • Propose several short responses	• Choose appropriate response • Select from list of choices	• Appropriate response sent • Feedback of choice selected	• Learning from choices to better describe judgment and automation
Medicine	• Annotated images of diagnostics, e.g. • Proposal of medical diagnostics	• Medical judgment • Effective therapy	• Better patient care • Feedback of decisions on care and clinical outcomes	• Learning from therapies and outcomes to better describe judgment and improve support

Delivering and capturing value from AI

- **Delivery** : operations - core, organization and operating model
- **Capture** : competition and strategy - perfomance drivers, positioning and resources - and risk governance

Business Model	Core	Resources and Capabilities	Organization and Operating Model	Performance Drivers	Positioning	Risk Governance
Traditional	• Business processes	Different across	• Focus and specialization	• Scale, scope and	• Focus on	• Well-established risk

Business Model	Core	Resources and Capabilities	Organization and Operating Model	Performance Drivers	Positioning	Risk Governance
	• Operated by workers, managers, process engineers, supervisors, customer service representatives • Reinforced by traditional information technology systems •	industries • Specialised vertical expertise • Standardised, predictable and repeatable tasks by people	underlie scale, scope and learning economies • Leading to siloed structures, reinforced by information technology	learning economies enabled by carefully defined core capabilities, limited by diminishing returns	traditional industry analysis • Stick with known businesses in well-understood industries	management, regulation and government intervention on less complex challenges
AI-Based	• AI Factory – decision-making as a science: predictions guide and automate operation and workflows 1. Data pipeline 2. Algorithms 3. Experimentation platforms 4. Infrastructure	• Universal • Network position, unique data, sophisticated analytics • Dislocation of some traditional capabilities, enrichment of other, require new capabilities	• Integrated core of data and unified, consistent code base • Avoid deep organisational divisions – confront silos, retool culture	• Faster scaling with AI processes • Larger scope enabled by connections to other digitized businesses • Ever more learning and improvement Initial delay – critical mass for network effects and cold start for data – followed by steep increase in value and share	• Connect businesses, aggregate flowing data and extract value through analytics and AI • Think beyond traditional industry context – highly connected AI-enabled services to transform and unleash value	Connected and frictionless • Information diffusion Reaction cascading Related risks • Spread of bias & misinformation • Failure in large unproven institutions • Impact of privacy and cybersecurity incidents • Market concentration, dislocations, inequality Multidisciplinary governance • Legal, corporate affairs • Deep thinking about

Business Model	Core	Resources and Capabilities	Organization and Operating Model	Performance Drivers	Positioning	Risk Governance
						legal and ethical challenges

Chapter 6: Data-Driven Business Models

Data, the new oil

- Gartner (2012) : "Big data is **high-volume**, **high-velocity** and **high-variety** information assets that demand cost effective, innovative forms of information processing for enhanced insight and decision making"."
- **uncertainty** of big data, namely veracity, referring to the reliability of a certain data type.
- **"Data is the new oil"**:
  - The exponential growth of data compounded by the internet, social media, cloud computing and mobile devices – or big data – has an embedded value potential that must be commercialized (Hartmann et al., 2016).

Building a Data-Driven, Smart Business Model

Smart Business:

- All players in the ecosystem are coordinated in an online network and use machine-learning technology to efficiently leverage data in real time;
- Most operational decisions are made by machines, allowing companies to adapt dynamically and rapidly to changing market conditions and customer preferences.

Becoming a smart business:

Automate decicion making:

- **Step 1 – "Datafy" every customer exchange**
  - Making sure every interaction yields as much data as possible; engage in creative datafication to enrich the pool of data the business uses to become smarter
  - Capture all information generated during exchanges and communications with customers and other network members as the business operates and then let the algorithms figure out what data is relevant.
  - Ex: datifying the bike renting service in China – QR code, payments, sensors
- **Step 2 - "Software" every activity**
  - Ensure that all business activities are mediated by software; software the business to put workflows and essential actors online
  - All activities are configured using software so that decisions affecting them can be automated
  - This way, live data can be collected naturally as part of the business process, building the foundation for the application of machine-learning technologies
  - Ex: Taobao has an instant message tool called Wangwang, through which buyers and sellers can talk to each other easily. Using the tool, the sellers greet buyers, introduce products, negotiate prices, and so on, just as people do in a traditional retail shop, but enabling data collection.
- **Step 3 - Get data flowing**

    - Using API's and other interface protocols to ensure smooth interaction among software systems; institute standards and APIs to enable realtime data flow and coordination
    - Communication standards, such as TCP/IP, and application programming interfaces (APIs) are critical in getting the data flowing among multiple players while ensuring strict control of who can access and edit data throughout the ecosystem.
    - Ex: Taobao's recommendation engines need to work with the inventory management systems of sellers and with the consumer-profiling systems of various social media platforms; Setting the tight incentives for companies to share data
- **Step 4 – Apply the algorithms**
    - Apply machine learning to make sense of data in real time and to generate "smart" business decisions
    - The firm must create models and algorithms that make explicit the underlying product logic or market dynamics that the business is trying to optimize
    - Ex: In Taobao, when customers log on, they see a customized webpage with a selection of products curated from the billions offered by our millions of sellers. The selection is generated automatically by Taobao's powerful recommendation engine to optimize conversion rates

Data Driven Business Models (DDBMs)

- "A business model relying on data as a key source"
- DDBM is not limited to companies conducting analytics, but includes companies that are "merely" aggregating or collecting data.
    - A company may sell not just data or information but also any other product or service that relies on data as a key resource.
    - Although any company uses data in some way to conduct business, these companies use data as a key resource for their business model

The DDBM framework - variables

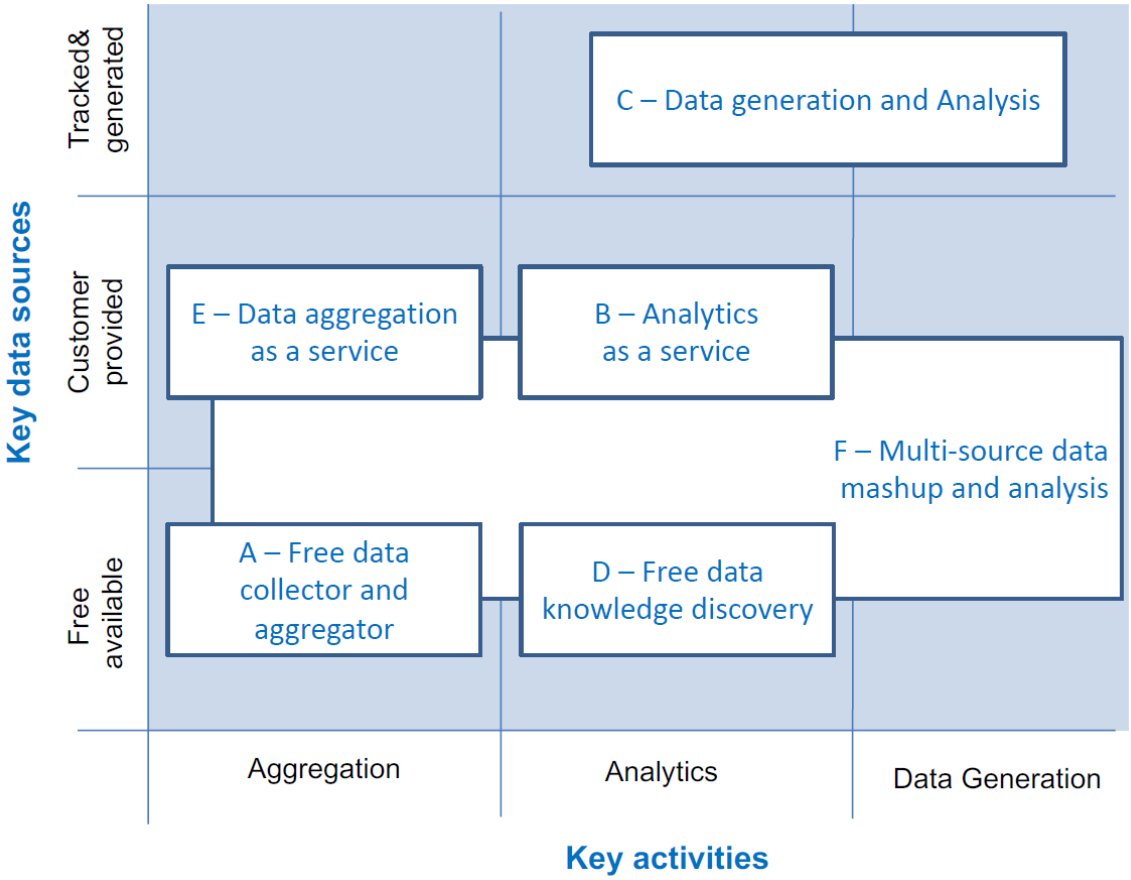
Data Sources	Key Activities	Offering	Target Customer	Revenue Model

• Internal
  ◦ Existing data
  ◦ Self-generated data
  ▪ Crowdsourcing
  ▪ Tracked, generated, or other
• External
  ◦ Acquired data
  ◦ Customer provided
  ◦ Free available
  ▪ Open data
  ▪ Social media data
  ▪ Web-crawled data
	• Data generation
	  ◦ Crawling
	  ◦ Tracking and crowdsourcing
	• Data acquisition
	• Processing
	• Aggregation
	• Analytics
	  ◦ Descriptive
	  ◦ Predictive
	  ◦ Prescriptive
	• Visualization
	• Distribution
		• Data
		• Information/Knowledge
		• Non-data product and service
			• B2B
			• B2C
				• Asset sale
				• Licensing
				• Usage fee
				• Subscription fee
				• Advertising

The DDBM framework - building blocks

1. Key resources – DDBM have data as a key resource (e.g. internal, external)
2. Key activities - For DDBMs these activities must be related to the key resource data (e.g. data generation, acquisition, aggregation, analytics...).
3. Value proposition – the VP is data driven, either as data or information/knowledge
4. Customer segments – either B2C or B2B
5. Revenue model – renting, subscription fee, usage fee...
6. Cost structure

Type of DDBMs



Type A - Free data collector and aggregator:

Key data sources	a vast number of different, mostly free, data sources: e.g. Social media data, proprietary acquired data, and crowdsourced data
Key activities	collecting and aggregating data from a vast number of different, data sources, and then distributing it, for example, through an API. To a lesser extent, also, data crawling and visualization.
Value proposition	easy, reliable access to a large number of different data sources through a single API
Customer segments	B2B and B2C

Revenue model	a mixture advertising, brokerage fees, subscription, and usage fees.
Example	• AVUXI https://www.avuxi.com/topplace • Gnip https://en.wikipedia.org/wiki/Gnip

Type B - Analytics as a service:

Key data sources	data from the company' customers and external datasets
Key activities	companies conduct analytics on data provided by their customers and provide access to the analytics results via an API: Collecting customer data; Distributing data through API development; Visualization of the analytics results
Value proposition	information/knowledge, insights generated by data analytics with customer data: Improving marketing activities, improving customer service and relationships, increase in sales
Customer segments	B2B
Revenue model	predominantly based on subscription or usage fees.
Example	• https://shield.com (Sift Science)

Type C - Data generation and analysis:

Key data sources	data generated by the company: Self-generated Data - Tracked, generated and other
Key activities	generating data rather than relying on existing data, and performing analytics on the data: Data generation - Tracking and crowdsourcing, Analysis, Aggregation
Value proposition	a combination of data and analytics, such as web analytics services; leads….
Customer segments	B2B, B2C
Revenue model	usage fee-based models, asset sales (devices)
Example	• https://www.gosquared.com

Type D - Free data knowledge and discovery:

Key data sources	free available data sources: Stack Overflow; Q&A websites; Review sites; Booking websites; Social media (Twitter, Facebook); Stock markets
Key activities	performing analytics on free available data (and crawl data from the web)

Value proposition	Aggregate large amounts of data and identify or predict trends, viral contents and key influencers for any topic in real-time
Customer segments	B2B, B2C
Revenue model	subscription, usage-fee-based models, advertising and brokerage fees;
Example	• https://trendspottr.com

Type E - Data aggregation as a service:

Key data sources	data from the company's customers
Key activities	aggregating data from multiple internal sources for their customers; provide data through various interfaces and visualize it
Value proposition	aggregated data from multiple customer sources; organize and distribute data, which simplify customers life
Customer segments	B2B (who possess data that needs organising)
Revenue model	predominantly based on subscription or usage fees.
Example	https://www.getalma.com

Type F - Multi-source data mashup and analysis:

Key data sources	A combination of free data (from web scrapping) and customer provided
Key activities	aggregating data provided by their customers with other external, mostly free, available data; Sourcing and performing analytics on this data: Data aggregation + data analytics + data generation (Web Scrapping)
Value proposition	using other external data sources to enrich or benchmark customer data analytics
Customer segments	mostly B2B
Revenue model	mostly Subscription based
Example	https://www.ampplaybook.com

Chapter 7: Software as a Service and Servitization Business Models

IoT and Service Business Models

- **Services** are activities one party offers to another, involving time-based efforts to achieve desired outcomes for people, objects, or assets under the customer's care. Customers spend money, time, and effort with the expectation of deriving value from accessing tangible goods, labor, expertise, facilities, networks, or systems without owning the physical aspects of the service provided.
- **From services to service logic**:
  - Service as a perspective: the application of competences for value co-creation
  - All products are service - they are appliances for service provision
  - 4 key aspects:
    - A1: Service is the essential basis of exchange, indicating that all businesses, regardless of industry, fundamentally provide a service.
    - A2: The customer is an active participant in creating value, emphasizing that value is co-created with the customer rather than embedded in the product by the firm alone.
    - A3: All economic actors are resource integrators, suggesting that both providers and consumers are involved in combining different resources to create value.
    - A4: Value is uniquely and phenomenologically determined by the beneficiary, meaning that value is subjective and perceived differently by each customer based on their experiences and context.
- **Value co-creation**
  - Value is uniquely and phenomenologically determined by the beneficiary (customer)
  - Viewed from a network perspective, value is co-created through the integration of resources, including a full range of market-facing, private and public actors
    - Organizations cannot pre-produce and deliver value to customers
    - Organizations can only create value propositions that customers can use to co-create value
- **Service Systems** are configurations of people, technology and other resoucers that interact to co-create value.
- **Service innovation** can be defined as the creation of new and/or improved service offerings, service processes, and service business models.
- **Business model innovation** requires systematic exploration of reconfigurations of resources and the consequences for value-proposition design
  - Improving existing offerings
  - Creating new offerings reconfiguring ecosystem partners
- Service Science as one of the 100 key IBM inventions in its 100 years of history
- **IoT technologies and services**
  - **Endpoints** - are the single-function sensors and actuators that reach out and touch the world around them, monitoring for changes and providing feedback to adjust to thosem changes (e.g. temperature sensor)
  - **Simple hubs** – devices that connect endpoints to broader networks (e.g. connected home thermostat)
  - **Integrating hubs** - relatively complex devices that connect simple hubs and outside connections, providing a diverse array of services are that fit more or less seamlessly together (e.g. home energy management system).
  - **Network and cloud services** - provide the infrastructure of the Internet of Things. They deliver the seamless and transparent connection to the Internet that hubs require, along with the cloud computing power needed to collect, store, and analyze vast amounts of data from myriad endpoints.
  - **Enhanced services** – services that make use of the information collected and analyzed by other platforms and services to deliver broad-based interactive functions (e.g. advanced systems that integrate and build upon the information of multiple hubs to develop more complex services, such as positive energy blocks)

Enablers: Building the Technology

- Primarily technology-oriented companies, such as Cisco, HP, IBM, and Intel.
- Build and maintain the critical IoT infrastructure that allows
  Engagers to create their own connected services.
- Their offerings include the endpoint, hub, and network and cloud service technologies: devices, connectivity hardware and infrastructure, computing and data storage systems, software platforms, and more.
- The systems they produce—intelligent endpoints, hubs, cloud services, and platforms—must not just provide connections, but manage and bill for those connections, and allow users to customize and develop their own services.

Engagers: Connecting to Customers

- Provide the direct link between the IoT and the market.
- They use the endpoint, hub, platform, and service offerings created by the Enablers to produce services for consumers and businesses (e.g. home energy management system providers, alexa).
- Engagers tend to be most active in hubs and connected services.
- They gain insight into customer needs and expectations, and use human-centered design to develop compelling services that change how customers behave.
- Moving beyond selling products to offering a powerful and attractive customer experience

Enhancers: Creating New Value

- Provide integrated services that reframe and repackage the products and services of the Engagers.
- Find new ways of creating and extracting value from the data, relationships, and insights generated from IoT activity (e.g. smart city solutions).

What is the impact of IoT on existing manufacturing companies?

- **Digital Servitization** is the transition toward smart product-service-software systems that enable value creation and capture through monotoring, control, optimization, and autonomous function. This concept reshapes the conventional idea of products as standalone concepts, instead emphasizing the connectivity between products (IoT) and between companioes (manufacturers, operators and customers).
- Product services systems
  - **Product Oriented Service:**
    - Maitenance and repair
  - **Use Oriented Service:**
    - Leasing
    - Renting
    - Sharing
    - Pooling
  - **Result Oriented Service:**
    - Functional results
    - Activity management
- **Types of digital servitization business models**
  - **Product-oriented service provider**: Providing products and add-on services
  - **Industrialiser**: Offering product and service modularity for efficiency and customization
  - **Customized integrated solutions provider**: Offering integrated product service solutions that are highly customized
  - **Outcome provider**: Selling outcomes instead of products and service

- **Platform provider**: Fully-fledged digitally enabled service where the company is a platform provider that connects various providers and customers

Product-oriented service provider

- Provides products and add-on services, with a traditional product business model.
- The role of remote diagnostics depends on the company technology strategy, but, in this definition, it does not affect product or add-on service pricing, which is still based on sold units.
- Focuses on capabilities and processes required for efficient design manufacturing, and delivery.
- The service portfolio is mainly based on basic offerings—so-called add-on services.
- Often, power is on the customer side, particularly in the case of simpler products and services where the manufacturer switching cost is low.
- Transaction costs are reduced by offering standard products and add-on services that are fairly easy to sell and purchase.

Industrialiser

- Emphasizes product and service modularity to improve efficiency despite increasing demands by customers to customize offerings to their needs.
- Develops modularity to combine increase efficiency of product-service delivery and customization of solutions
- In terms of strategic capabilities, it focuses on combining effective solution customization with efficient order delivery by developing capabilities in modularity.

Customized integrated solutions provider

- Offer integrated product-service solutions, often entailing relatively high levels of solution customization
- Provision of availability sets relatively high standards of remote diagnostics, requiring accurate data acquisition, analytics, and implementation.
- However, the customers of companies that apply this business model may still want to purchase integrated solutions with performance guarantees and availability instead of pure outcomes
- Some companies using this business model may offer monitoring, control, optimization and crewless autonomy as a service.
- This requires the development of capabilities in digitalization (e.g., capabilities in monitoring, control, optimization, and autonomous vehicles). These capabilities build on sales, design, and delivery of integrated lifecycle solutions.
- Development of integrated solutions requires in-depth knowledge of not only customers but also other partner company equipment and processes, as well as the integration of technologies (e.g., software beyond firm boundaries).

Outcome provider

- Solution providers that sell outcomes instead of products or services . Instead of selling products, providers retain ownership and sell the value created by the product (e.g. Rolls-Royce's powerby- the-hour concept).
- Offering such solutions requires the capability of accurately measuring the generated performance, often entailing accurate monitoring and control of the product or fleet of products.
- Being able to continuously measure and optimize the equipment or processes is a critical underlying requirement of outcome providers.
- Strategic capabilities to sell and implement outcome-based contracts, suggesting capabilities in detailed monitoring, control and optimization of even autonomous solutions.
- Implementation of these systems, require also in-depth collaboration between ecosystem actors.

Platform provider

- Fully-fledged digitally enabled service business model where the company is a platform provider that connects various providers and customers (e.g. car-sharing platform).
- This transformation entails a full transition from car manufacturer to provision of (car sharing) services and may require a software platform for multiple different providers and customers.
- Platform providers need the digital platform, numerous providers and customers, and, to achieve this, a strong brand name. A digital platform is needed not only to share information and facilitate exchanges but also to monitor, control, and optimize services and products.
- The power position of platform providers is potentially strong because of the data they collect on the usage of services. Platform

Energy service business models

- Energy supply contract – selling hot water or heat instead of the energy
- Energy service financing – acting as project developer, financing the primary conversion systems as well as taking responsibility for their O&M (but customers still keep ownership)
- Energy performance contracts – providing guarantees for measured and verified performance savings from one or more final energy services such as heating or illumination.
- Energy service agreement - a variant of EPCs that involve integrated financing of energy saving measures, backed by a long-term performance guarantee (off-balance sheet)
- Energy as a Service (EaaS) - models, bundling the upstream energy supply into a single final service payment, e.g., households may pay a comfort charge relating to room.

Chapter 8: Omnichannel Business Models