

Economics of Innovation

Topic 5 Digital Transformation

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Slides are taken/adapted from different sources In particular in the second part:
D.R. Rogers, *Digital Transformation Playbook*
Columbia Business School Publishing, 2016

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Drivers of Digital Transformation



Social channels are being leveraged by businesses to interact with their customers.



Mobility is shifting the focus of application development away from the traditional “desktop- based” approach to a “mobile-first” one.



Analytics is enabling enterprises to explore large volumes of data to gain insights and drive strategic decisions.

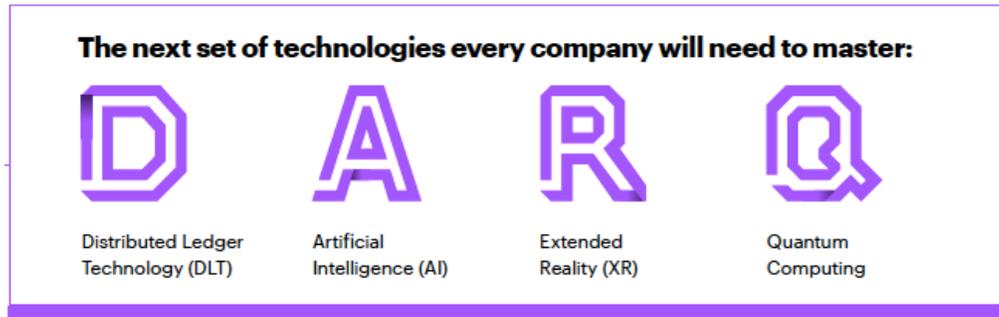


Internet of Everything (IoE) is opening significant opportunities by connecting everything to internet.



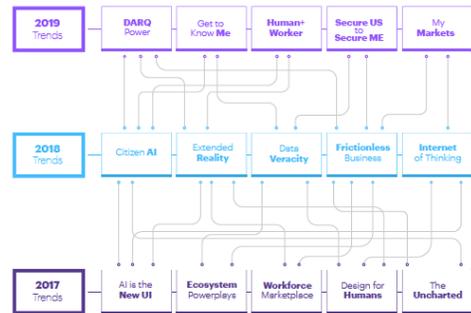
Cloud computing is reshaping the way software and services are sold and delivered.

Drivers of Digital Transformation



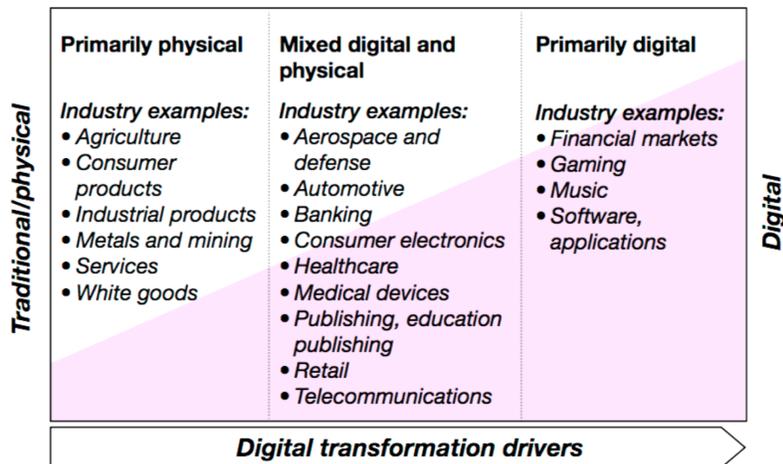
TREND
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DARQ Power
Understanding the DNA of DARQ
New technologies are catalysts for change, offering businesses extraordinary new capabilities. Distributed ledger technology, artificial intelligence, extended reality, and quantum computing will be the next set of new technologies to spark a step change, letting businesses reimagine entire industries.



Digitalization of Product and Service

Degree of product and service digitization



Source: IBM Institute for Business Value analysis.

Internet and competitive strategy

Porter defines industry attractiveness as “long term return on invested capital”

... depending on the level of the competitive forces playing in the industry.

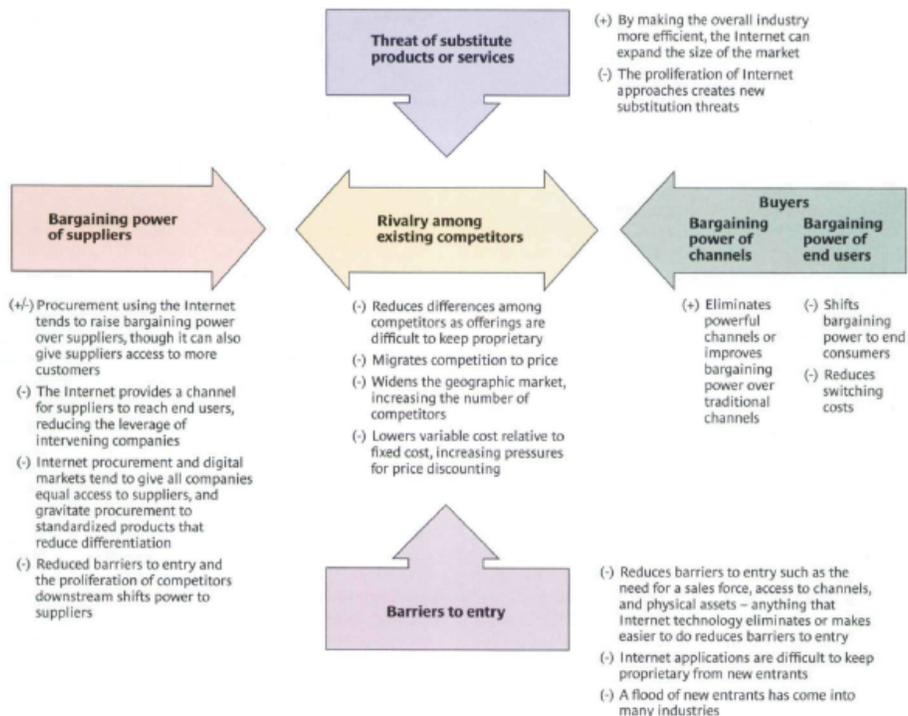
Internet is changing the scenario in many industries as it can be used to:

Operate at a lower cost, increasing operational effectiveness

Command a premium price, achieving a unique strategic positioning

At a first step this analysis can be done according to a traditional approach but the increase of the digitalization call for a ridefinition of the business models

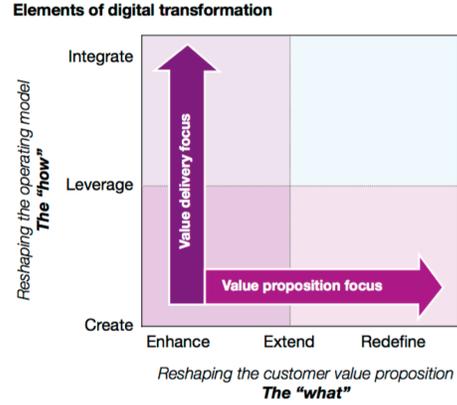
Internet and industry structure (Porter)



Dimensions of digital transformation

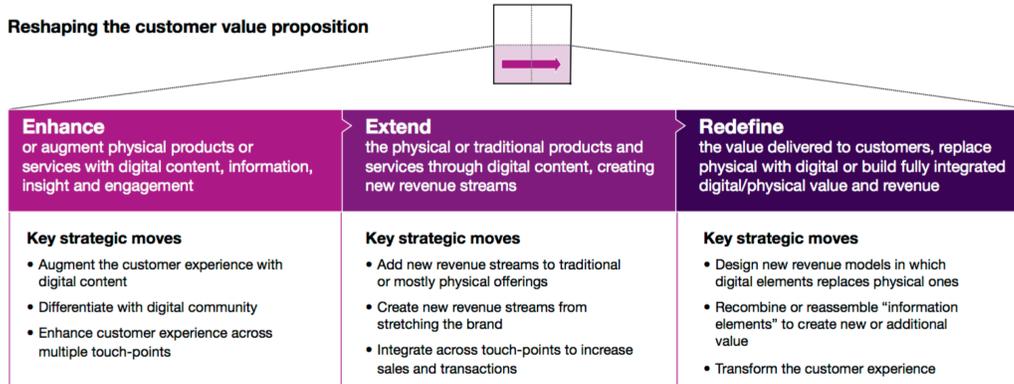
What do businesses need to do to get ahead of the widespread forces for change in our digital age?

- a. Reconfiguring the customer value proposition (what is being offered)
- b. Reshaping the operating model (how it is delivered).



Source: IBM Institute for Business Value analysis.

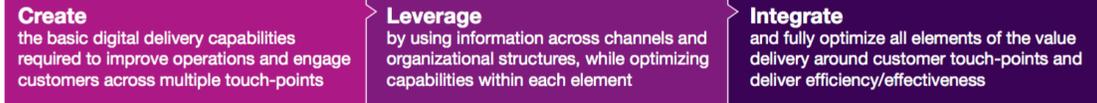
Dimensions of digital transformation



Source: IBM Institute for Business Value analysis.

Dimensions of digital transformation

Reshaping the operating model



Create
the basic digital delivery capabilities required to improve operations and engage customers across multiple touch-points

Leverage
by using information across channels and organizational structures, while optimizing capabilities within each element

Integrate
and fully optimize all elements of the value delivery around customer touch-points and deliver efficiency/effectiveness

Source: IBM Institute for Business Value analysis.

The Enterprise IT system is a strategic leverage for the “How” of the digital transformation, as long as there are these conditions:

- deploy a consistent technology platform
- keep on innovating and coming up with better ways of working
- use the IT platform to propagate these business innovations widely and reliably.

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Categories of IT applications

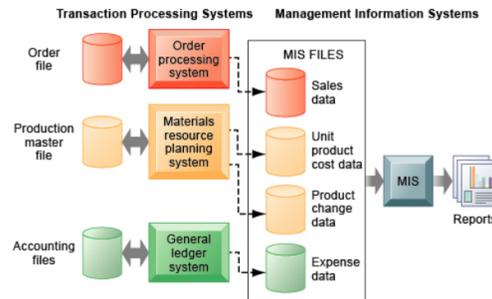
IT applications can be classified based on their impact on activities and processes

IT Category	Definition	Characteristics	Examples
Function IT	IT that assists with the execution of discrete tasks	<ul style="list-style-type: none"> • Can be adopted without complements • Impact increases when complements are in place 	Simulators, spreadsheets, computer-aided design, and statistical software
Network IT	IT that facilitates interactions without specifying their parameters	<ul style="list-style-type: none"> • Doesn't impose complements but lets them emerge over time • Doesn't specify tasks or sequences • Accepts data in many formats • Use is optional 	E-mail, instant messaging, wikis, blogs, and mashups
Enterprise IT	IT that specifies business processes	<ul style="list-style-type: none"> • Imposes complements throughout the organization • Defines tasks and sequences • Mandates data formats • Use is mandatory 	Software for enterprise resource planning, customer resource management, and supply chain management

Source: McAfee, Mastering the three worlds of IT

Types of Information Systems

- Transaction Processing System (TPS)
Goal: increasing efficiency/productivity;
Data source: internal;
Data: very detailed.
- Management Information System (MIS)
Goal: increasing efficiency/effectiveness;
Data source: mainly internal;
Data: synthesis, with possible drilling-in.
- Executive Support System (ESS)
Goal: improve effectiveness;
Data source: mainly external;
Data: very broad (potentially detailed on key topics).



ERP - Definition

ERP is an integrated Enterprise IT system.

It has grown from MRP (Material Requirements Planning) driven by a need for stronger integration between the functional enterprise silos that dominated firms (legacy IT systems).

ERP (enterprise resource planning):

“framework for organizing, defining, and standardizing the business processes necessary to effectively plan and control an organization so the organization can use its internal knowledge to seek external advantage”.

Source: The Eleventh Edition of the APICS Dictionary (Blackstone and Cox, 2005)

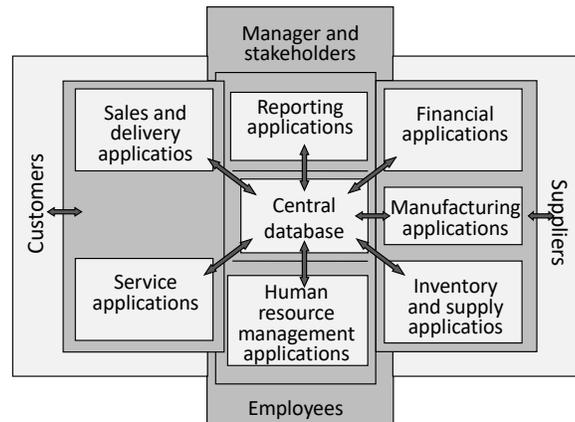
With the rise of e-Business and the need to integrate multiple sources of information within the enterprise, ERP software has emerged as the standard reference for enterprise IT systems as well as the required building block for digital transformation.

ERP System structure

ERP provides the backbone for an enterprise-wide information system.

At the core of this ES is a central database which draws data from and feeds data into modular applications that operate on a common computing platform

ERP is based on a common business model standardizing business processes and data definitions into a unified IT environment.

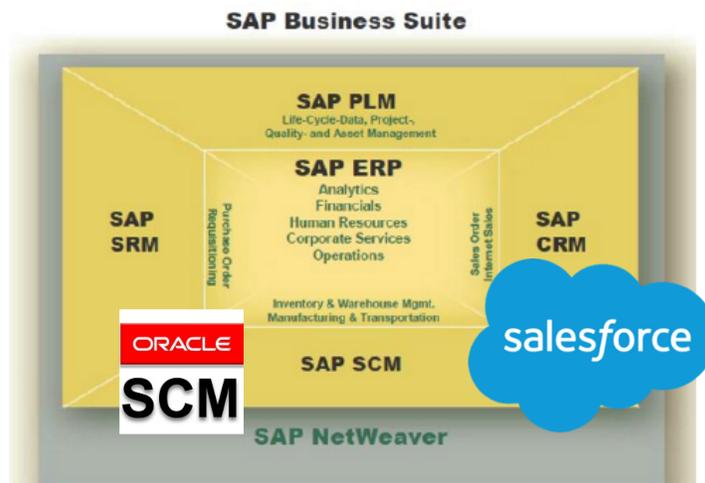


Source: Davenport, Putting the Enterprise into the Enterprise System

ERP system as an extended platform

ERP systems can be used as an extended platform to integrate:

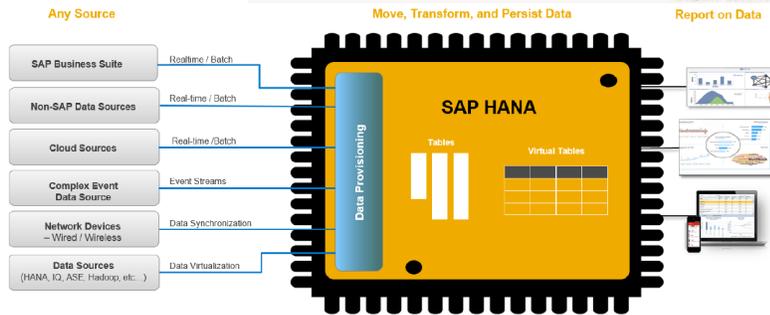
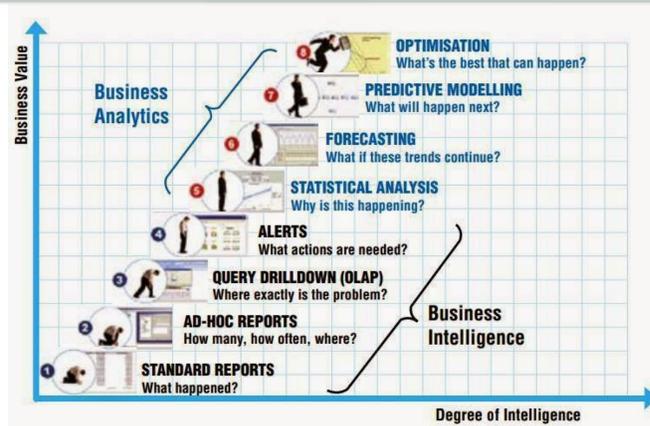
1. Downstream: CRM
Customer Relationship Management
2. Upstream: SRM
Supplier Relationship Management
3. Development: PLM
Product Life-cycle Management
4. Operations: SCM
Supply Chain Management



ERP can also be the platform for

- Business Analytics
- Process Mining
- Enterprise Social Media
- interface with IoT (Internet of Things)

... towards business analytics

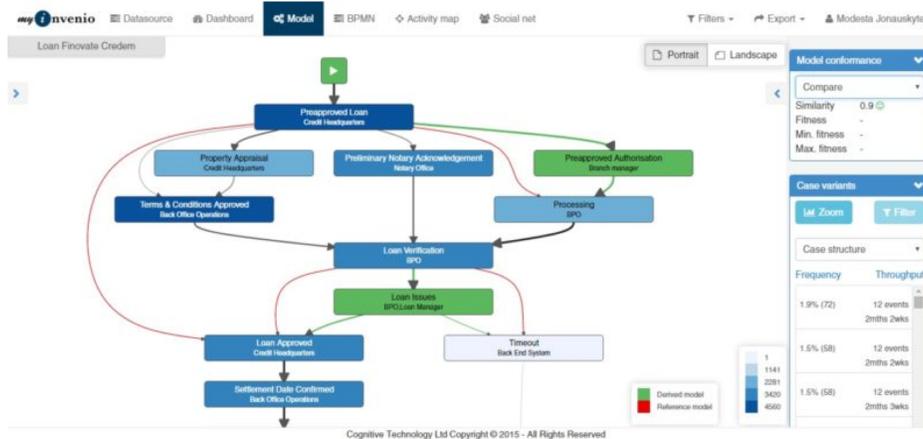
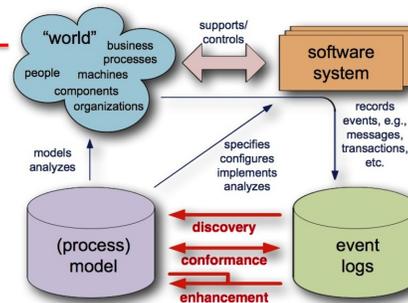


... towards process mining

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QPR

Dare to improve.



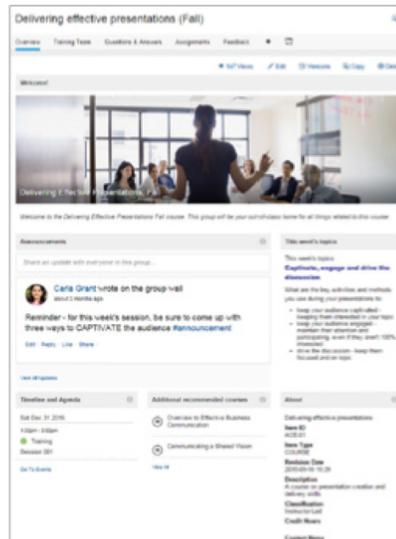
... towards social media features

SAP Jam Collaboration for HR Revolutionize work, simplify your business

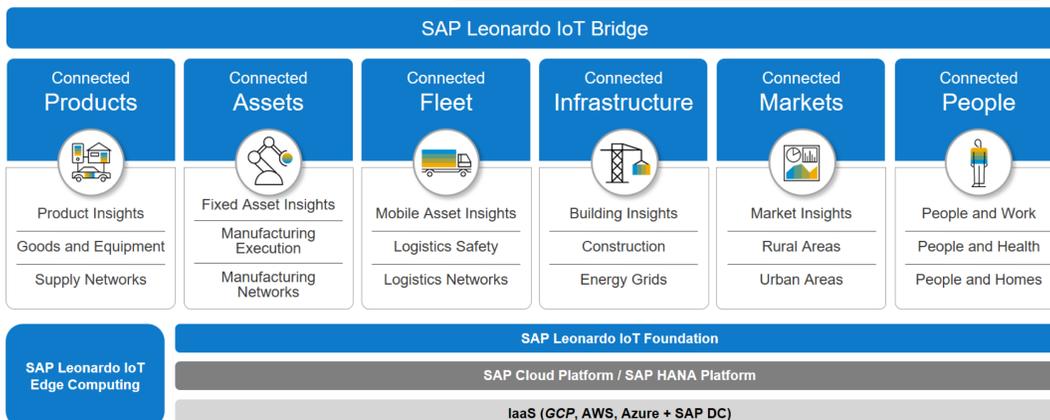
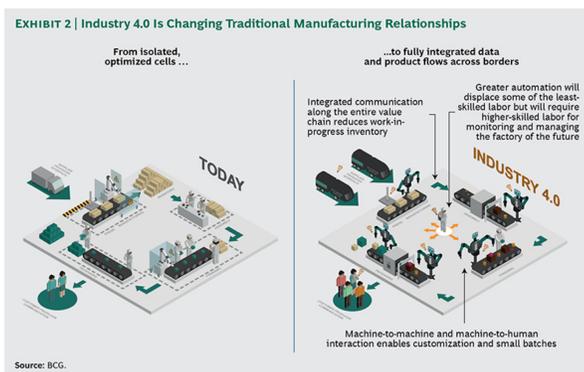
Social collaboration streamlines HR business processes across your organization – bringing people together to drive companywide results.

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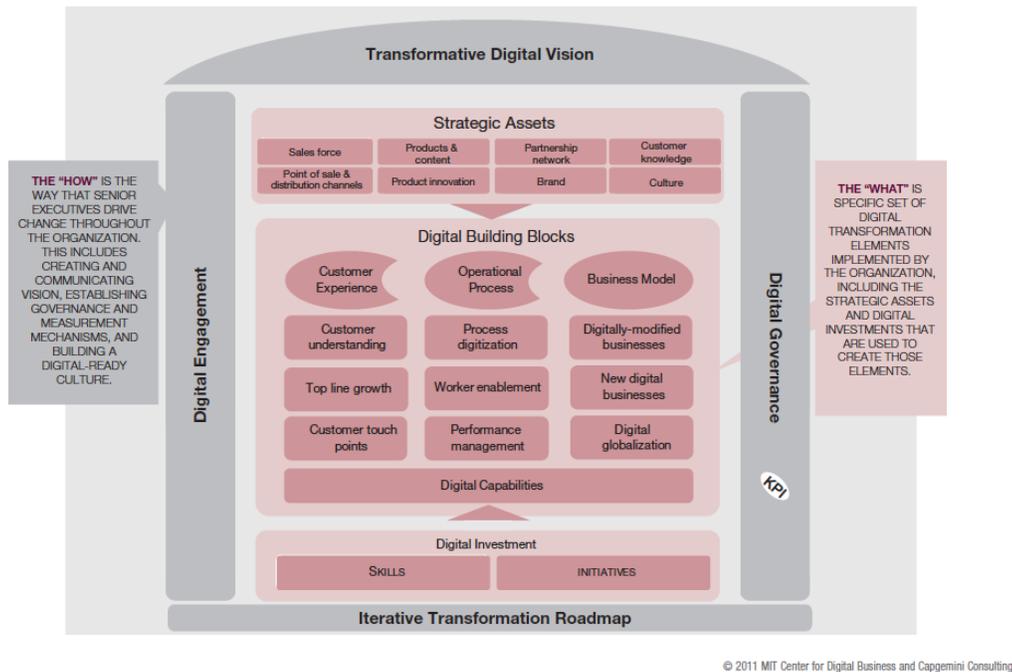
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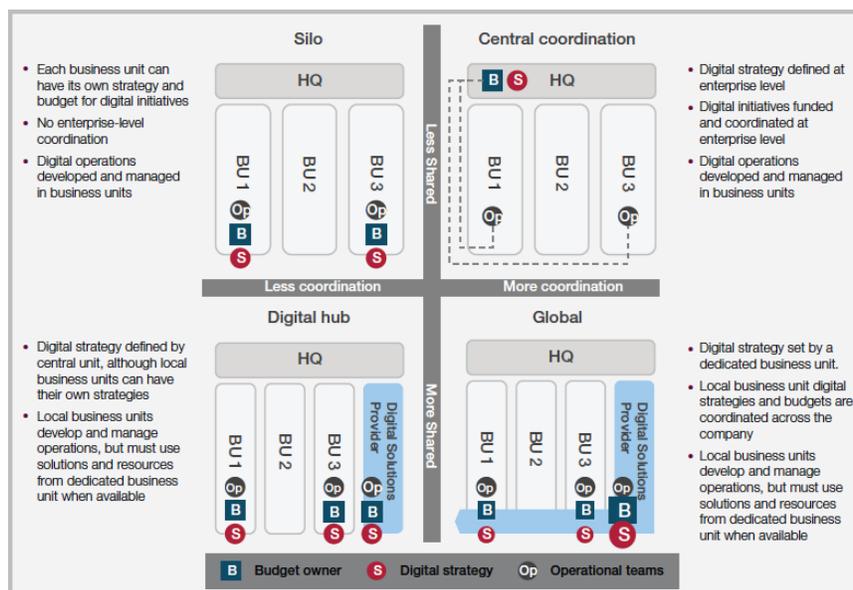
... towards Industry 4.0 IoT



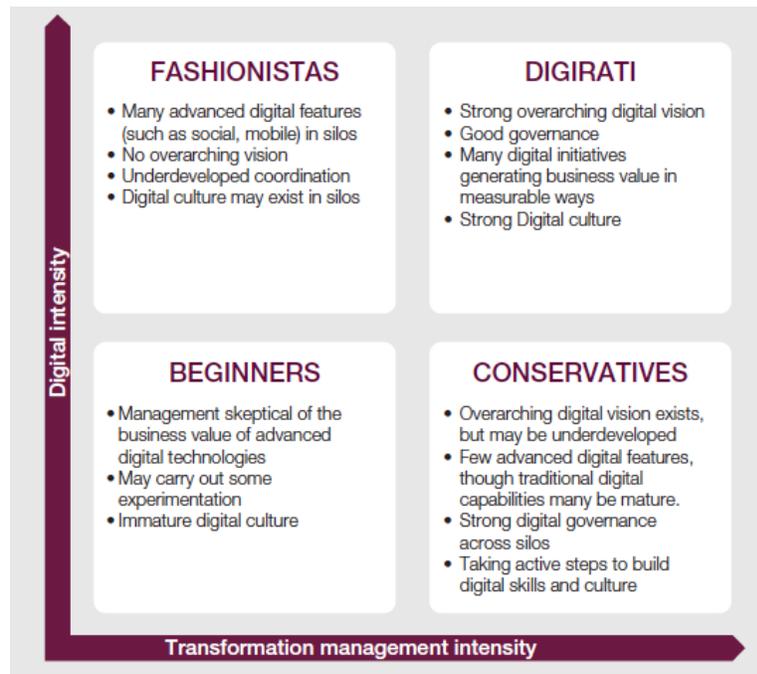
Dimensions of digital transformation



Coordination models for digital transformation



Approaches to digital transformation

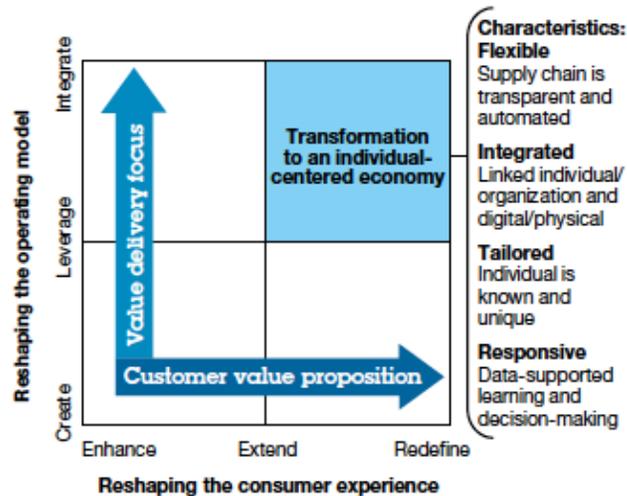


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The essence of digital transformation

Digital transformation framework



Source: IBM Institute for Business Value analysis; "Digital transformation: Creating new business models where digital meets physical." IBM Institute for Business Value.

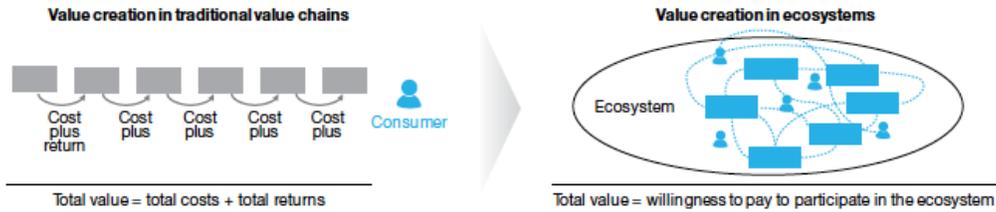
The value chain/industry changes

Value chains will fragment

New technologies will make value chains more transparent and easier to decompose (see Figure 4). In the past, value chain disruptions often involved replacing whole value chains or big chunks of value chains, such as replacing traditional banking processes with Internet-based, virtual banking. Next generation value chain disruption will involve contesting more specific elements or functions within value chains.

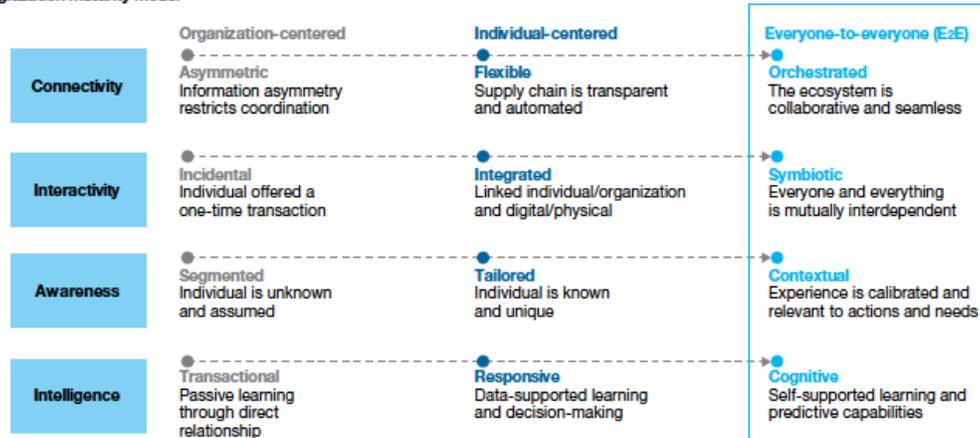
Industries will converge

As specific functions in value chains are contested, new competitors will emerge. Functional specialists from one industry will begin competing in specific value chain functions of other industries. This cannibalization across industries will begin to drive industry convergence (see Figure 5).



Digital transformation trends

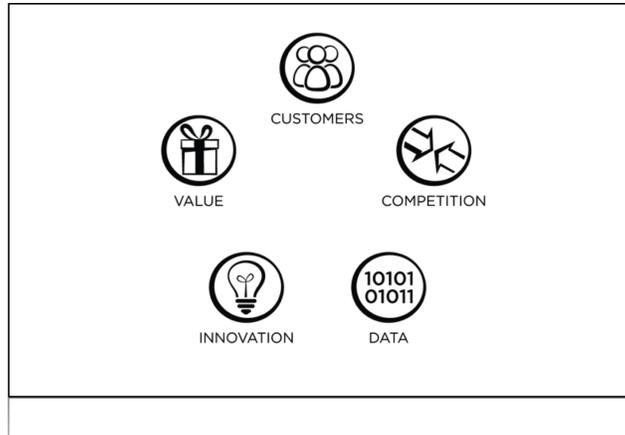
Digitization maturity model



Source: IBM Institute for Business Value analysis.

Five Domains of Strategy that Digital is Changing

Across these five domains, digital technologies are redefining many of the underlying principles of strategy and changing the rules by which companies must operate in order to succeed.



	From	To
 CUSTOMERS	Customers (chapter 2) Customers as mass market Communications are broadcast to customers Firm is the key influencer Marketing to persuade purchase One-way value flows Economies of (firm) scale	Customers as dynamic network Communications are two-way Customers are the key influencer Marketing to inspire purchase, loyalty, advocacy Reciprocal value flows Economies of (customer) value
 COMPETITION	Competition (chapter 3) Competition within defined industries Clear distinctions between partners and rivals Competition is a zero-sum game Key assets are held inside the firm Build product with unique features and benefits A few dominant competitors per category	Competition across fluid industries Blurred distinctions between partners and rivals Competitors cooperate in key areas Key assets reside in outside networks Build platforms with partners who exchange value Winner-takes-all due to network effects
 DATA	Data (chapter 4) Data is expensive to generate in firm Challenge of data is storing and managing it Firms only make use of structured data Data is managed in operational silos Data is a tool for optimizing processes	Data is continuously generated everywhere Challenge is turning data into valuable information Unstructured data is increasingly usable and valuable Value of data is in connecting it across silos Data is a key intangible asset for value creation
 INNOVATION	Innovation (chapter 5) Decisions made based on intuition and seniority Testing ideas is expensive, slow, and difficult Experiments conducted infrequently, by experts Challenge of innovation is to find the right solution Failure is avoided at all cost Focus is on the "finished" product	Decisions made by testing and validating Testing ideas is cheap, fast, and easy Experiments conducted constantly, by everyone Challenge of innovation is to solve the right problem Failures are learned from, early and cheaply Focus is on minimum viable products and iterating after launch
 VALUE	Value (chapter 6) Value proposition defined by industry Execute your current value proposition Optimize your business model as long as possible Judge change by how it impacts your current business Market success allows for complacency	Value proposition defined by changing customer needs Uncover the next opportunity for customer value Evolve before you must, to stay ahead of the curve Judge change by how it could create your next business "Only the paranoid survive"

Customer



CUSTOMERS

- In the digital age, we are moving to a world best described not by mass markets but by customer network.
- Customer are dynamically connected and interacting in ways that are changing their relationships to business and to each other and shaping business reputations and brands.
- Customer use digital tools to discover, evaluate, purchase and use products and how they share, interact and stay connected with brands.
- Therefore, businesses should rethink of their traditional marketing funnel and reexamine their customers' path to purchase.

Competition



COMPETITION

- How businesses compete and cooperate with other firms.
- Industry boundaries are blurring.
- A major shift in the locus of competitors.

Data



-
- How business produce, manage, and utilize information.
 - Data generates from every conversation, interaction, or process inside or outside business (think about social media, mobile services, sensors,...)
 - The “big data” tools allow firms to make new kinds of predictions, uncover unexpected patterns in business activity and unlock new sources of value.
 - Data is a vital part of how every business operates, differentiates itself in the market, and generates new value.

Innovation



-
- The process by which new ideas are developed, tested, and brought to the market by businesses.
 - Traditionally, innovation mainly focuses on finished products, where market testing was difficult and costly, and the cost of failure was high.
 - Digital technologies enable a very different approach to innovation based on rapid experimentation.
 - Digital technologies makes it easier and faster to test ideas, having market feedback. Assumptions are repeatedly tested based on validation by real customers.
 - The focus is on minimum viable prototypes that maximize learning while minimizing cost.

Value



- Traditionally, a firm's value proposition was seen as fairly constant. A successful business was one that found a clear value proposition, found a point of market differentiation, and focus on executing and delivering the best version of the same value proposition to its customers.
- In the digital age, we can observe changing value propositions and disruption by new competitors.
- Any new technology may be a way to extend and improve the value proportions.
- Businesses need to seize emerging opportunities!

THE DIGITAL TRANSFORMATION PLAYBOOK

DOMAINS	STRATEGIC THEMES	KEY CONCEPTS
 CUSTOMERS	<i>Harness customer networks</i>	<ul style="list-style-type: none">• reinvented marketing funnel• path to purchase• core behaviors of customer networks
 COMPETITION	<i>Build platforms, not just products</i>	<ul style="list-style-type: none">• platform business models• (in)direct network effects• (dis)intermediation• competitive value trains
 DATA	<i>Turn data into assets</i>	<ul style="list-style-type: none">• templates of data value• drivers of big data• data-driven decision making
 INNOVATION	<i>Innovate by rapid experimentation</i>	<ul style="list-style-type: none">• divergent experimentation• convergent experimentation• minimum viable prototype• paths to scaling up
 VALUE	<i>Adapt your value proposition</i>	<ul style="list-style-type: none">• concepts of market value• paths out of a declining market• steps to value prop evolution

Harness Customer Networks



- Customers behave moralize tightly connected networks, therefore, businesses must learn to harness the power and potential of customers network.
- It means engage, empower and co-create with customers. Creating effective customer strategy requires to understand such key concepts as customers and strategic assets, the reinvented marketing funnels, the digital path to purchase, and the five core behaviors of customer networks :
 - Access /Engage/ Customize/ Connect/ and Collaborate

Build platforms, not just products



- Building effective platform business models may involve becoming a trusted intermediary who brings together competing businesses.
- To develop a digital-age competitive strategy, we need to understand platform business models, direct and indirect network effects, co-opetition between firms, dynamics of intermediation and disintermediations, and competitive value trains.

Turn data into assets



- To turn data into a truly strategic assets:
 1. assembling the right data
 2. applying it effectively to generate long term business value.
- Four templates of data value creation: the new sources and analytical capabilities of big data, the role of causality in data-driven decision making, the risks around data security and privacy.

Innovate by rapid experimentation



- Digital technologies make it so fast, easy, inexpensive to test ideas.
- Innovation in the digital age requires that you have a firm understanding both convergent experiments (with valid samples, test groups and controls), and divergent experiments (designed for open ended inquiry).
- To bring the results to market, minimum viable prototypes and products and mastering the four paths to scaling up an innovation are needed.

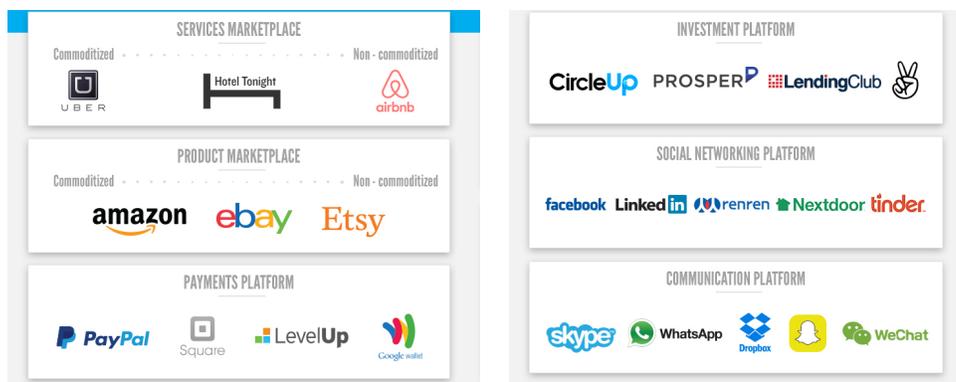
Adapt your value proposition



- Businesses must learn how to continuously adapt their value proposition.
- Businesses need to focus beyond their current business model and less in on how they can best deliver value to their customers as new technologies reshaped opportunities and needs.
- To proactively adapt value proposition: the different concepts of value propositions, the three possible paths out of a declining market position, analyzing the existing value proposition, identifying emerging opportunities and threats, synthesize an effective next step in evolution.

Rise of the platform

- Platforms businesses to shift from linear to more networked business models.



What is Platform Business Model?

- in general “something on which you can build”.
- in tech circles may be any underlying software on which additional programs are built.
- in media industries may be a distribution channel.
- in marketing may refer to any brand or product line that could be used to launch additional products.
- In this chapter: a kind of Business Model.

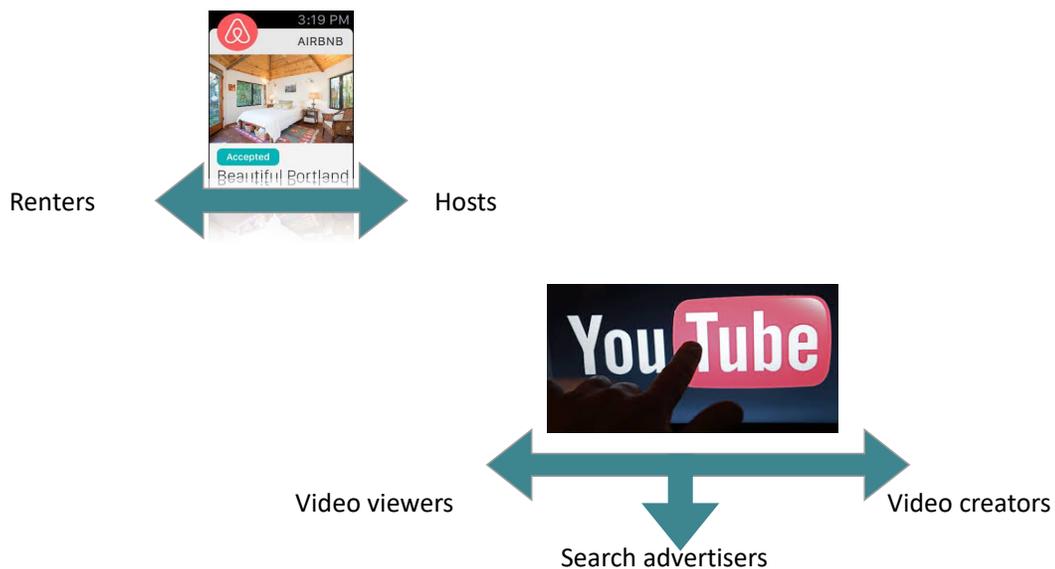
Origins of Platform Theory

- The idea of platforms as business model has its origins in the economic theories of two-sided markets.
- The theory began to shift from looking at the market dynamics (i.e. who will pay what price in equilibrium with others) to looking at the kind of businesses that make them possible (i.e. what distinguishes the business model of a Visa or MasterCard).

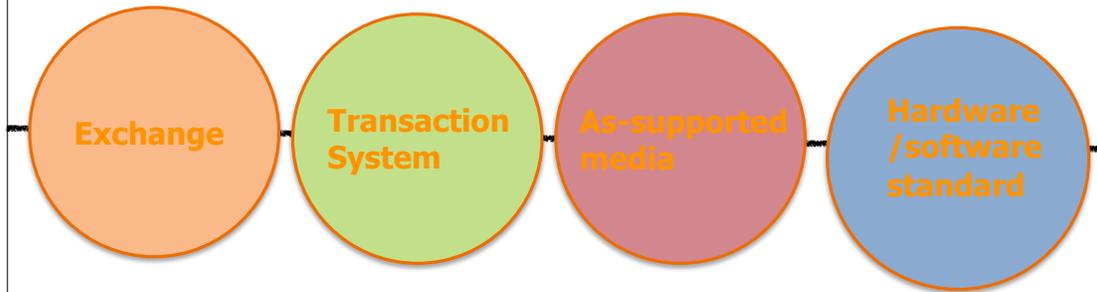
A definition of Platforms

- “A platform is a business that creates value by facilitating direct interactions between two or more distinct types of customers.”
- Three key points:
 1. Distinct types of customers: two or more distinct sides (buyer and seller, software developers and consumers, ...)
 2. Direct interaction: direct interactions of two or more distinct sides
 3. Facilitating

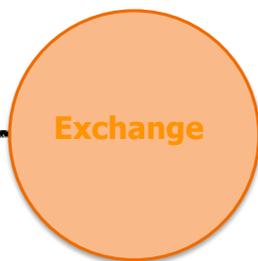
Some examples of Platforms



Four types of Platforms



Four types of Platforms



Bring together two distinct groups of customers for a direct value exchange.

example: real estate brokers, eBay, Airbnb

Four types of Platforms



Transaction System

Act as an intermediary between different parties to facilitate payments and financial transactions.

Example: PayPal & Apple Pay

Four types of Platforms

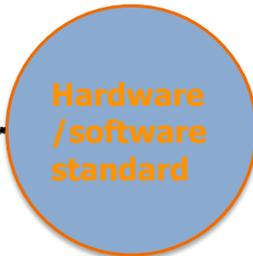


As-supported media

Play an additional role for creating (or sourcing) media content that is attractive to customers.

As platform attract more people, its value to advertisers increases.

Four types of Platforms



Provide a uniform standard for the design of subsequent products to enable their interoperability and the benefit the ultimate consumer.

Apple's iOS and Google's Android

Direct and Indirect Network Effects

- Network Effect: the value of platforms increases as more customers use them.
 - *Direct Network Effect: the increasing number of customers or users of a product drives an increase in value or utility for the same type of user (Facebook)*
 - *Indirect Network Effect: increase in the number and quality of customers on one side of the platform drives increasing value for customers on the other side of the platform (Airbnb and Paypal).*

How digital impact Platforms?

- Digital technologies are supercharging the growth and power of multisided platforms: web, on-demand cloud computing, application program interfaces (APIs), social media, mobile computing devices,...
- Digital technologies are driving four key elements of platforms:
 1. Frictionless acquisition
 2. Scalable growth
 3. On-demand access and speed
 4. Trust

How digital impact Platforms?

- Frictionless acquisition: Thanks to the Web, APIs, and software development kits, the process of acquiring new customers for a platform is increasingly frictionless.
- Scalable growth: Cloud computing allows any size of business to rapidly scale the size of its platform as fast as it can acquire new customers.
- On-demand access and speed : By mobile computing, any platform can be accessible to all of its customers anywhere at any time.
- Trustability to authenticate customers through their Facebook, Google, Twitter and ... identities make it much easier for businesses to use a verification system for new customers on its platform.

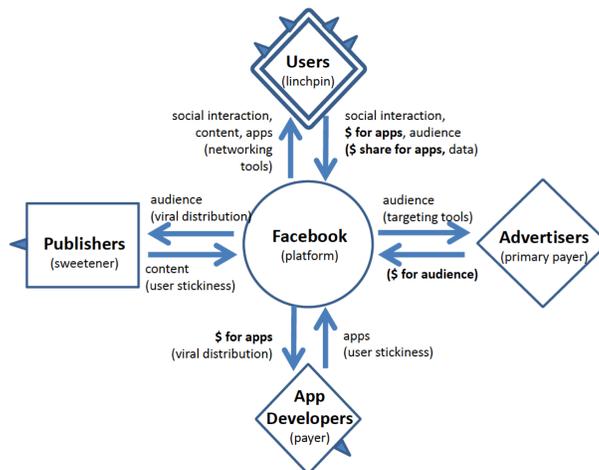
The biggest impact of digital technology on platforms may be in the size of the businesses involved (from large enterprises to start-ups).

Competitive Benefits of Platforms

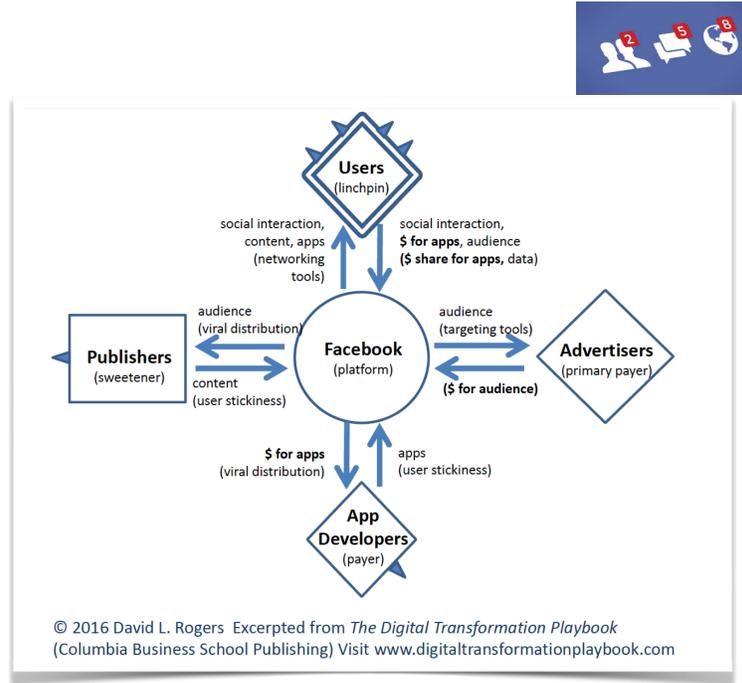
- Light in Assets :tend to having few employees for the revenue since customers do much of the work tat employees would do in a vertically integrated business. Thus, platform businesses can achieve extremely high operating margins on a percentage basis.
- Scaling fast: cloud computing architecture enable fast grow.
- Winner takes all:it is hard to be a direct competitor to catch up with Google. The real threat too Google is Siri, Amazon’s product search,
- Economic Efficiency:Platform business models enable the efficient usage of distributed pockets of economic value (labor, assets, skills)- “Sharing Economy”.

Platform Business Model Map

- The Platform Business Model Map is an analytic and visualization toll designed to identify all the critical parties in a platform and analyze where value creation and exchange take place among the different customers and with the platform business itself.



Example : Facebook



What we can learn from Facebook's business model

- Facebook brings together 4 types of customers: social network users, advertisers, app developers, news and content publishers.
- Facebook's business model is mix of ad-supported media and software standard
- The platform is fueled by cross-side network effects (different types of customers are attracted to each other) and same-side network effects (users are attracted by more of their own kind).
- Users are the linchpin that attract everyone else to the platform.
- Advertisers are the primary revenue source.
- news publisher provide NO revenue, but they add value for the linchpin customers.

The shifting landscape of competition

- In the digital era, any relationship between two businesses is a shifting mix of competition and cooperation.
- Competition with rival is changing, becoming less of a direct contest.
- Industries definitions and boundaries are becoming more fluid (shift from symmetric to asymmetric competitors).
- More relationships between businesses and their supply chain partners.

Co-opetition

- = a mix of competition and cooperation
- Digital platforms are a factor in driving cooperation among business rivals (e.g. Google search engine in Apples' devices)
- Disruptive threats from new technologies are driving rival businesses to team together and cooperate.

Organizational Challenges of Competition

- As businesses adapt to the growing importance of platforms and the shifting landscape of competition and cooperation, there are some challenges:
- Reshaping the roles and relationships specially for those with long-standing business model
- Coopetition: when to fight when to make peace?
- A platform business model is letting go of some of the value creation process (e.g. Apple: shifting course and provide tools for outside developers to program directly for the iPhone).

Summary

- The ways knowledge actually flows around an innovation project are complex and interactive, woven together in a kind of social spaghetti where different people talk to each other in different ways, more or less frequently, and about different things.
- Increasingly, the networks we have to learn to deal with are becoming more virtual, a rich and global set of human resources distributed and connected by the enabling technologies of the Internet, broadband and mobile communications and shared computer networks.
- Open innovation is a very broad and therefore popular concept, but needs to be applied with care as its relevance is sensitive to the context. The appropriate choice of partner and specific mechanisms will depend on the type of innovation project and environmental uncertainty.