

EMSE_03

PSS & servitization: consequences on companies' business model and financial performance

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Introduction

Definitions: 3 levels of analysis



▶ The offer level: PSS

“A product-service system is a system of products, services, networks of actors and supporting infrastructure that continuously strives to be competitive, **satisfy customer needs** and have **a lower environmental impact** than traditional business models.”

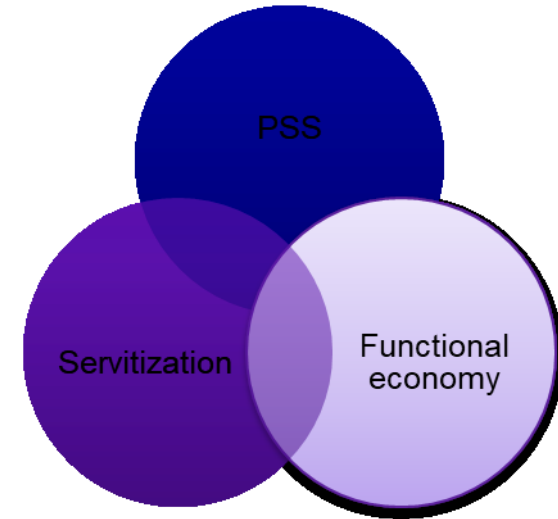
(Mont, 2004)

▶ The firm level: Servitization

- ▶ “**Servitization** is the innovation of an organisation’s capabilities and processes to **better create mutual value through a shift from selling product to selling PSS.**” (Baines & al. 2009)

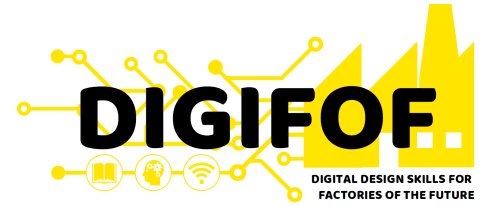
▶ The economic system level: Functional service economy

- ▶ “A functional economy is one that optimizes the use (or function) of goods and services and thus the management of existing wealth (goods, knowledge, and nature). The economic objective of the functional economy is to **create the highest possible use value for the longest possible time while consuming as few material resources and energy as possible.**” (Stahel, 2008)



Introduction

PSS and servitization of manufacturing



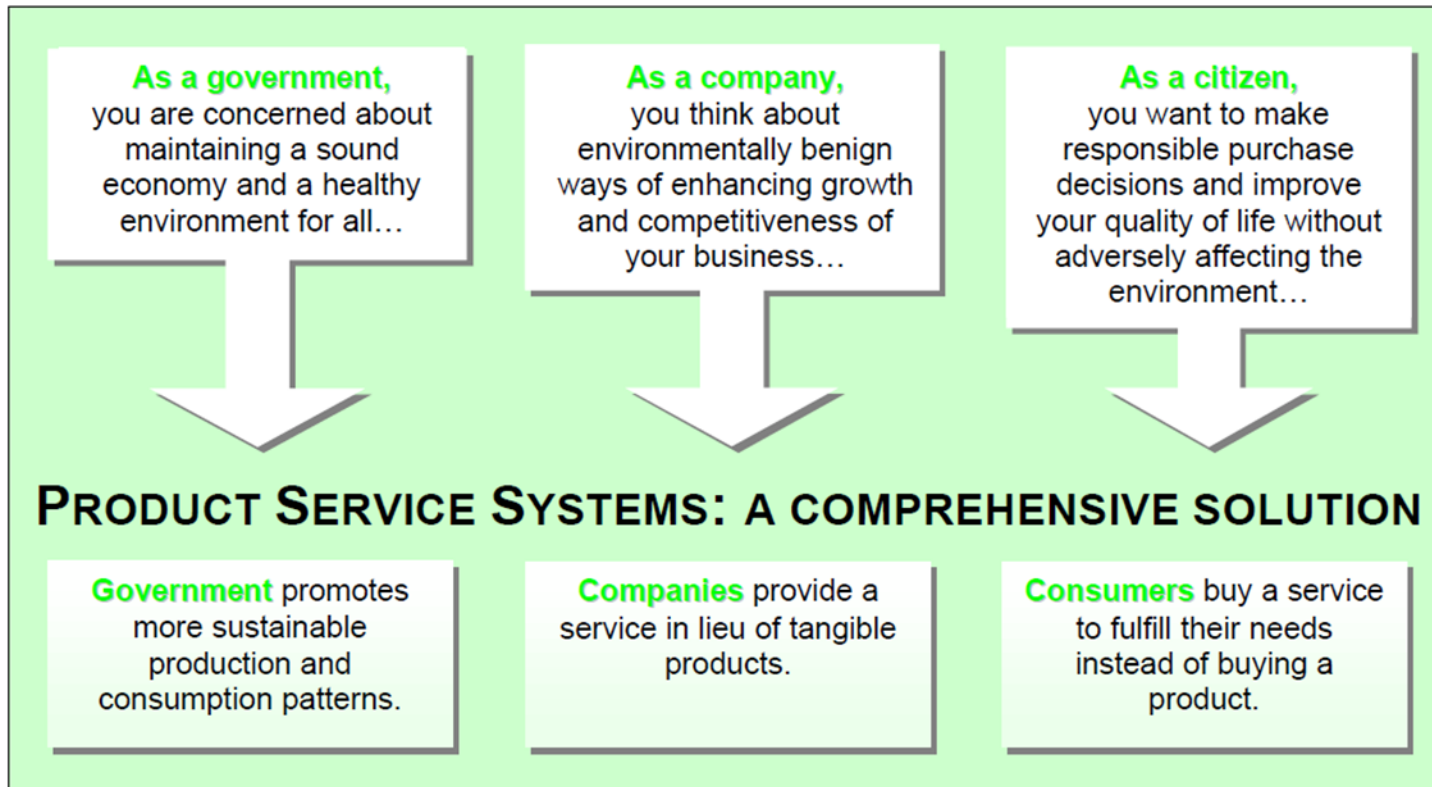
- ▶ **Famous examples**
 - ▶ In the B2C sector : Velib, Autolib, ...
 - ▶ In the B2B sector : Xerox, Rolls Royce, Michelin...

- ▶ **Not as new but a growing trend**
 - ▶ Manufacturing companies have always provided services (e.g. IBM)
 - ▶ But service component is growing in many product-centric firms

- ▶ **An opportunity for the manufacturing sector** (and perhaps for the environment)

Introduction

PSS: a promising approach



Source : UNEP, 2001

Introduction

Content



Part I. Servitization & PSS as a business model innovation

- ▶ What is a “business model”?
- ▶ How does servitization/PSS impact a firm BM?

Part II. Financial consequences of servitization & PSS

- ▶ How does servitization/PSS impact the financial/economic model of a firm?

Part I



Part I. Servitization & PSS as a business model innovation

- ▶ What is a “business model”?
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Part II. Financial consequences of servitization & PSS

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Part I

Business model and economic/financial model



▶ A business model

- ▶ is a description of how a company intends to create, deliver and catch value in the market place on the basis of
- ▶ Its combination of **products, services, image, and distribution**
- ▶ The **underlying organization of people**, and the **operational infrastructure** that they use to accomplish their work (quoted by Chesbrough & Rosenbloom, 2002:532)

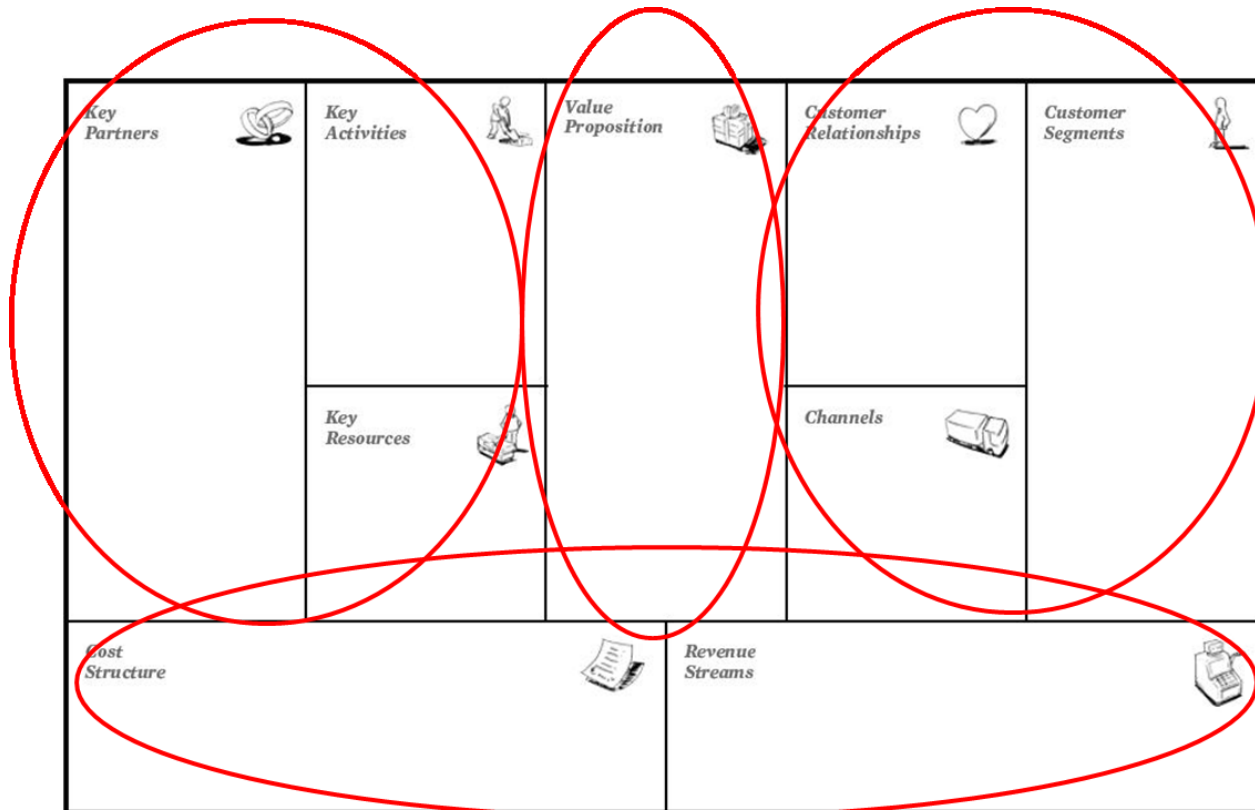
▶ The economic/revenue model

- ▶ is a sub-part of the BM
(even though 'economic model' is sometimes considered as a synonym of 'business model')

Part I

The Business Model Canvas

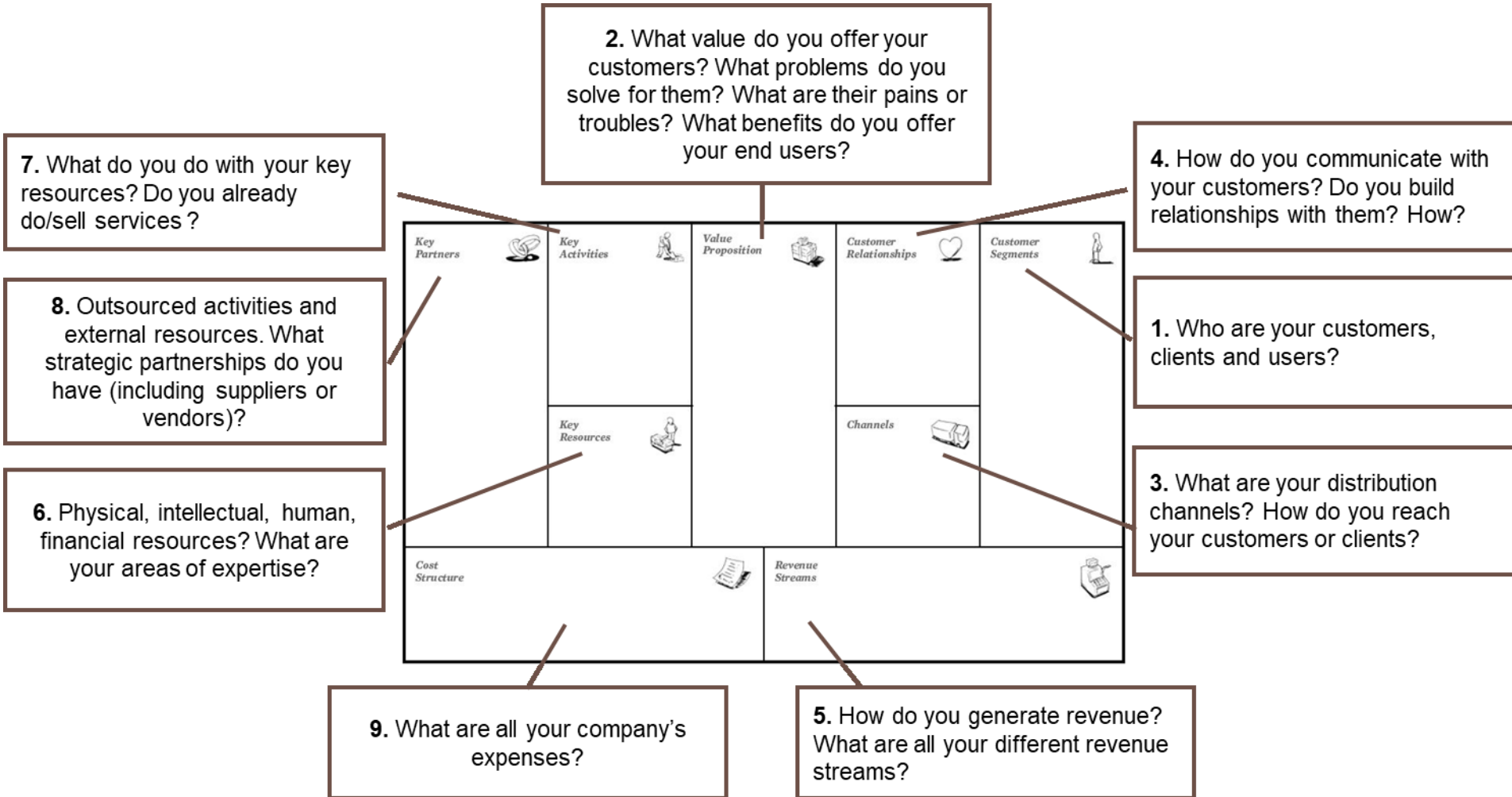
- ▶ 9 blocks that cover 4 essential dimensions of the firm: the **offering**, the **customers**, the **infrastructure**, and the **financial viability**



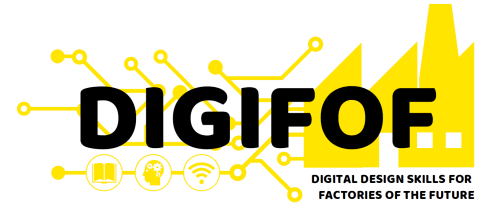
Osterwalder & Pigneur (2010)

Part I

The Business Model Canvas



Part I



PSS offerings will impact all the 4 dimensions of the BM

▶ Value proposition

- ▶ The VP changes from a product to a PSS that is a **“bundle” of product(s) and service(s)**
=> Which product(s)? Which service(s)? Which combination of both? i.e. which specific offering?

▶ Customers

- ▶ Which customers (segments) could be interested in this offering?
- ▶ How to communicate on it? How to sell and deliver it?
- ▶ Does PSS suppose **specific relationships** with customers?

▶ Infrastructure/organization

- ▶ Which **specific resources and activities** are needed to offer PSS: information system, sales force, technicians ...
- ▶ Can the firm offer PSS on its own or does it need partners to do so: IT specialist, dealers, technical support ...

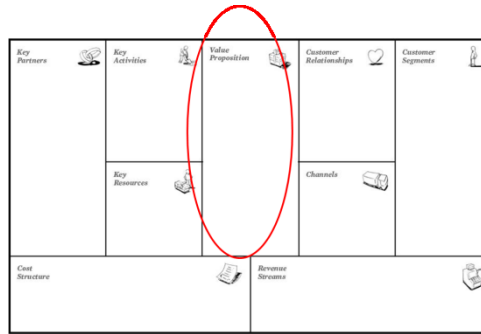
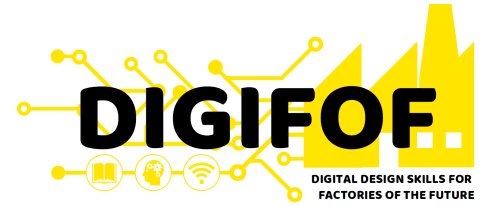
▶ Financial viability

- ▶ How much money would yield the offering?
- ▶ How much will it cost to create and deploy this offering?

www.digifof.org ▶ **What margin** can the company expect to generate?

Part I

The value proposition



► Several types of PSS

Product – Oriented

Value Creation: Add services to products.

Examples: Extended warranties, maintenance, upgrading, and ended – of – life management.

Ownership: Customer owns product.

User – Oriented

Value Creation: Provide access to the product and the function it provides.

Examples: Leasing, rental.

Ownership: Customer does not need to own the product.

Result – Oriented

Value Creation: directly provide function to the customer.

Examples: Waste management [Tangible], Communication [Intangible].

Ownership: Customer pays for functionality rather than use of or access to a particular product.

Servicizing

Quite common nowadays

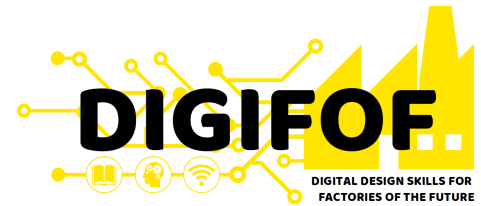
e.g. Xerox/Pay-per-print; Rolls-Royce/Power-by-the-hour

e.g. Michelin/Michelin fleet solutions;
General Motors/Chemical management Services

Yachnin & Associates (2010)

Part I

What does it change?



► Example

Traditional product sales	Innovative alternatives: Product-Service Systems	
Consumer buys a washing machine to clean cloths in house/hotel.	Consumer rents a washing machine to clean cloths in house/hotel.	Client buys a service from a company (laundry) to clean cloths (Company determines best equipment and methods based on client's needs).
Client owns, uses and stores washing machine. Consumer is responsible for maintenance and the 'quality' of the cleaning.	Company retains ownership of washing machine and is responsible for maintenance. Client is responsible for use and 'quality' of cleaning.	Company owns, maintains and stores the cleaning equipment including washing machine. Company is responsible for 'quality' of the cleaning.
Initial investment for consumer could be considerable.	Consumer costs are spread over time (they pay a low initial deposit and then pay per wash).	Consumer costs are spread over time (they pay per wash).
Consumer ultimately disposes of washing machine and buys replacement.	Company is responsible for disposal and has incentives to prolong use of product, reuse component and recycle materials.	Company is responsible for disposal and has incentives to prolong use of product, reuse component and recycle materials.

Consequences throughout the life-cycle

UNEP (2002)

Part I

A lot of possible services!

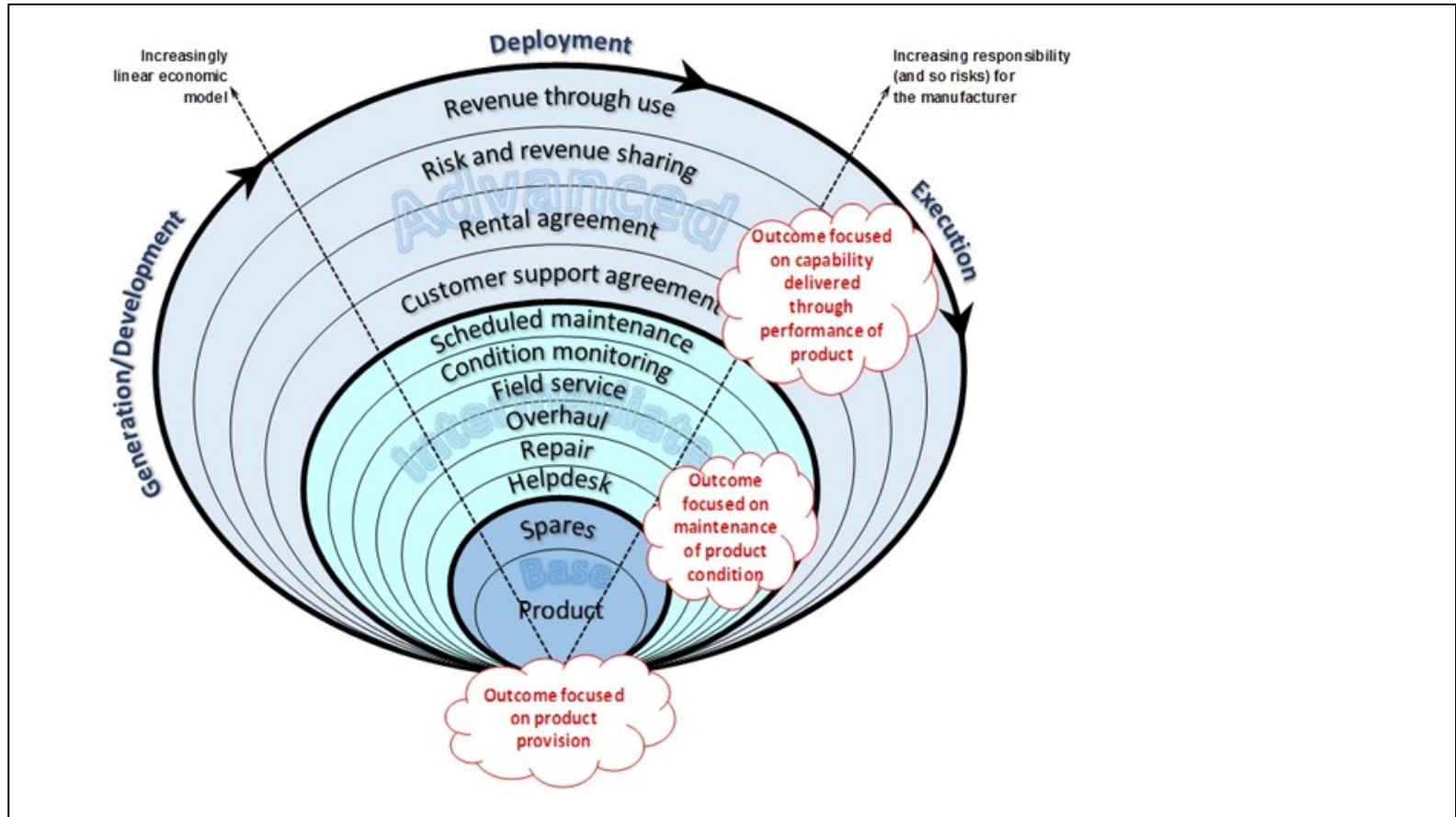


	Product-oriented services	End-user's process-oriented services
Transaction-based services	<i>Basic installed base services</i> Documentation Transport to client Installation/commissioning Product-oriented training Hot line/help desk Inspection/diagnosis Repairs/spare parts Product updates/upgrades Refurbishing Recycling/machine brokering	<i>Professional services</i> Process-oriented engineering (tests, optimization, simulation) Process-oriented R&D Spare parts management Process-oriented training Business-oriented training Process-oriented consulting Business-oriented consulting
Relationship-based services	<i>Maintenance services</i> Preventive maintenance Condition monitoring Spare parts management Full maintenance contracts	<i>Operational services</i> Managing maintenance function Managing operations

Oliva & Kallenberg (2003)

Part I

A lot of possible services!



Baines & Lightfoot, H. (2013)

Part I

The major role of IT / digitalization



- ▶ **Pay-per-print, Power-by-the-hour, Michelin fleet solutions, ... would not be possible without IT**
- ▶ **Remote monitoring technology**
 - ▶ PSS (especially use-oriented and result-oriented) deals with **a transfer of risks** from the customer to the supplier: non-availability of the product, suboptimal performance
 - ▶ **Hardware & software technologies** (e.g. sensors) that allow to collect **real-time data** in order to determine the current and predicted condition of a product which can then be used to optimize its availability and performance
 - ▶ It also enables **learning and better understanding** of customers' needs and their business

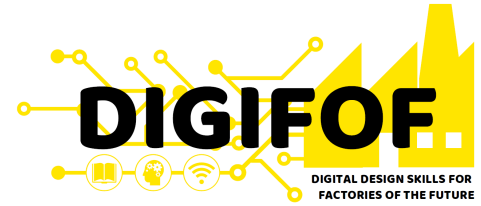
Example:

<https://www.advancedservicesgroup.co.uk/post/2018/09/17/servitization-in-action-alstom-transport>

- ⇒ **IT is often a major component of PSS offerings**
- ⇒ **Digitalization is a driver for creating new ones** (e.g. “digitally enhanced advanced services”)

Part I

Which customers?



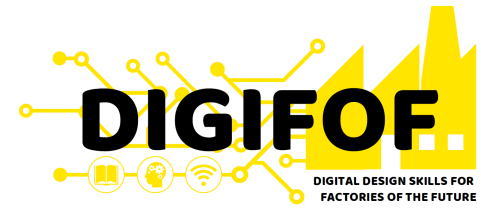
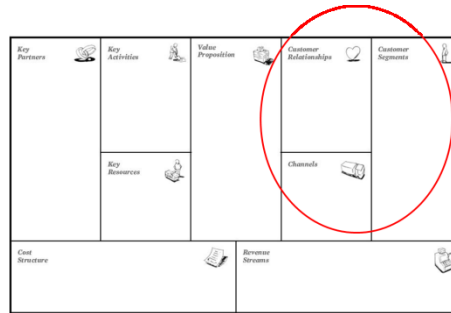
- ▶ **Underlying assumption**
 - ▶ Users are not really wanting a product or service per se, but rather what these products and services enable a user to achieve: their utility
 - ▶ **Which utility can I provide? To whom?**

- ▶ **The VP must be built in reference with customer segment(s) who have specific constraints, needs, and/or usages**

- ▶ Customers who are interested in
 - ▶ The possibility to obtain product function without necessarily making **large investments**
 - ▶ Benefiting from a **specific technical expertise** that they don't own
 - ▶ Increased **flexibility**, improved **quality**, **comfort**, **customization**
 - ▶ ...

Part I

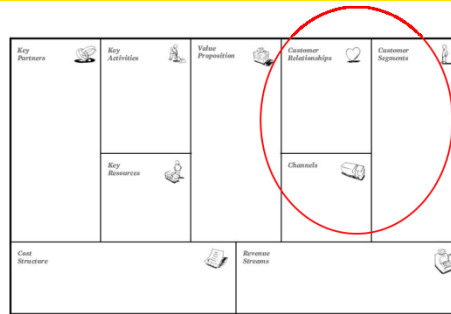
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 - ▶ ...

Part I

Customer relationships



▶ PSS offerings lead to longer relations with customers

- ▶ PSS extends the relationship with the customer beyond the product sale by continuous interaction in the **use phase** (and even in the end-of-life of the product by remanufacturing it or recycling its materials)
- ▶ Price-based relationship -> more “relational” contract

■ 2 important dimensions

▶ The **customer interface**

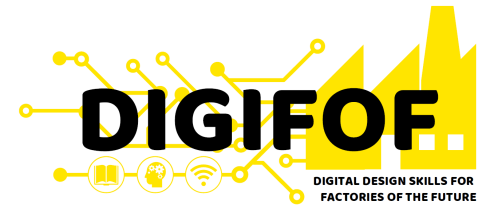
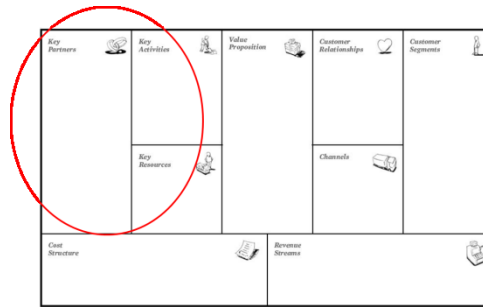
- ▶ Interactive process of information and knowledge exchange (cooperation process)
- ▶ It requires a specific organization (people & tools)
- ▶ It leads to an increased intensity of communication which opens up the possibility for **increased feedback** and consequently for the development of better value propositions that in turn may lead to **customer loyalty**

▶ The **service delivery**

- ▶ “how” the service is delivered to customers: who are the people who are going to deliver it? Which skills and abilities do they need? How will be organized the delivery process?...

Part I

Infrastructure & organization



▶ Key resources & activities

- ▶ Knowledge on the **customers' product usage** and on the **customers' process**
 - ▶ **Design-to-service** competencies
 - ▶ An **experienced product sales force** and **distribution network**
 - ▶ A **field service organization**
 - ▶ **Data processing** and interpretation competencies
 - ▶ ...
- ⇒ Challenging for manufacturing firms

▶ Key partners

- ▶ PSS offerings generally call for '**complementors**'
 - ▶ Partners with software and hardware specialist skills
 - ▶ Distributor network
 - ▶ Local partners taking in charge maintenance operations
 - ▶ ...

⇒ Providing PSS => a **collaborative capability**

⇒ Which configuration of the value chain: which distribution of costs, revenues, risks, responsibilities, ...?

Part I

Corporate culture

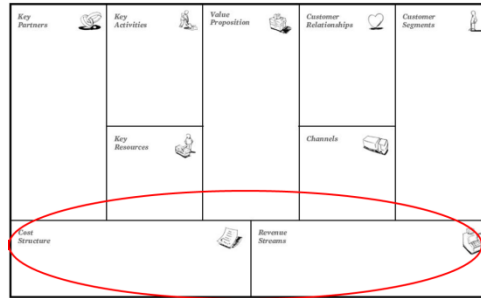


- ▶ **A new mind-set**
 - ▶ Manufacturing firms are not familiar with service activities and with a strong proximity with customers
 - ▶ In service activities (vs. manufacturing activities), the customer is much more integrated in companies' processes

- ▶ **Managers & employees will have to adapt their values & behavior**
 - ▶ Participation of **customers** in the design
 - ▶ Strong **collaboration between the marketing and production** departments
 - ▶ **Relational marketing** and Customer Relationship Management (CRM)
 - ▶ Use of **client data** in assessing organizational effectiveness
 - ▶ Evaluation of the interpersonal skills of customer contact personnel
 - ▶ ...

Part I

Financial viability



- ▶ **Financial objectives are considered as one of the main factors encouraging companies to enter a servitization strategy and to offer PSS**
 - ▶ **PSS offerings may entail new revenue streams, but they certainly also yield new costs and new risks**
- ⇒ **Consequences of PSS on the economic/financial model?**

Part II



Part I. Servitization & PSS as a business model innovation

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Part II. Financial consequences of servitization & PSS

- ▶ How does servitization/PSS impact the financial/economic model of a firm?
 - ▶ Added value and revenues
 - ▶ Costs and risks
 - ▶ Financing issues

Part II

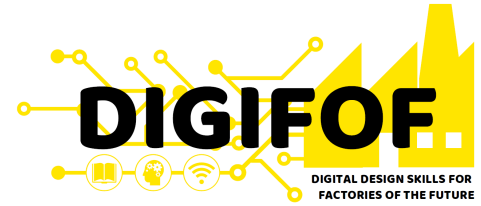
PSS & Financial performance



- ▶ **Theoretically, PSS should lead to increased revenues and profitability**
 - ▶ **Market ‘saturation’**: in industries with high-installed product base (e.g. aerospace, locomotive, automotive) **service revenues can be greater** than new product sales
 - ▶ Services seem to be a **steadier source of revenue** (services are counter-cyclical or more resistant to economic cycles; are less sensitive to price competition; and promote customer loyalty)
 - ▶ Services would be globally **more profitable** (lower sensitivity to price competition, service offerings are likely to provide higher rates of return comparatively to pure product offerings)
- ▶ **The ‘service paradox’**
 - ▶ **Substantial investment** in extending the service business leads to increased service offerings and higher costs, but does not generate the **expected correspondingly higher returns**
- ▶ **Higher costs due to**
 - ▶ **A more complex organization**: higher working capital, higher total assets
 - ▶ **More expensive employees**: higher employment costs

Part II

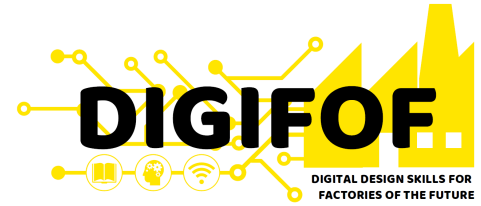
PSS & Financial performance



- ▶ **Empirical studies show a non-linear relationship**
 - ▶ **The impact of servitization on the firm value** is insignificant or slightly negative until service sales reach 20 or 30% of total sales, and becomes positive only beyond this threshold (Fang et al. 2008)
 - ▶ **Services contribute positively to profits** until they are about 20% of total revenues; beyond that point and until they reach about 60% of revenues, they result in a decrease of profitability (Cusumano, 2008)
 - ▶ The **inflection point** where the contribution to performance of additional services changes from negative to positive is **around 56 % of total revenues** (Suarez et al. 2013)
- ⇒ **There is a need to carefully evaluate revenues and costs**

Part II

More added value



▶ **Tangible/objective value**

▶ **Resources, time input and cost of capital saved**

- ▶ A customer who has the choice between buying a product or using a PSS can start to make a **rational calculation** about what the product actually costs, including all kinds of 'hidden' cost, and that is in principle the maximum price he/she would like to pay for a competing PSS

- ▶ For instance, in the concept of chemical manufacturing services the PSS provider not only sells chemicals, but takes over specific handling and management tasks for the client. This saves the client **human resources, management time** and maybe even space, which often costs five to ten times more than the chemicals themselves

▶ **Intangible/subjective value**

▶ **Customization, design, novelty, innovation, coaching, image ...**

- ▶ By creating such intangible added value, the provider makes the client willing to **pay more** than would be justified on the basis of 'rational' calculation. This allows the provider to charge more

Part II

Positive externalities

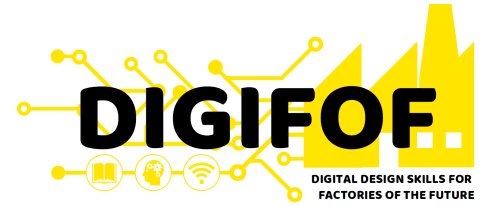


▶ **Externality**

- ▶ **Non intentional effect of an activity on the environment and/or on third parties**
- ▶ **Non monetary phenomena:** costs that are not incurred by those who induced them, or gains that are not payed by those who benefit from them
- ▶ **Mostly negative** (pollution, health, ...) but can also be positive
- ▶ E.g. construction and operation of an airport
 - ▶ Negative externalities: noise, landscape, pollution, decrease in the value of local residents 'houses, ...
 - ▶ Positive externalities: increased accessibility -> positive effect on local business, tourism, ...

Part II

PSS can bring positive externalities



- ▶ **Mainly environmental**
 - ▶ **Waste reduction** through re-use, recycling, refurbishing
 - ▶ Same value or more with **less material and/or energy**
 - ▶ **Use intensification** (sharing, pooling, ...)
- ▶ **Social**
 - ▶ **Stronger link to territory** (above all in the B2C sector)
 - ▶ **Relocation of activities** (services are difficult to offshore)
 - ▶ Can provide **access to the greatest number** (reduced investment)
- ▶ **But ...**
 - ▶ **Not automatic:** PSS should be designed in order to have positive environmental/social impacts (-> "S-PSS")
 - ▶ **Rebound effect?** (cf. debate on Blablacar)

Part II

PSS: a Sustainable Business Model?

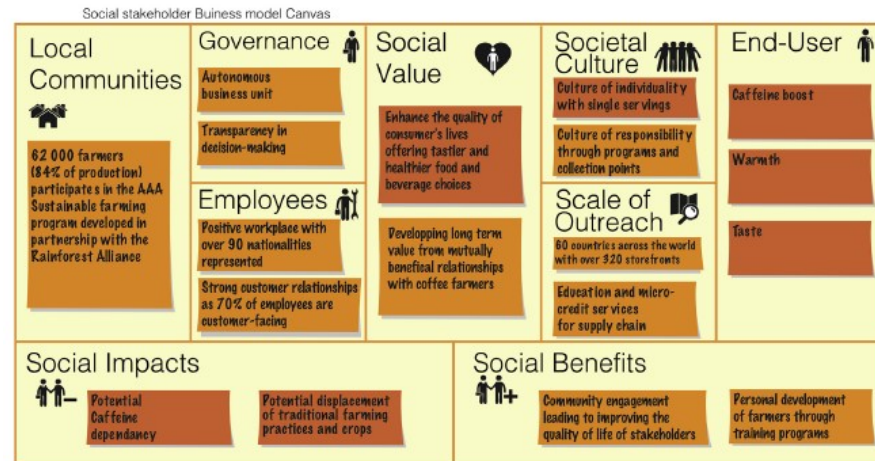
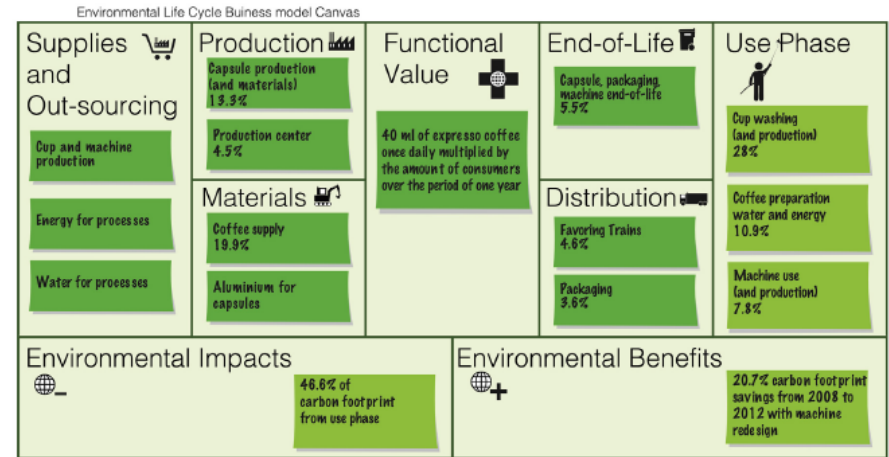
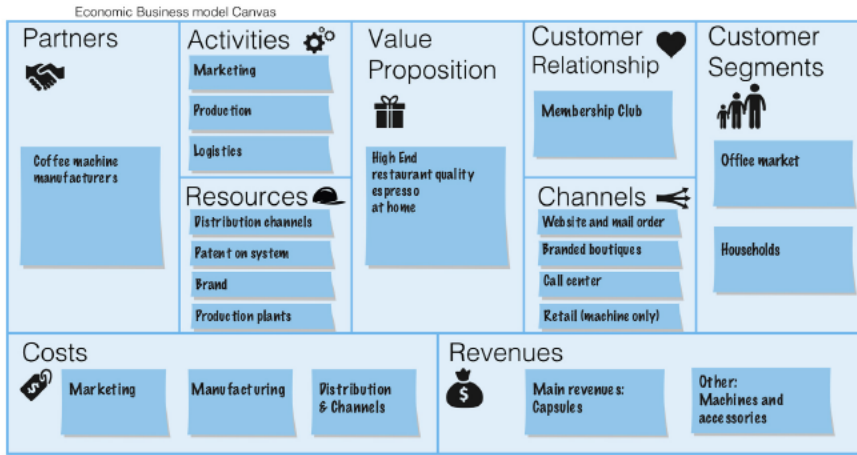


- ▶ SBM incorporate a **triple bottom line approach** and consider a wide range of stakeholder interests, including environment and society
- ▶ Can help **embed sustainability into business purpose**

- ▶ Example: The Triple Layer Business Model Canvas
 - ▶ Extends the original business model canvas by adding two layers:
 - ▶ an environmental layer based on a lifecycle perspective
 - ▶ a social layer based on a stakeholder perspective

Part II

Ex. Nespresso



(Joyce & Paquin, 2016)

Part II

PSS: a Sustainable Business Model?



▶ **Multiple possible benefits**

- ▶ Breaks the link between **profit and production volume** (but probably not usage volume)
- ▶ Can reduce **resource consumption**
- ▶ Motivation and opportunity to deal with **through-life and end-of-life issues** as the manufacturer retains ownership of assets
- ▶ Enhanced **efficiency in use**
- ▶ Enhanced **product longevity/durability**
- ▶ **Reuse** of materials
- ▶ PSS are not sustainable *per se*
- ▶ They are complex to design, test, implement and bring to the mainstream

Part II

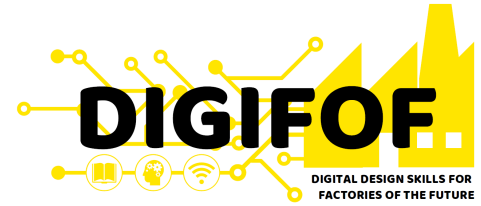
More costs



- ▶ **Traditional ‘tangible’ production costs**
 - ▶ **Resources, time input and cost of capital used**
 - ▶ Often mirror the **tangible/objective value**
 - ▶ PSS implies that **activities formerly performed by the user are now performed by the provider**. This makes sense if the tangible added value of the PSS for the user is higher than the (extra) production costs for the provider, or if a cost deficit is more than compensated for by the intangible added value that the user attributes to the PSS

Part II

More risk

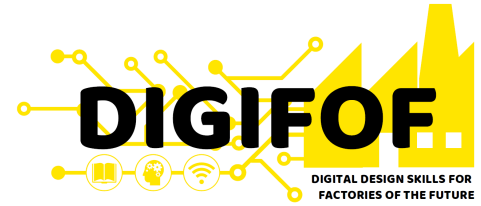


- ▶ **The value is co-created with the customer**
 - ▶ Michelin Fleet Solutions (pay-per-km): the service effectiveness also depends on driving abilities of trucks' drivers
 - ▶ **The result is co-produced between the provider and the customer**
 - ⇒ Ex ante, the provider cannot know precisely the costs they will assume (e.g. maintenance needs will also depend on the way the equipment is used by the customer)
 - ⇒ **Trust-based** relationship and/or **monitoring**

- ▶ **Risk and uncertainty related to the solution (result-oriented PSS)**
 - ▶ By promising a result, the provider often faces difficulties in **predicting and controlling risks, uncertainties and responsibilities** that otherwise were the problem of the user
 - ▶ For instance, if a company sells pesticides and gives advice on how to use them, the farmer bears the full risk of success of crop growth. If the provider promises a result such as an x% reduction in loss of crop due to pests, a hefty penalty might have to be paid if the provider fails. If such liabilities cannot be controlled, the provider should either refrain from such a PSS or include a (probably prohibitive) high risk premium in its cost price

Part II

Capital and investment needs



▶ **Inherent capital needs**

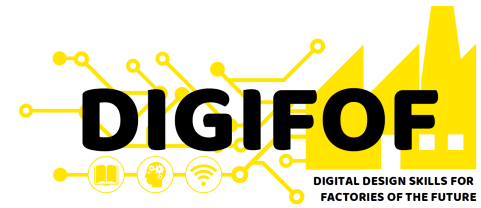
- ▶ The inherent capital base needed to produce the solution
- ▶ There can be **important differences among PSS types**
 - ▶ For instance, a company leasing cars needs one car for each client. A company operating a car pooling system can have considerably fewer cars for the same client pool, and hence needs to invest considerably less

▶ **Additional ‘transition’ investments needed to create the system that produces the solution**

- ▶ Companies which are currently quite product oriented have to invest in **infrastructures and relationships** to be able to provide a PSS

Part II

A global appraisal attempt



PSS type

	Market value for the user		Costs for provider		Capital needs		Ability to sustain value in future		
	Tangible value	Intangible value	Tangible costs	Risk premium	Inherent capital	Transition costs	% Value captured	Client loyalty	High speed of innovation
1. Product-related service	0/+	0/+	-/0	0	-/0	-/0	0	+	0/+
2. Advice and consultancy	0/+	0/+	0	0	0	-/0	0	+	0/+
3. Product lease	0/+	?	-/0	-/0	-	-	+	-/+	0
4. Product renting or sharing	-/+	--	+	0	-/+	-	?	?	?
5. Product pooling	-/+	--	+	0	-/+	-	?	?	?
6. Activity management	+?	+?	0	-/0	0	-	?	+	+
7. Pay per unit use	+	?	0	?	0	-	+	+	+
8. Functional result	0	?	++/?	--	++/?	--	?	?	+

Key

++: Much better than reference (product)

+: Better than reference

0: Indifferent

-: Worse than reference

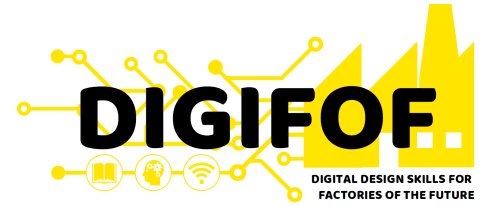
--: Much worse than reference

?: No judgement possible

Grey: Most problematic areas

Part II

Specific financing issues



The **non transfer of property rights** has specific financial consequences

▶ The financing of tangible capital

- ▶ The company no more sells the product but its use/result
- ⇒ It still owns the product(s) => increased fixed assets => **increased capital stock and/or debt**
- ▶ Revenue streams are spread over time
- ⇒ **Cash needs increase** (at least temporarily)

▶ The financing of intangible capital

- ▶ In order to provide PSS offerings, companies need some **intangible assets**
 - ▶ Customer relationship, customer loyalty
 - ▶ Specific skills and competencies
 - ▶ Specific organization
 - ▶ ...

⇒ **These assets are hard to assess and difficult to fund**

Conclusion

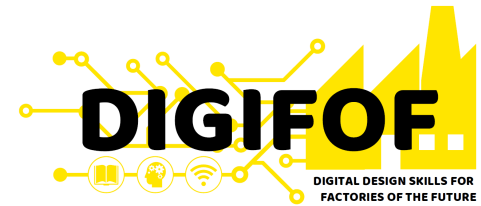
Many hurdles



- ▶ **“Manufacturing firms must learn to value services and how to sell, deliver, and bill them”** (Oliva & Kallenberg, 2003)
 - ▶ How to convince customer to **pay for intangible services** (which were sometimes before perceived as free) ?
 - ▶ How to **assess costs** quite precisely (sometimes on a quite innovative solution)?
 - ▶ How to **evaluate and integrate risk**?
 - ▶ How to **share costs and revenues among partners** in the value network?

Conclusion

Main challenges



Shifting mindsets	Of marketing – from transactional to relational marketing
	Of sales – from selling multi-million dollar products to selling service contracts and capability
	Of customers – from wanting to own the product to be happy with the service
Timescale	Managing and delivering multi-year partnerships
	Managing and controlling long-term risk and exposure
	Modelling and understanding the cost and profitability implications of long-term partnerships
Business model and customer offering	Understanding what value means to customers and consumers, not producers and suppliers
	Developing the capability to design and deliver services rather than products
	Developing a service culture
	Embedding all of the above into a service organisation

Neely (2008)

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