

A close-up photograph of a hand holding a glowing incandescent lightbulb. The lightbulb is the central focus, emitting a warm, yellow light. The background is a soft, out-of-focus bokeh of green and yellow light spots, suggesting an outdoor setting with foliage. The hand is positioned at the top right, with fingers gently gripping the base of the bulb. The overall mood is one of inspiration and innovation.

Digital Transformation and sustainable business models

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CHAPTER 1 „New sustainable business models“	CHAPTER 2 „Enablement of Business Models through technologies“	CHAPTER 3 „Enablement of Business Models through technologies“	CHAPTER 4 Execution of business models by people and processes“	EXAM „New business model marketplace“
▪ Overview & Administrative Things ▪ Digital Transformation ▪ Business Model Canvas & Value Proposition Canvas ▪ Exam Introduction ▪ Sustainability & Technology	▪ Recap ▪ Cloud Computing ▪ Persona Creation & Design Thinking ▪ Analytics & Big Data ▪ Customer Journey Method	▪ Recap ▪ Artificial Intelligence & Machine Learning ▪ Internet of Things ▪ Ecosystems & Platforms ▪ Digital Twin Concept	▪ Recap ▪ Agile Development ▪ Management of Change ▪ Mindset & Culture ▪ Digital Talent	Exam – presentation of each group work (business model created) with active discussion among all students

New Business Models

CHAPTER 1

Digital Transformation

What does digitalization & digital transformation mean? – A definition

Digitalization in a narrow sense

Conversion of information and documents from analogue to digital formats

Digitalization in a broader sense

Integration of digital technologies into existing business processes & to change a business model

Digital Transformation

A fundamental rethink of customer experiences, business models and operational processes. Finding new ways to create business value, generate revenue and increase efficiency. Constant development and adaption to market and technology changes by making use of digital technologies

Transformation of
Business
Processes

Transformation of
Business models

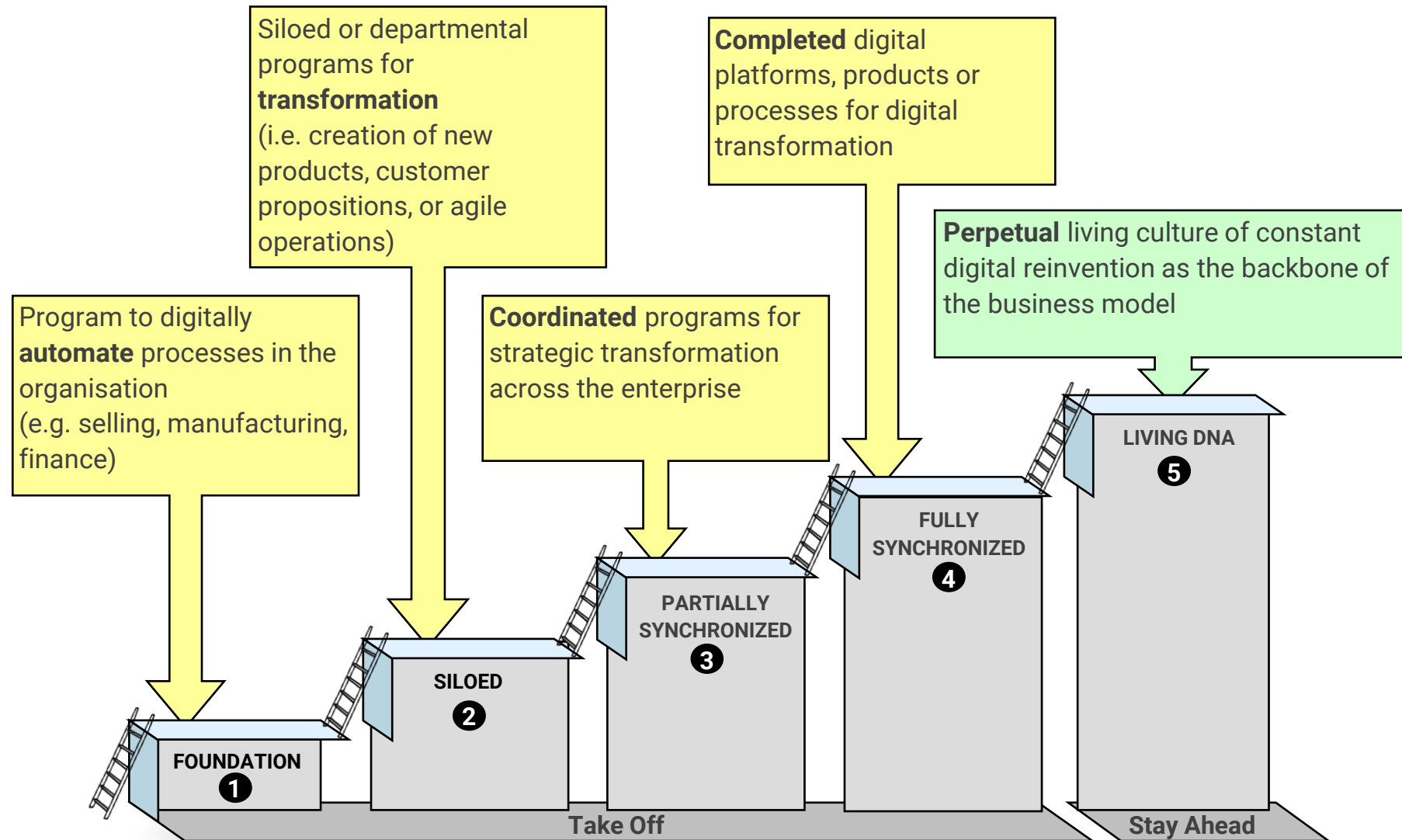
Organizational &
cultural
transformation

Digitalization: Explanation attempt

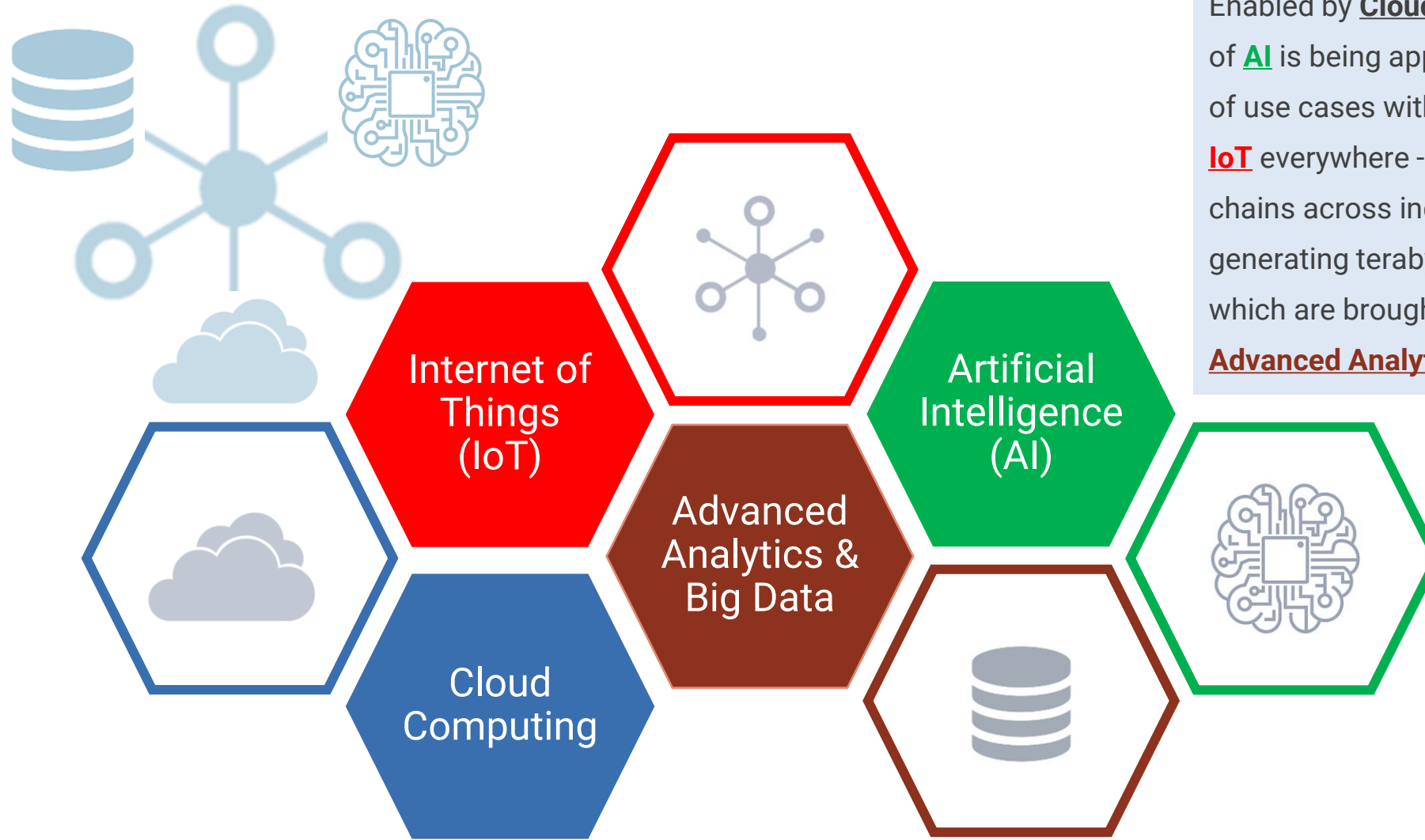
1. Degree of use of analog or digital methods
2. Degree of networking
3. Communication between product and user
4. Utilization of digital possibilities in processes
5. Degree to which business models depends on digital possibilities



The Five-Stage Digital Transformation Model



Digital Transformation: Confluence of profoundly disruptive Technologies



Enabled by **Cloud Computing**, a new generation of **AI** is being applied in an increasing number of use cases with stunning results. And we see **IoT** everywhere - connecting devices in value chains across industries and infrastructures. generating terabytes of **Big Data** every day which are brought into insights and value by **Advanced Analytics**.

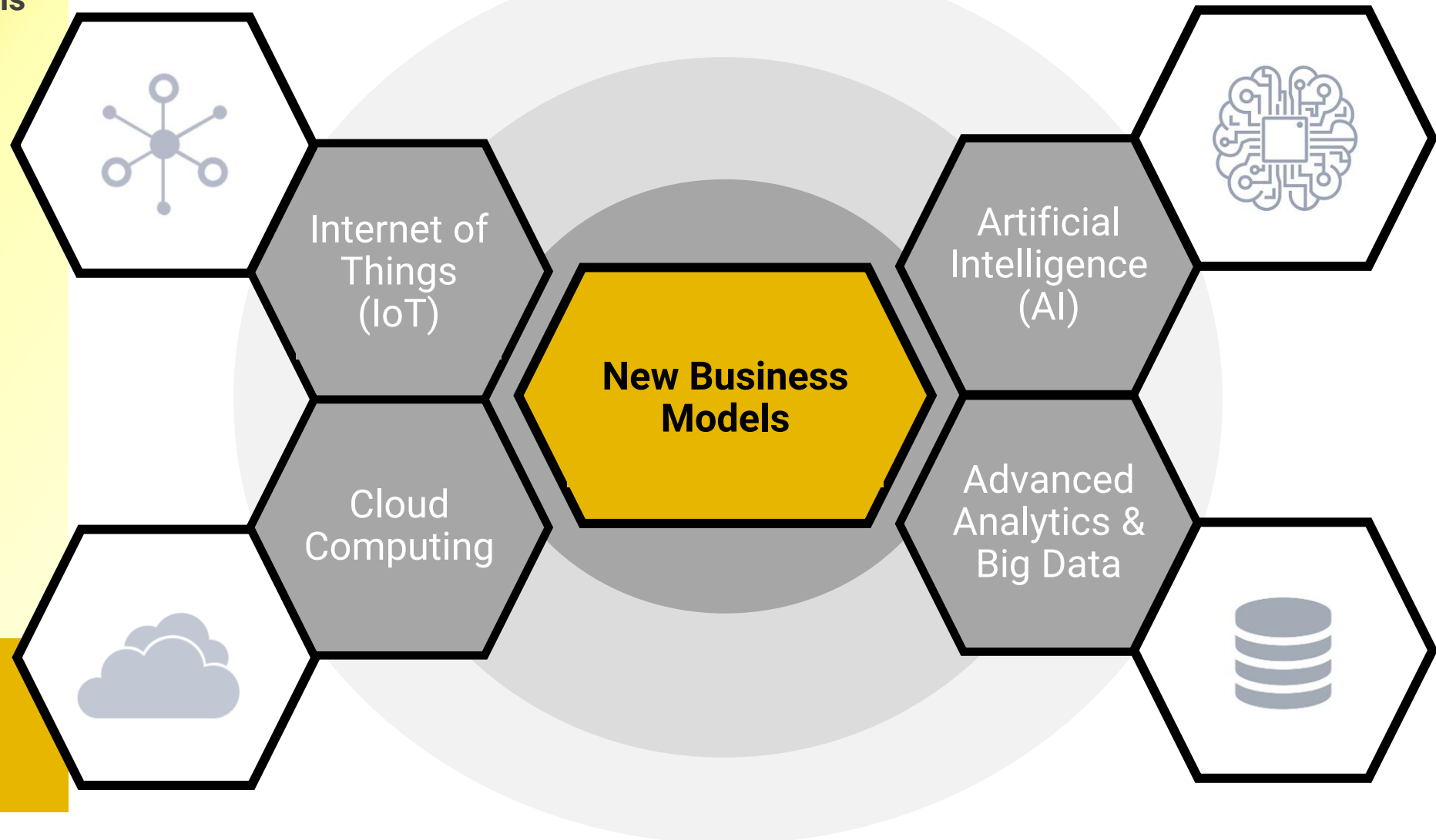
New Sustainable Business Model

Digital Technologies enables new Business Models

Benefiting Business Models

1. Cash Machine
2. Freemium
3. Hidden Revenue
4. Lock-in
5. Marketplace
6. Pay per Use
7. Peer to Peer
8. Sharing Economy
9. Subscription

**If you are not paying for the product,
then you are the product.**



'Disruption' means Replacement through something New

Disruptive Technology	Replacement of ...
Internet of Things	individual evaluation of sensor data
Cloud Computing	local storage of data
Big Data	separate analysis of existing data
Artificial Intelligence	decisions taken by humans

Disruptive business models based on disruptive technologies



Alibaba Group

the world's largest retailer has no physical products



airbnb

the largest accommodation provider has no real estate



UBER

the largest taxi company in the world has no vehicles

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Disruptive business models based on disruptive technologies



the world's largest movie house owns no cinemas



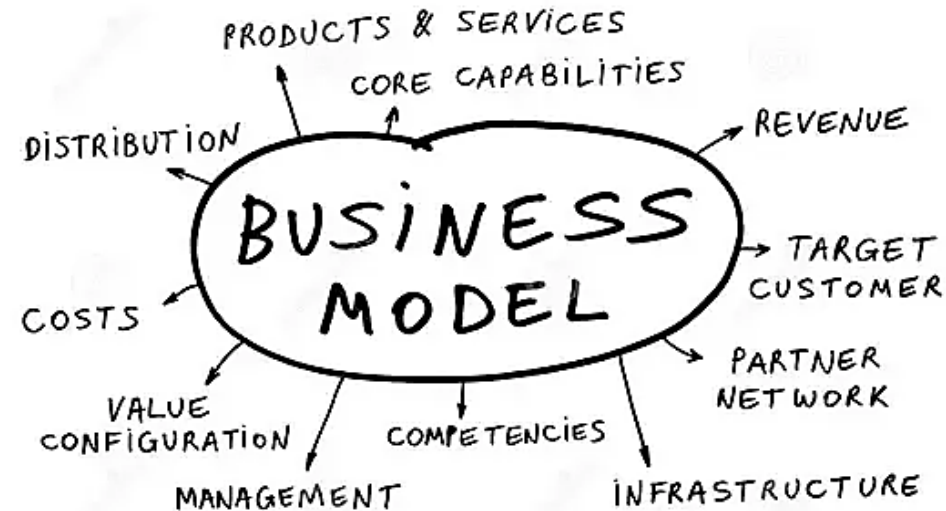
largest software vendors don't write the apps



the largest media company does not create content

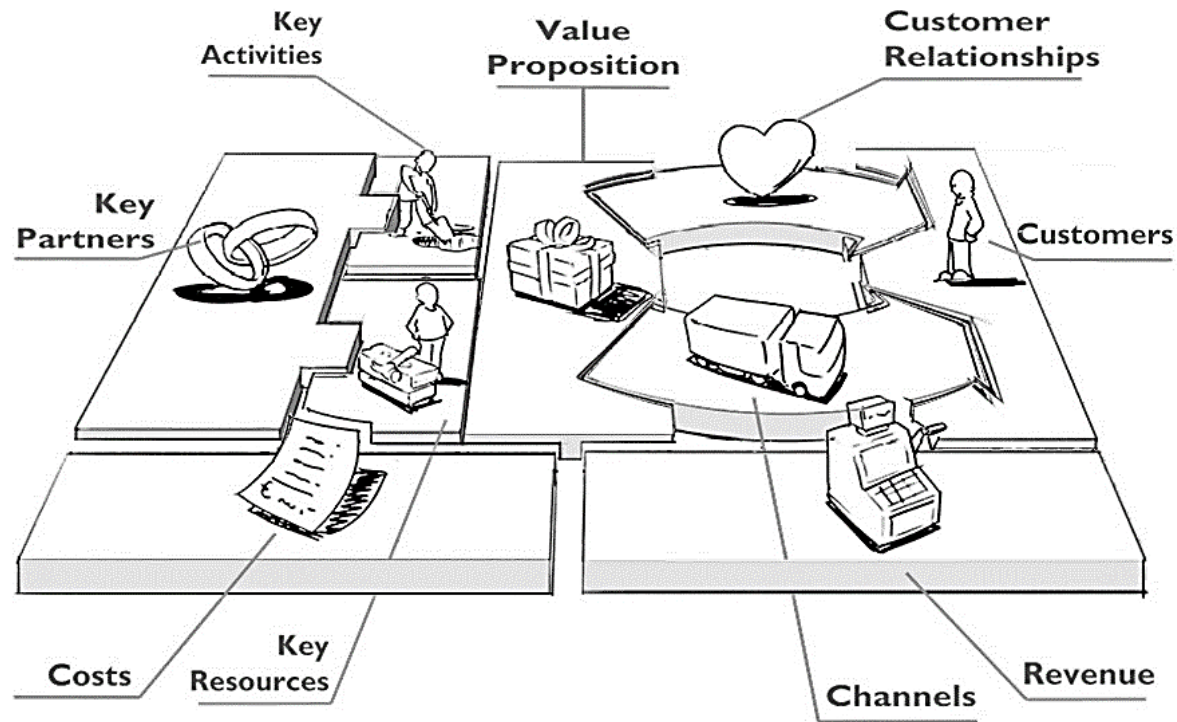
New Business Model Development

„A business model describes the rationale of how an organization creates, delivers, and captures value” and it “shows the logical relationships of a company's business activity to create this value)
(Osterwalder/Pigneur 2010; Gablers Wirtschaftslexikon)



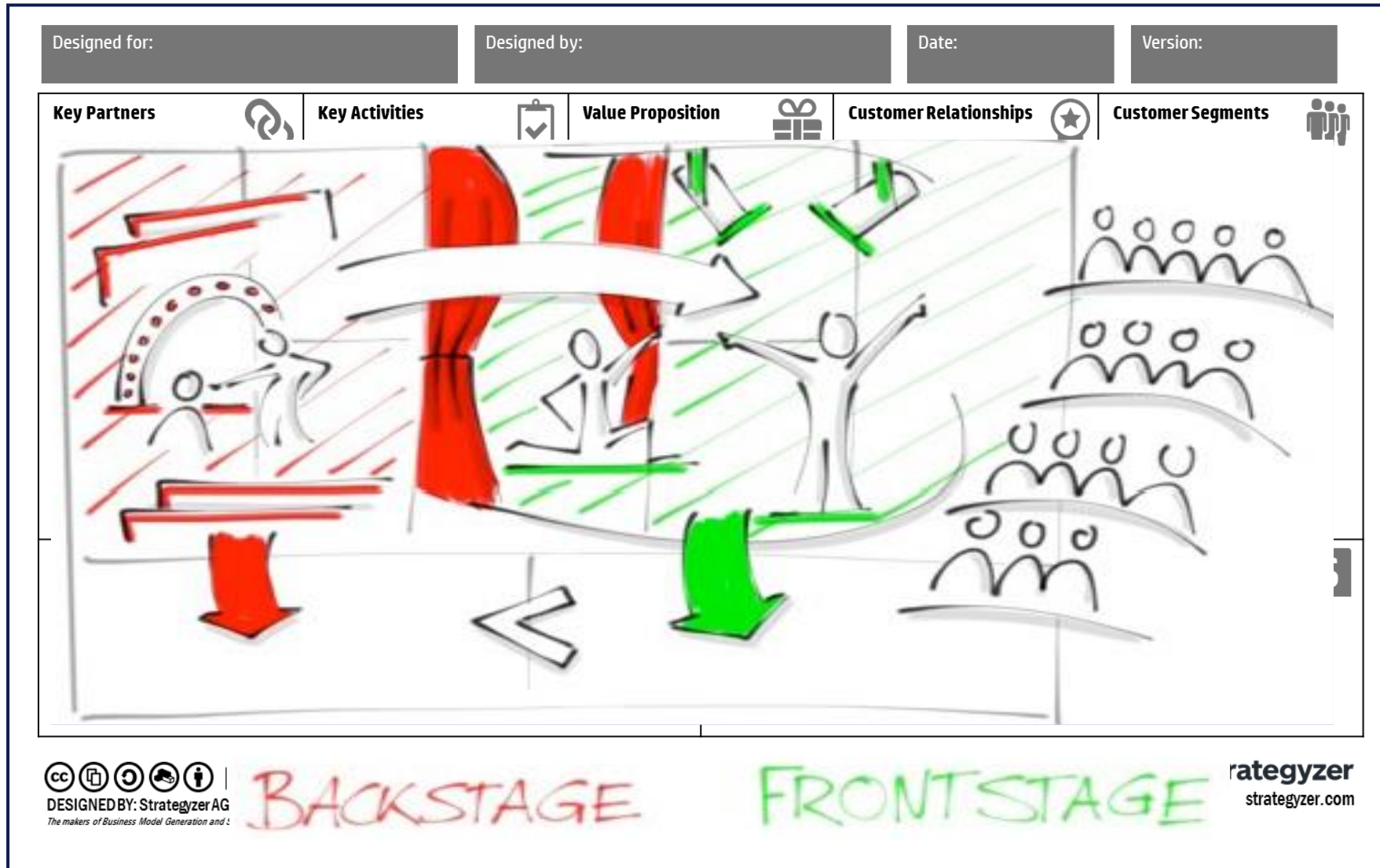
The most important thing of a business model is its **value proposition**. It is in the center of all business activities.

Creating new business models with the **business model canvas**



<https://www.youtube.com/watch?v=QoAOzMTLP5s>

Business Model Canvas



WHAT?



Value Proposition
Customer Segments
Customer Relationship
Channels



Key Activities
Key resources
Key Teilners

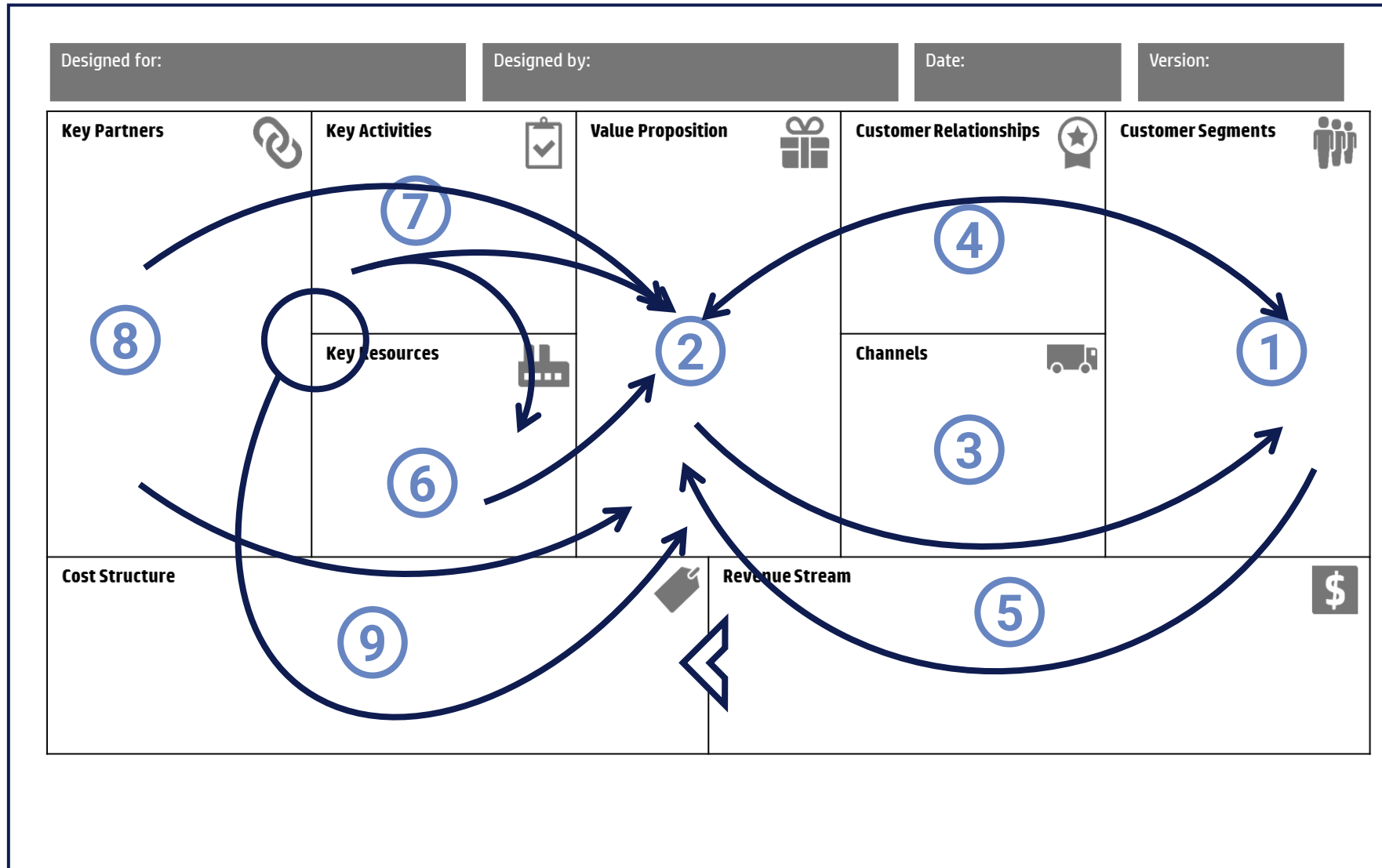


Revenue Streams
Cost Structure

WHY?

*"The Business Model Canvas, is a **strategic management** and **entrepreneurial tool**. It allows you to describe, design, challenge, invent, and pivot **your business model**."*

Business Model Canvas



WHAT?



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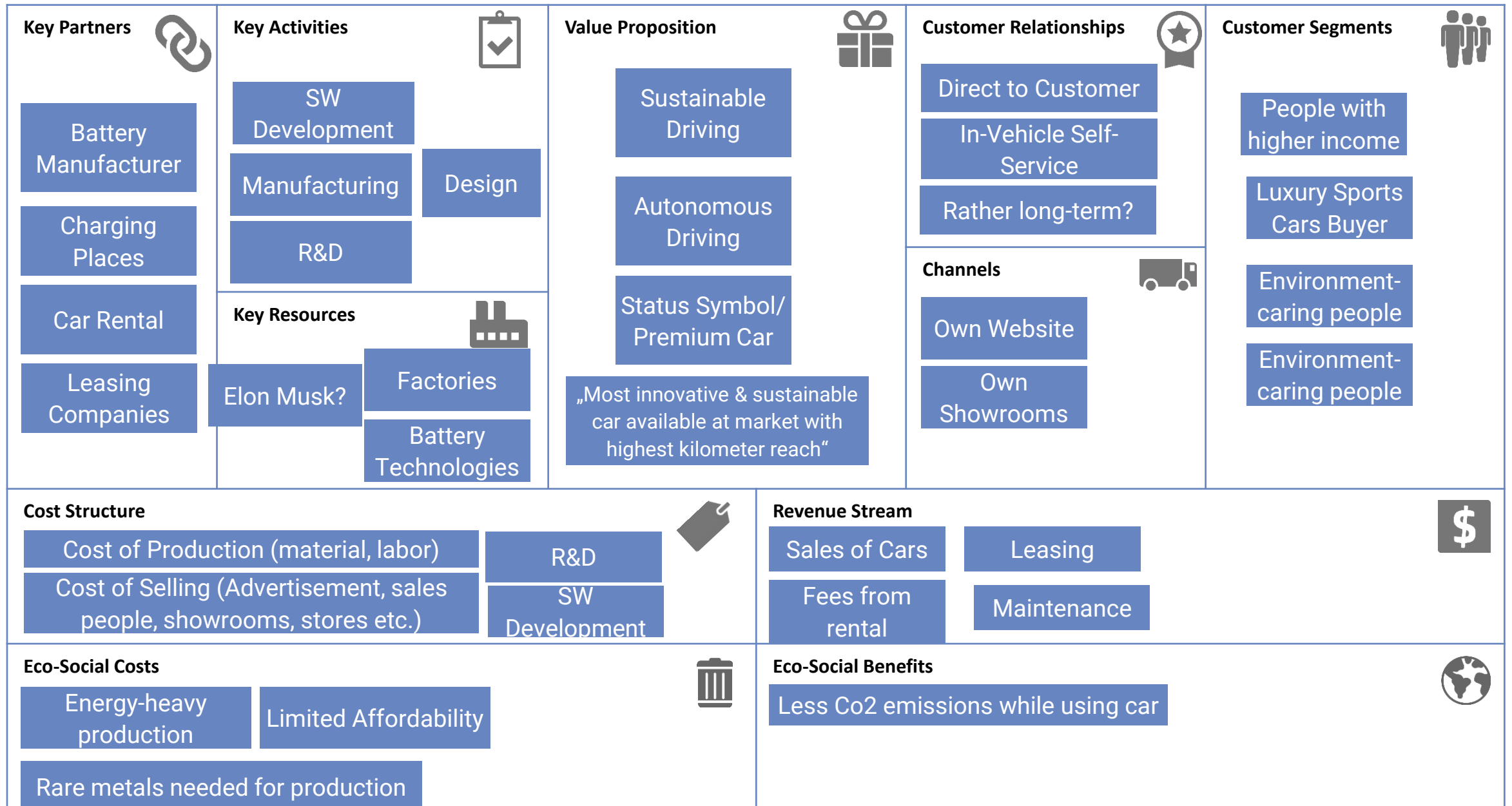


Revenue Streams
Cost Structure

WHY?

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Tesla Business Model Canvas



The Sustainable Business Model Canvas



Business Model Canvas is extended by 2 categories: The Eco-Social Costs and the Eco-Social Benefits of your product & services should be described:

What **ecological and social costs** is our business model causing?

What **ecological and social benefits** is our model generating?

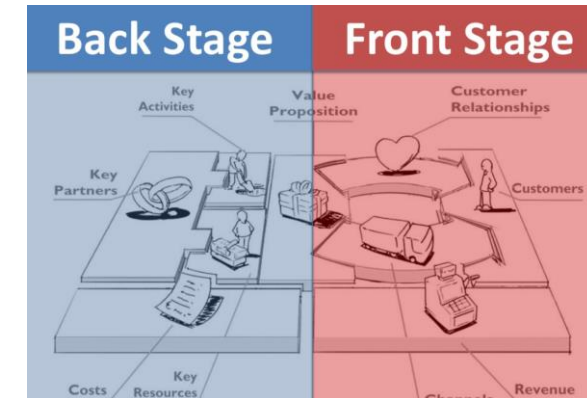
Key Partners  Motivation für Partnerschaften: Optimierung & Wirtschaftlichkeit Geringeres Risiko + Ungewissheit Erwerb von bestimmten Ressourcen und Aktivitäten	Key Activities  Produktionsaufgaben, netzbezogene Aufgaben, SW-Entwicklung, Werbung Key Resources  Beispiele: Fertigkeiten, Mitarbeiter, Produktionsanlagen, IP, Finanzen	Value Proposition  Neuheit, Leistung, Anpassung, Design, Marke/Status, Preis, Kostensenkung, Risikominderung	Customer Relationships  Beispiele: Langfristig, Mitgestaltung, automatisierte Dienste, Self-service, Personal Assistance, Communities Channels  Arten von Kanälen: Eigene Direkte (eigener Außendienst, Website, eigene Einzelhandelsgeschäfte) Partner indirekt (Großhandel, Einzelhandel, eigene Website)	Customer Segments  Beispiele: Masse, Nische, segmentiert, diversifiziert, lokal
Cost Structure  Beispiele: Fixkosten (Gehälter, Mieten, Versorgungsleistungen), variable Kosten, Größenvorteile, Verbundvorteile		Revenue Stream  Beispiel: Verkauf von Vermögenswerten, Nutzungsgebühr, Abonnementgebühr, Verleih/Vermietung/Leasing, Lizenzierung, Werbung		
Eco-Social Costs  z.B. negative Auswirkungen, die durch Partner, Ressourcen und anderem entstehen		Eco-Social Benefits  z.B. Verringerung der CO2-Emissionen, Verbesserung der Wasserqualität, Verringerung der Umweltverschmutzung, Verbesserung der globalen Gesundheit		

Group Work – Fill the Business Model Canvas

1. Find together in a group of max 3 students
2. Describe the business model of the following companies using the “Business Model Canvas” method
3. Fill in the BMC template

→ You have 50 minutes for steps 2+3

4. Be ready to present the BMC to the other students afterwards



Group

1

ZARA

Group

2

NETFLIX

Group

3

facebook

Group

4

Google

Group

5

UBER

Key Partners ⑧  Fahrer	Key Activities ⑦  • Verfügbarkeit ↳ App (Plattform) ↳ Fahrer ↳ Mitarbeiter • Werbung •	Value Proposition ②  • Transport selbst • Sicherheitsaspekt während des Transports, Kontrolle • Bequemer Transport, Schnelligkeit • Bequeme Buchung • Verlässlichkeit • Niedrigere Kosten im Vergleich • Sichere Zahlung (attraktiv für Fahrer)	Customer Relationships ④  • Direkter E-Mail Kontakt • Rabattaktionen, Cashback, Voucher • User Ona (Abo-Modell) • Bewertungssystem	Customer Segments ①  Massenmarkt Alter 18-65 Reisende, Stadtbewohner
	Key Resources ⑥  • Mitarbeiter } Menschen • Kunden • Daten		Channels ③  • Application Direkt • E-Mail Indirekt • Printwerbung • Social Media	
Cost Structure ⑤  • Fahrer (variabel) • Mitarbeiter (fixiert) • Instandhaltung der Plattform • Verleumdungen			Revenue Stream ⑤  • Kundenzahlung für Transport 65% • Trinkgeld 5% • Kundendaten (Verkauf) 20% • Abo einnehmen (unabhängig von Fahrer) 10%	
Eco-Social Costs ⑩  • CO2 Ausstoß • Disruptive Wirkung auf Taxi Branche			Eco-Social Benefits ⑨  • Weniger eigene Autos (Parkplätze) • Weniger berufliche Politik	

Key Partners  Produktions-firmen Werbepartner Rechteinhaber Inhaber der Techn. Infrastruktur Medienkonz.- Film- und Prod.-Ges.	Key Activities  Eigenproduktionen Rechtssicherung Werbung Markenanalyse Key Resources  Mitarbeiter Techn. Infrastruktur	Value Proposition  Verfügbarkeit, Exklusivität, günstig durch Sharing, familiengeeignet	Customer Relationships  Langfristig + sehr geringe Mitgestaltung Channels  Website und App (TV, Phone)	Customer Segments  Segmentiert ca. 14 - 55 J + Erweiterung auf ältere Zielgruppe <u>Mass</u>
Cost Structure  Gehälter, Mieten, ... Leasing Techn. Infrastruktur, Marketing			Revenue Stream  Abonnementgebühr Werbung (USK) Datenverkauf?	
Eco-Social Costs  CO2, geringe Gehälter, Wettbewerbs- druck, soz. Verhältnisse			Eco-Social Benefits  Ressourcen einsparen, für alle verfügbar, überall verfügbar	

Sustainable IT & Digital Transformation

The groundings: the strategic resources and their effects



ELECTRICITY to CO₂

- **3% of the global electricity supply** (+2% of total GHG emissions) is generated by Big Data and Cloud Computing alone
- Training a single model of AI injects into the atmosphere more CO₂ than five cars during their entire life-cycle



WATER

- A medium-sized data center (~15 megawatts) uses roughly **the same amount of water as three medium-sized hospitals** (130 gallons, roughly 492 million liters)

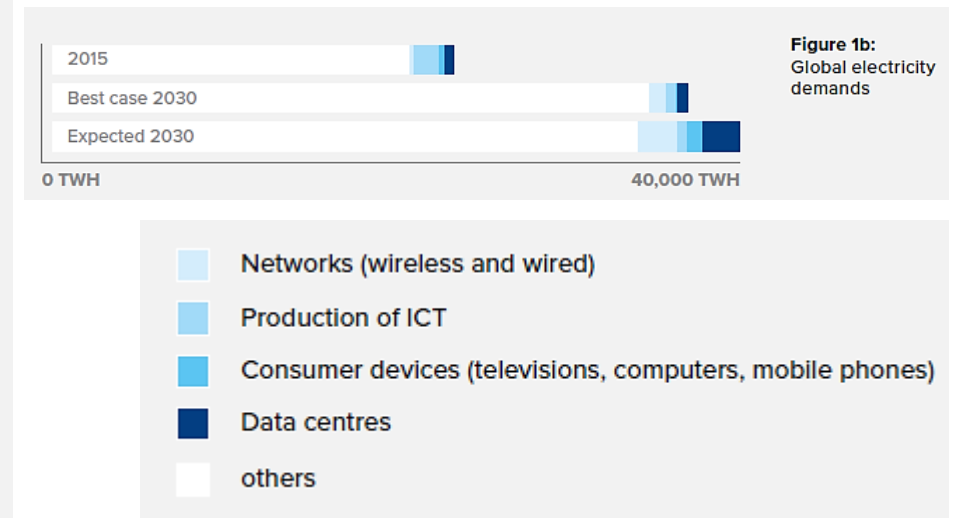
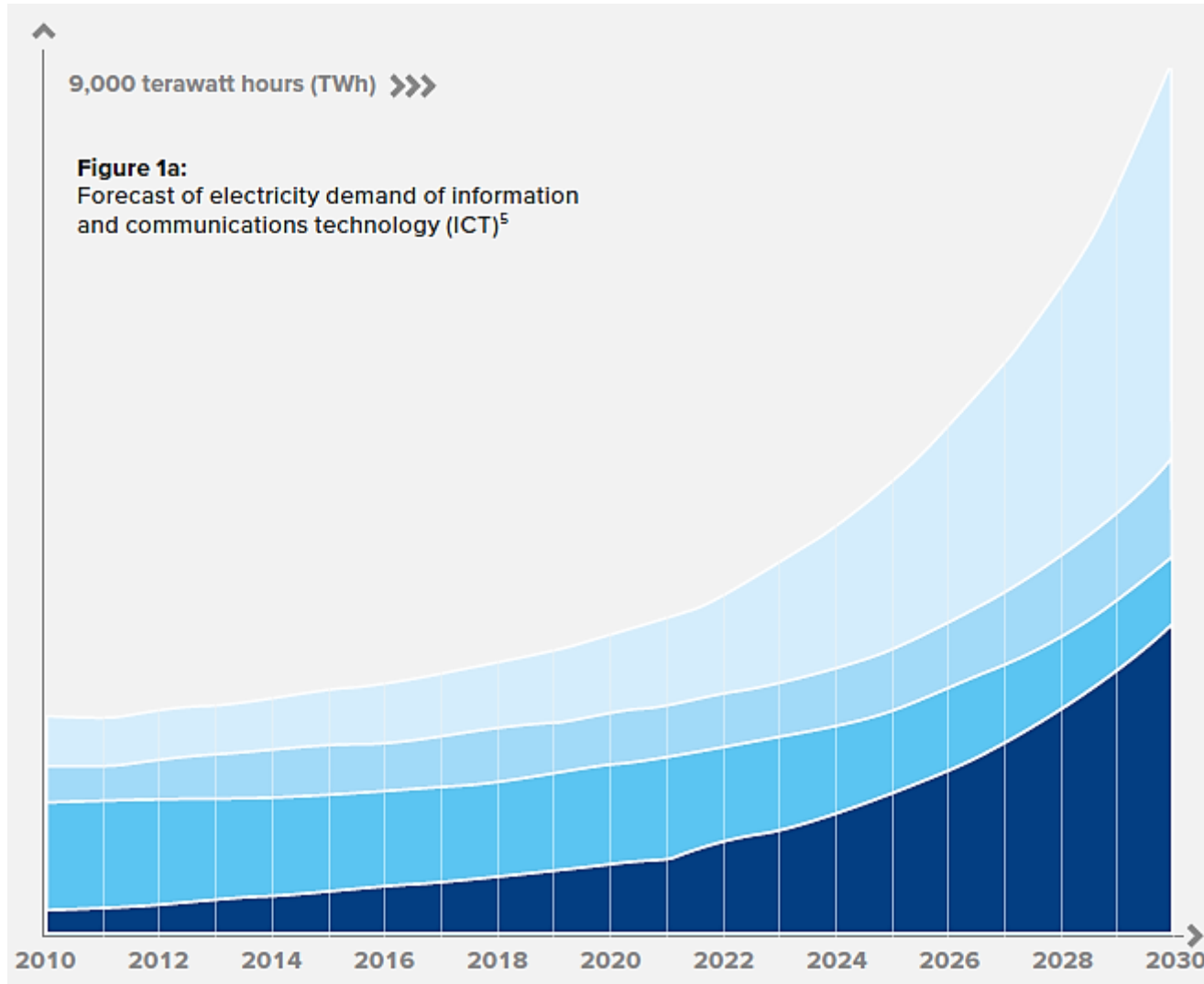


NATURAL MINERALS

- Effects of the extraction of rare metals required to produce smartphones and hard drives are hardly quantifiable but macroscopic, since that process is directly responsible for an increase in air and soil pollution, as well as the production of wastewater rich in radioactive waste

Key Partners ⑧  Fahrer	Key Activities ⑦  • Verfügbarkeit ↳ App (Plattform) ↳ Fahrer ↳ Mitarbeiter • Werbung • Key Resources ⑥  • Mitarbeiter } Menschen • Kunden • Daten	Value Proposition ②  • Transport selbst • Sicherheitsaspekt während des Transports, Kontrolle • Bequemer Transport, Schnelligkeit • Bequeme Buchung • Verlässlichkeit • Niedrigere Kosten im Vergleich • Sichere Zahlung (attraktiv für Fahrer)	Customer Relationships ④  • Direkter E-Mail Kontakt • Retentionen, Cashback, Voucher • User On- (Abo-Modell) • Bewertungssystem Channels ③  • Application Direkt • E-Mail Indirekt • Printwerbung • Social Media	Customer Segments ①  Massenmarkt Alter 18-65 Reisende, Stadtbewohner
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Development Electricity demand of information & communications technology



Digitalization and Sustainability influence each other

Digitalization with negative side effects on society and corporates



- Threatened customer and user privacy due to extensive data collections
- Algorithm based decisions might discriminate certain groups

→ Trustworthy AI

Digitalization as challenge for a fair and eco-friendly development



- Increasing energy demands and CO2 emissions due to
 - Digitalization projects and their demands on hardware
 - Resource intensive technologies (e.g. BlockChain, KI)
- Linear product cycles for hardware and devices result in social and ecological challenges in production and disposal

Digitalization fosters Sustainability



- Digitalization endeavors create profound data basis, which enables
 - making more fact-based and sustainable decisions
 - Better prognosis to achieve sustainability goals
- Creates transparency and trust among all stakeholder groups
- Drives resource efficiency and savings through digitalized processes

Environmental motivations – “it’s about time”

Energy consumption is increasing by rising need for computing services & data centers ...

- **Energy consumption of DCs** in Europe expected to increase from 2018 to 2025 **by 21%**. Share of Cloud DCs expected to increase from 35% to 60%¹
- Amount of Energy used by DCs **doubles every four years**²
- **ICT industry** is expected to **account for 8% of total electricity** demand by 2030 (Worst case scenario expects 20,9%)³



...but cloud services can also be a far more sustainable than traditional on-premises DCs & IT services

- **Shifting** from on-premise DCs **to the public cloud** can reduce an enterprise’s **energy usage by almost 80%** and cut **carbon emissions of workloads by up to 96%**⁴
- According to a recent report by International Data Center (IDC), **cloud computing can possibly eliminate 1 billion metric ton of CO2 emission** from 2021 to 2024. This is equivalent to the total emission of 218 million cars over an entire year!⁵
- Studies by Hyperscalers show that Cloud services are much more efficient concerning energy consumption & carbon emission compared to on-premise equivalents



Overall energy consumption of ICT industry is rising going along with the broader usage of cloud services. At the same time, **cloud services** can be much more **energy-efficient** than their on-premises equivalents, supporting a more sustainable way of computing. Additionally, cloud services can be the **accelerator for new innovative sustainable use cases**. The key is to **design cloud services as environmental-friendly** as possible.

We can help you with this!

¹ EU report: Energy-efficient Cloud Computing...

² <https://www.datacenterknowledge.com/industry-perspectives/data-center-dilemma-our-data-destroying-environment>

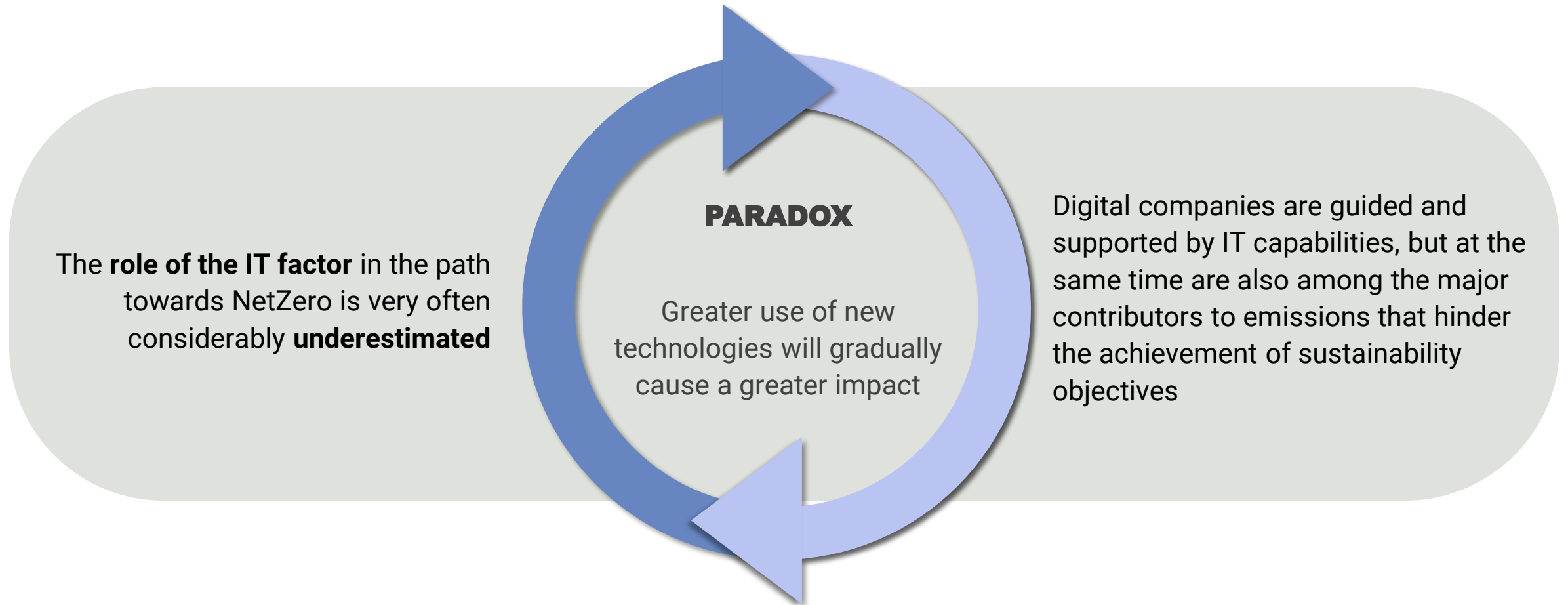
³ <https://www.nature.com/articles/d41586-018-06610-y>

⁴ <https://www.aboutamazon.eu/news/aws/eu-businesses-that-move-to-aws-cloud-can-improve-energy-efficiency-and-reduce-carbon-emissions>

⁵ <https://www.capgemini.com/no-no/2021/04/cloud-sustainability-the-case-for-carbon-accounting-in-it/>

The Role of «Green IT» - the paradox

IT emissions already amount to 3% of all CO2 emissions, by 2030 that figure is destined to triple due to the exponential diffusion of digital technology



Using digital twin concept to manage buildings efficiently

VASAKRONAN

**Brookfield
Properties**



Using Azure Digital Twin to combine data from 30 different sources into one model of entire building and all systems within it

If performance of an asset starts to slip, operators proactively change or service the equipment before energy is wasted or it affects the tenant experience.

Analysis of data over time improves performance and shapes future asset strategies, resulting in further operational and economical savings

Energy savings >20%

Using IoT to charge electrical vehicle with sustainable energy



Clever

Leading Mobility Service Provider

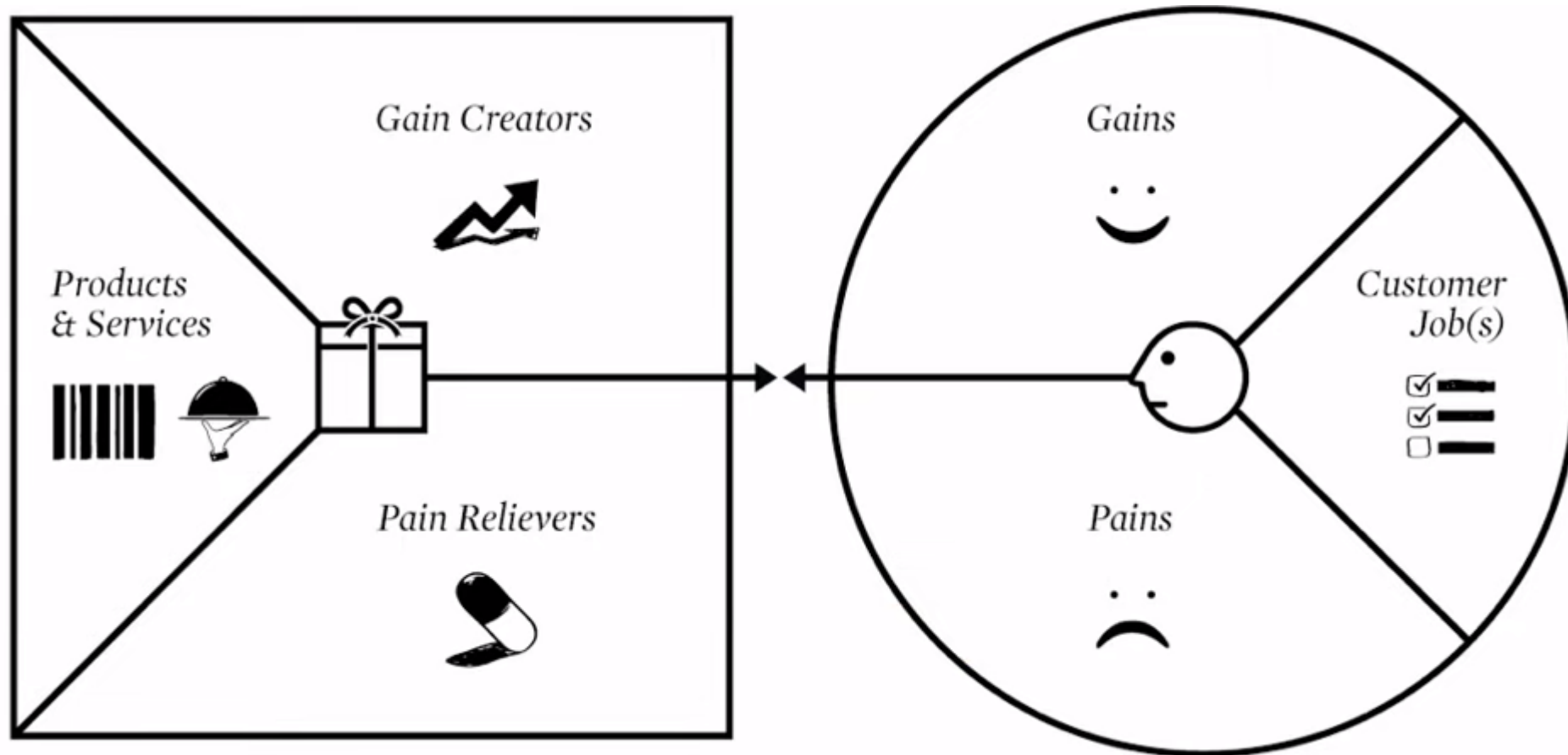
Optimize consumption of energy generated from wind turbines **at night** (~40% more sustainable energy in power mix) to power Electrical Vehicles by day; **users can see when demand on energy is lowest**

Smart Grid technology → predictably charge to balance energy consumptions

Azure: Connect IoT sensors to charging station to deliver data insight for SW deployments, storage & retrieval charging-point data for reporting, reimbursements, charging transaction

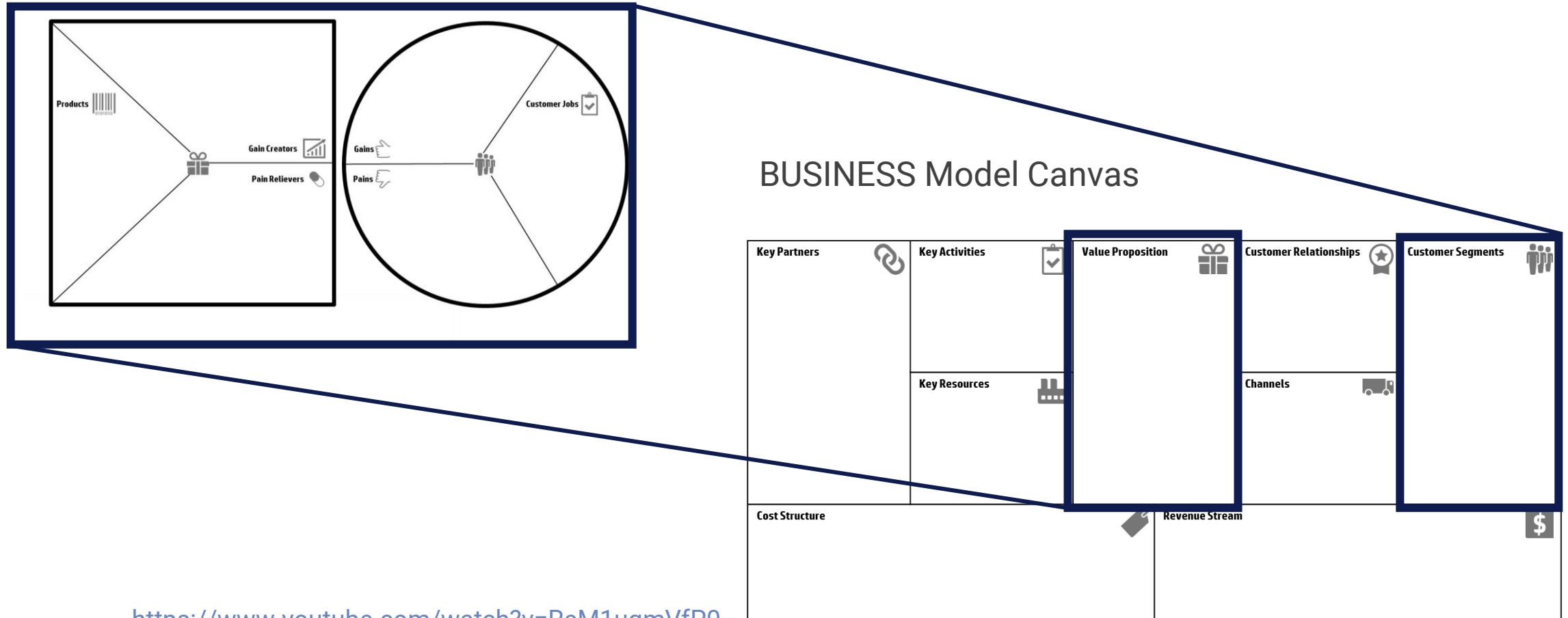
Value Proposition Canvas (VPC)

Value Proposition Canvas (VPC)

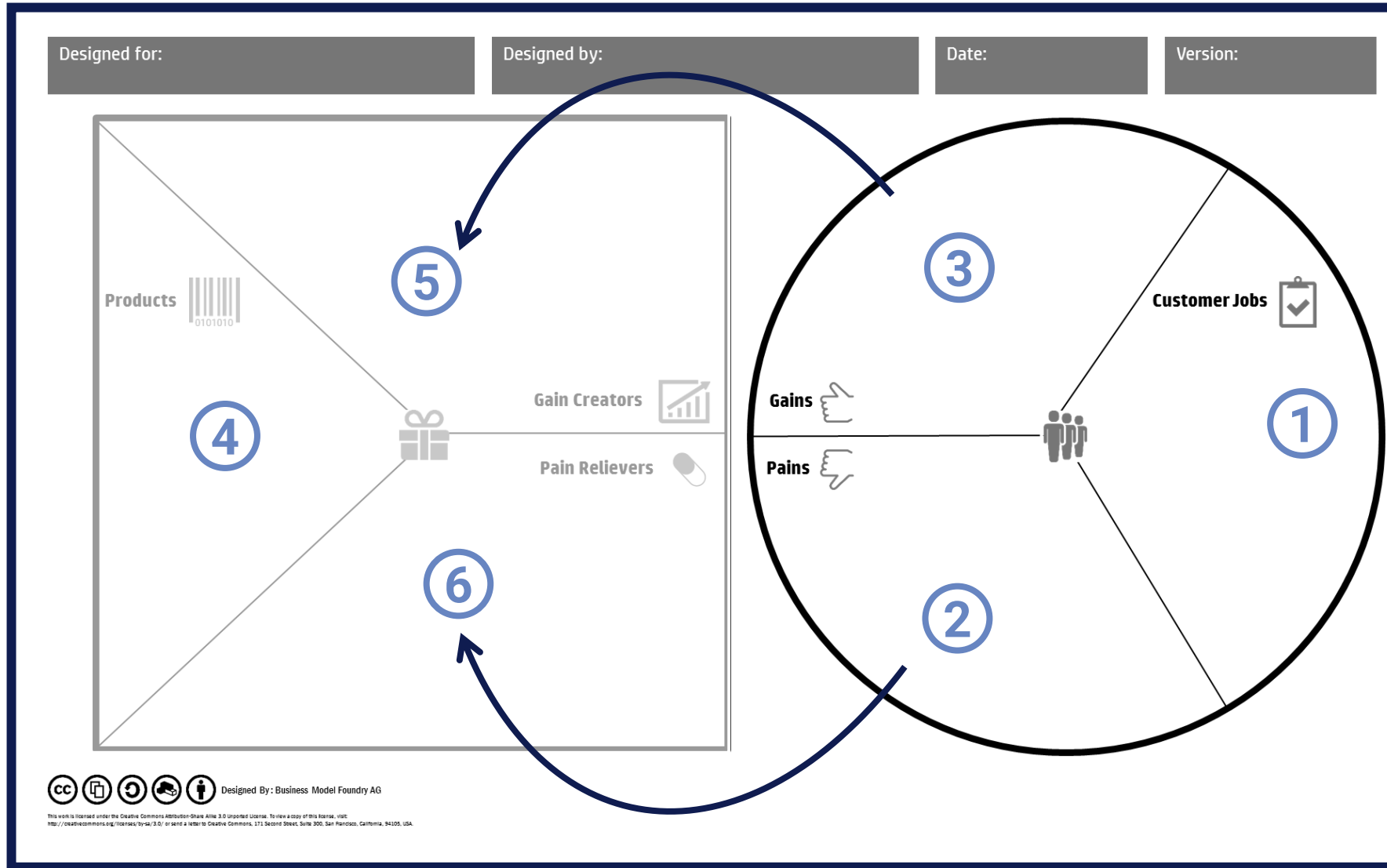


<https://www.youtube.com/watch?v=aN36EcTE54Q>

Creating unique value by using the **value proposition canvas**



Value Proposition Canvas



WHAT?



Customer Jobs

Pains
Gains

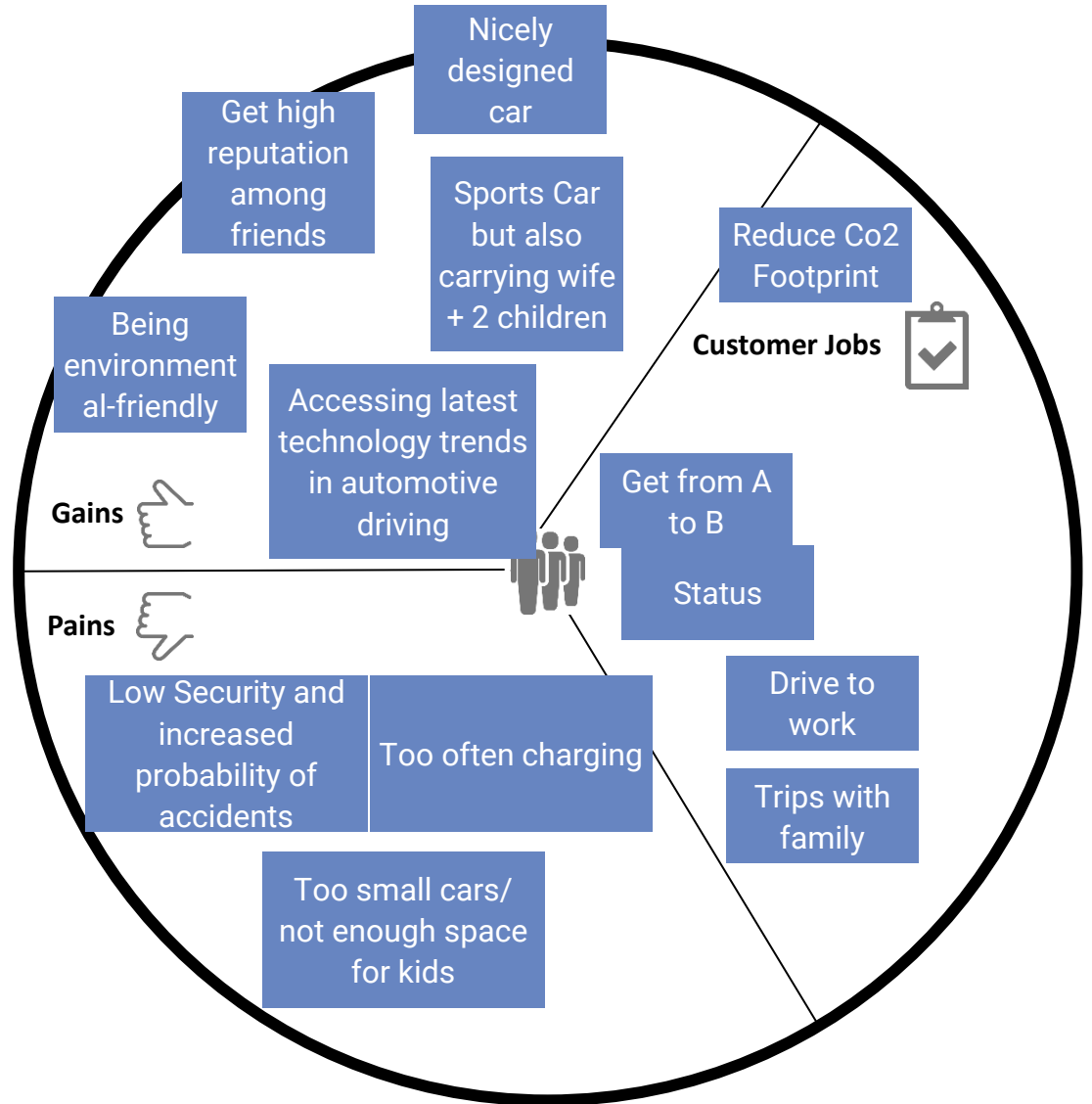
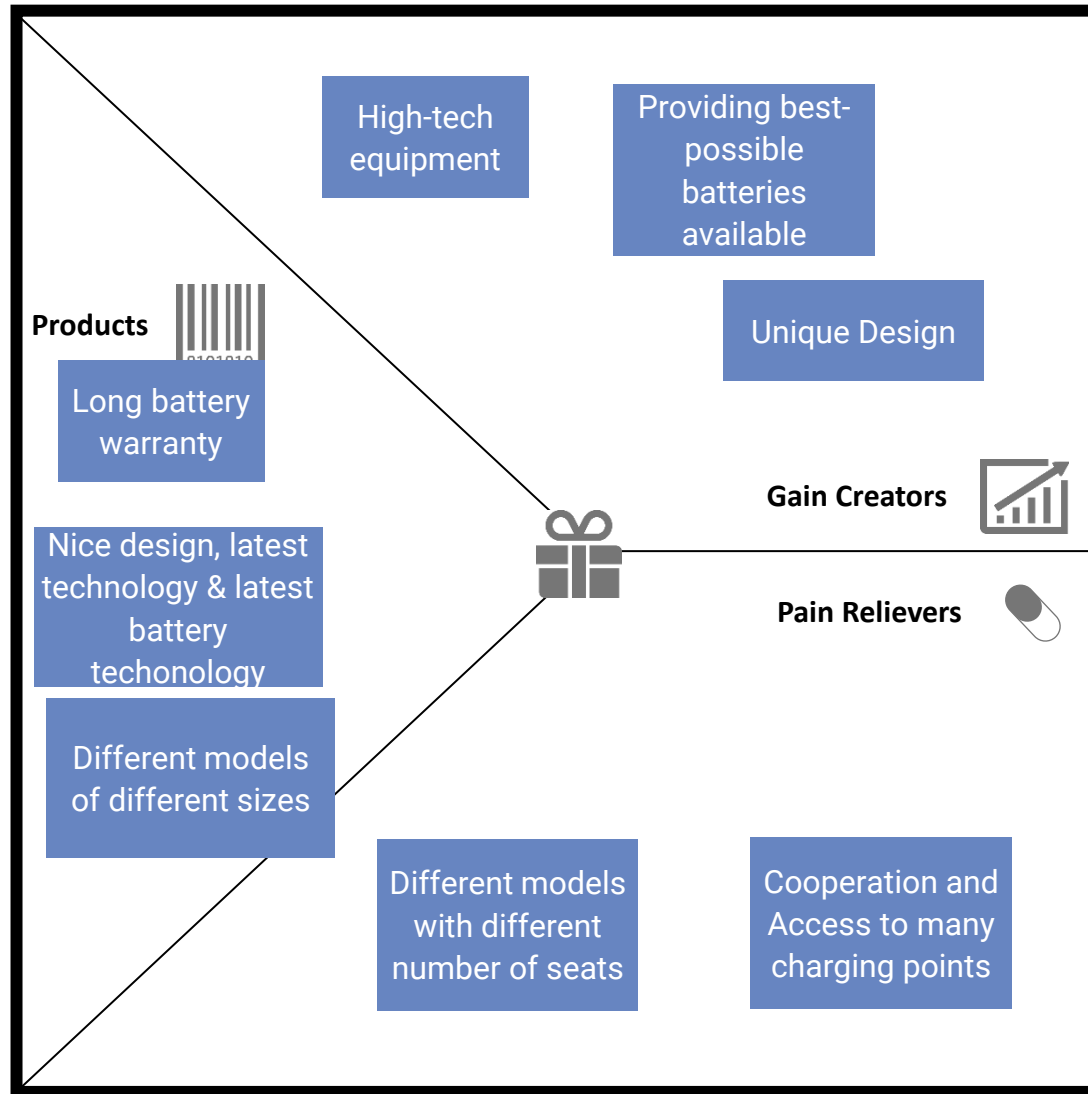


Pain Relievers
Gain Creators
Products & Services

WHY?

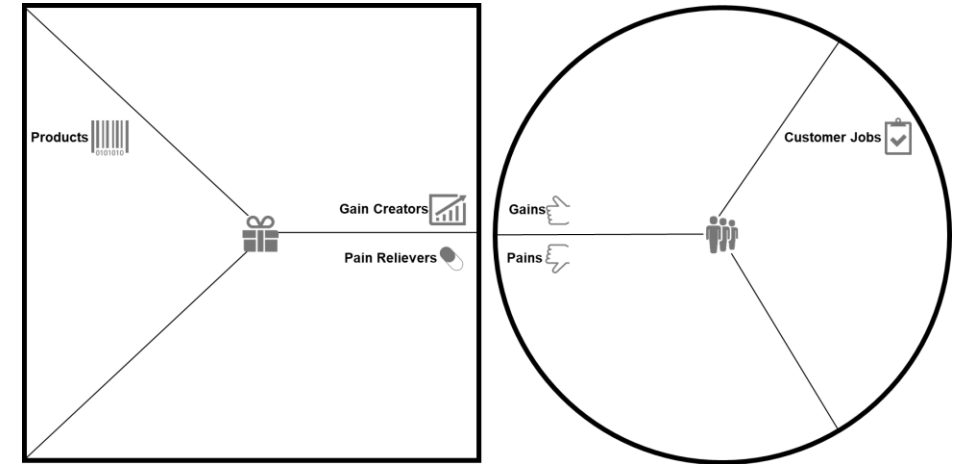
*"The Value Proposition Canvas makes explicit how you are creating **value for your customers**. It helps you to design **products and services your customers want**."*

Value Proposition Canvas Tesla



Group Work – Fill the Value Proposition Canvas

1. Find together with the same group as before
2. Describe the value proposition of the same company as before using the “Value proposition Canvas” method
3. Fill in the VPC template
- You have 40 minutes for steps 2+3
4. Be ready to present the VPC to the other students afterwards (~ 5 minutes)



Group

1

ZARA

Group

2

NETFLIX

Group

3

facebook

Group

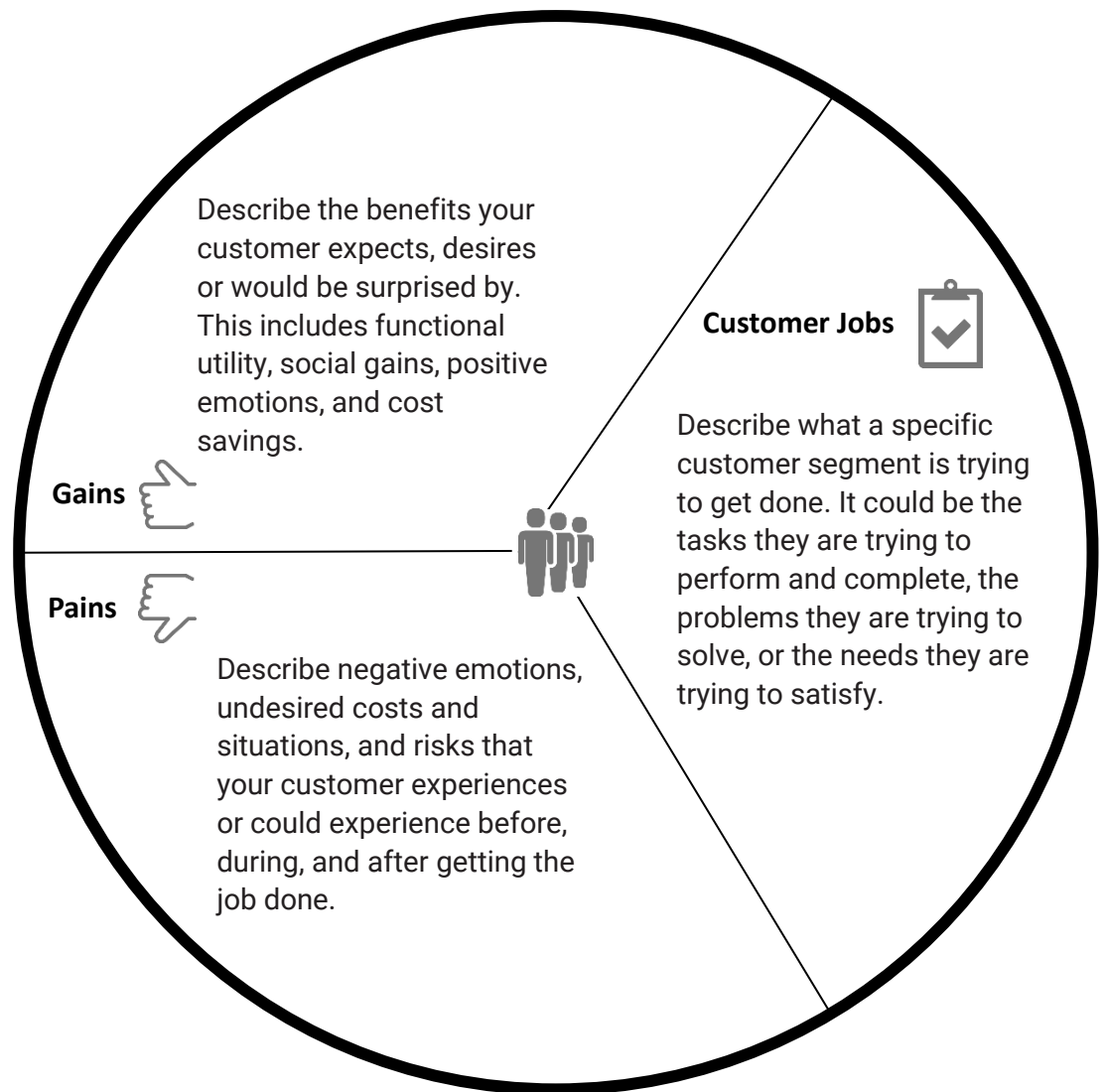
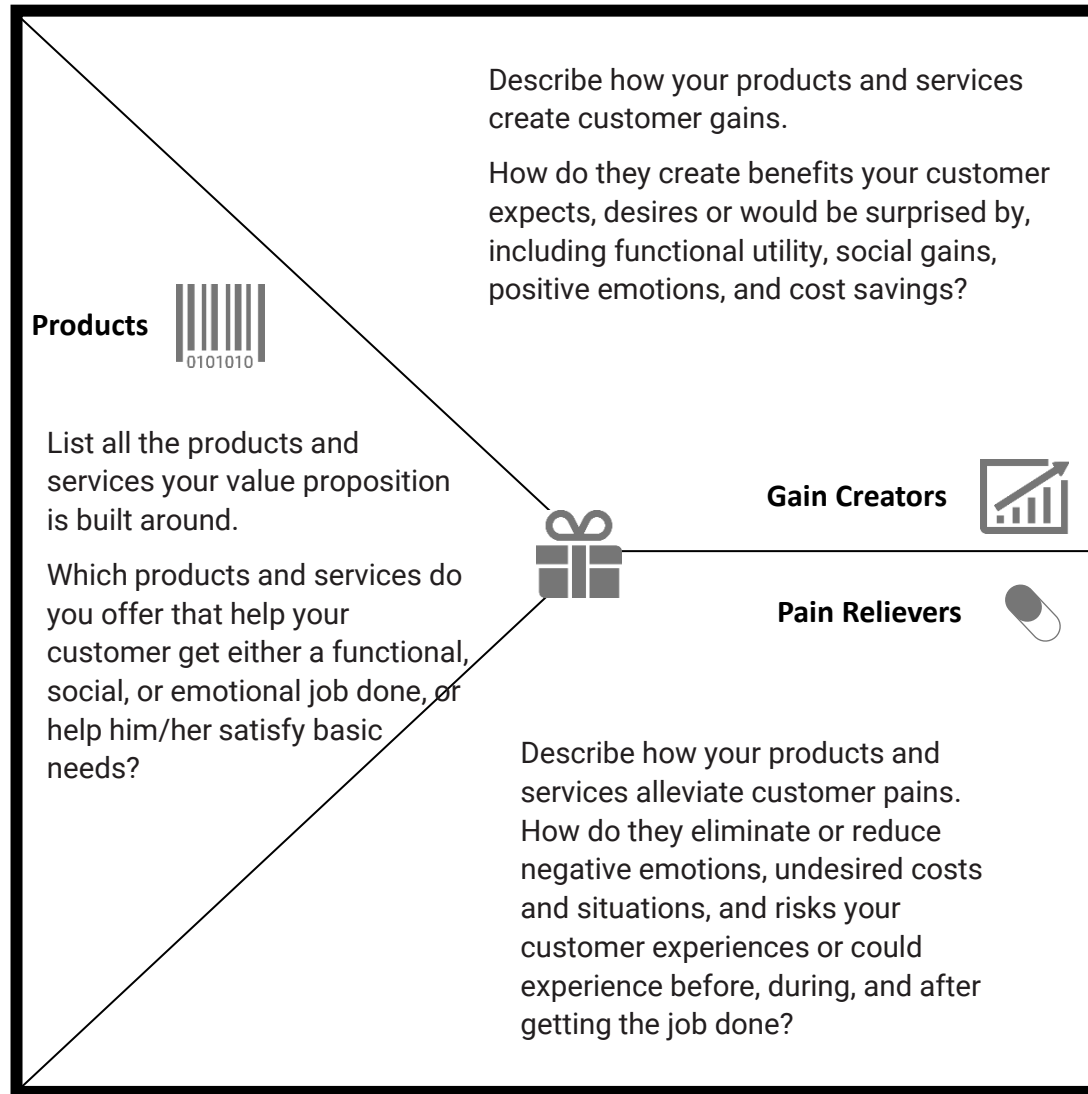
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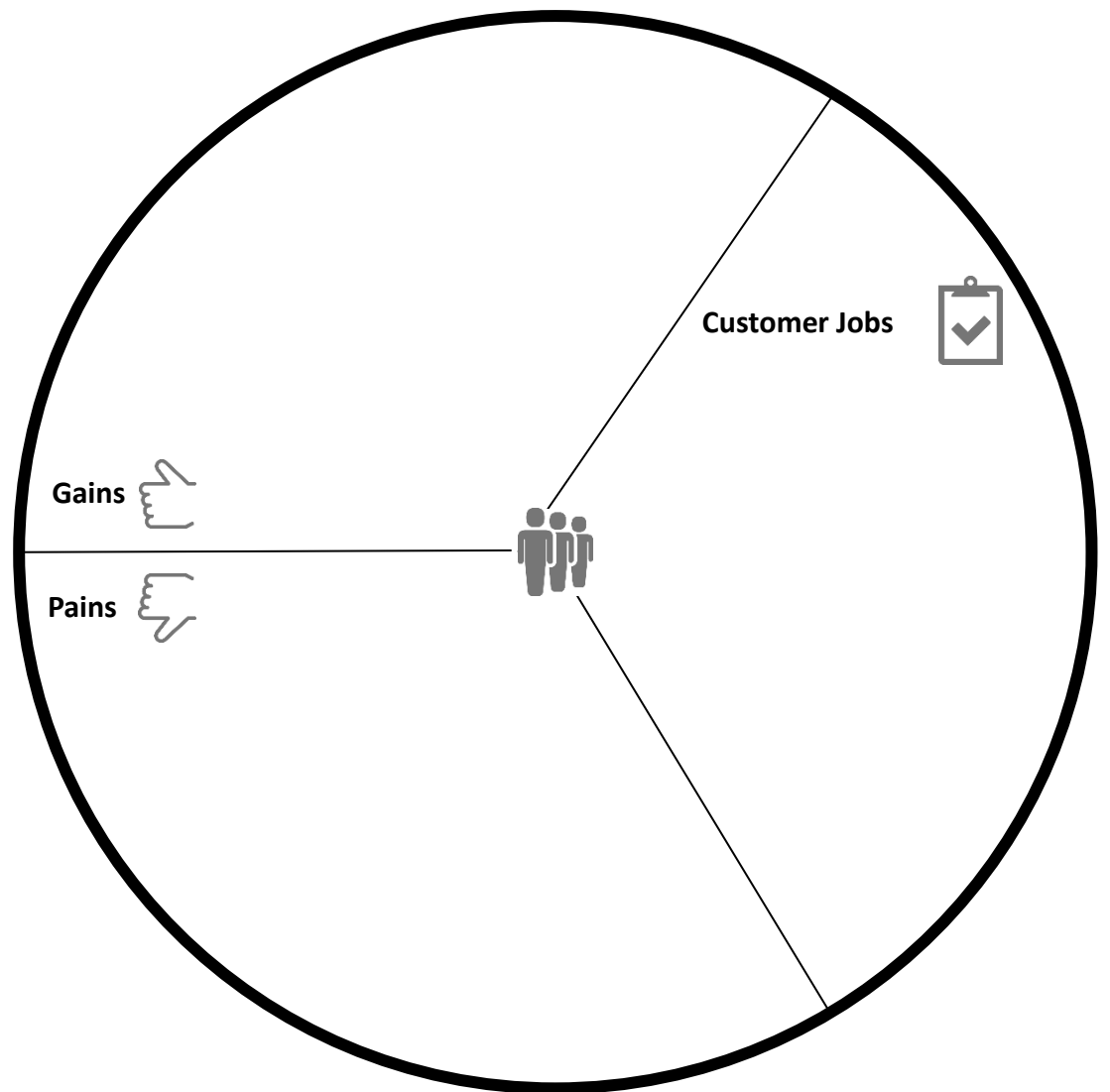
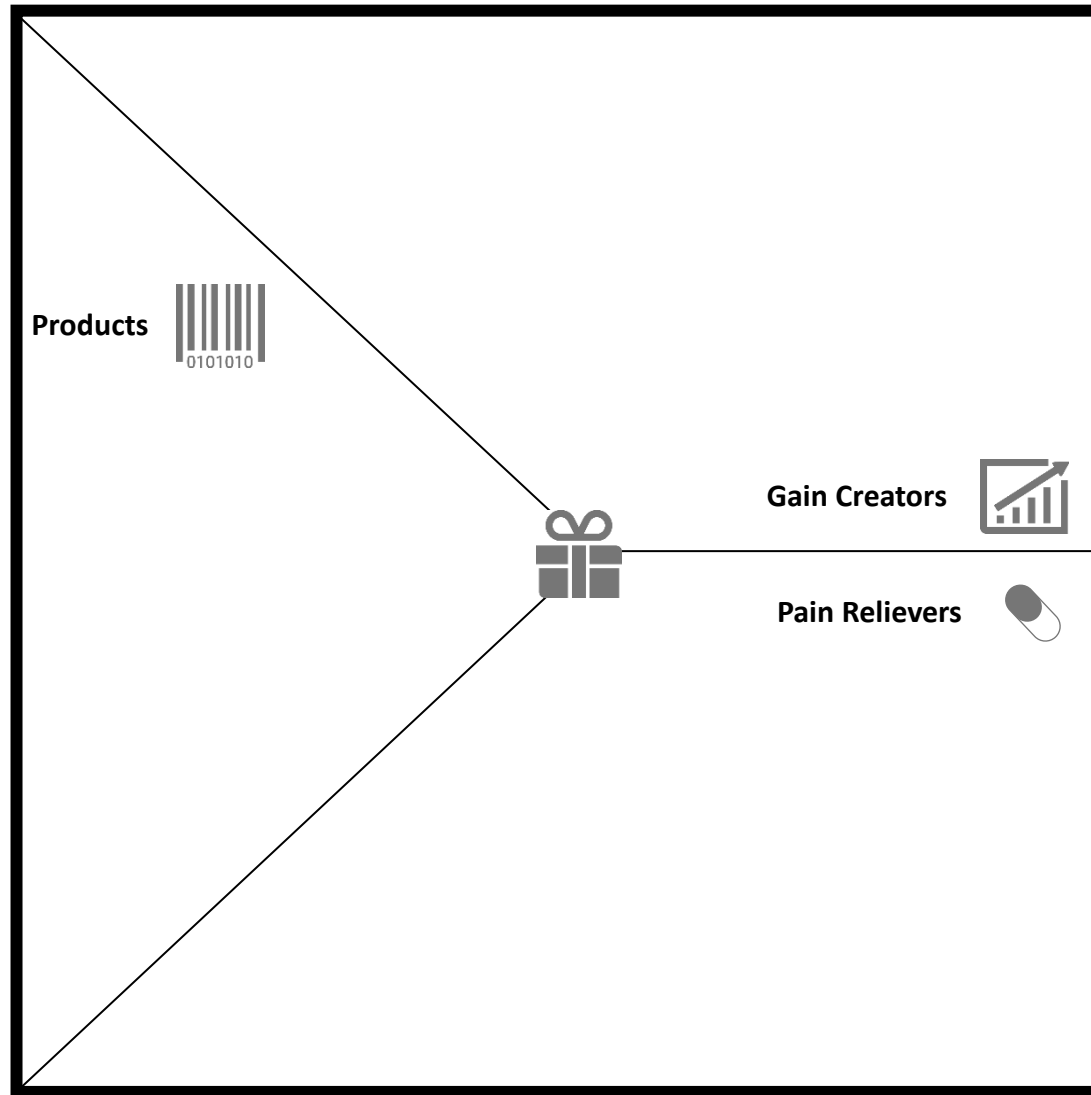
Google

Group

5

 UBER





Products



Listen Sie alle Produkte und Dienstleistungen auf, auf denen Ihr Wertversprechen (value proposition) beruhen.

Welche Produkte und Dienstleistungen bieten Sie an, die Ihrem Kunden helfen, entweder eine funktionale, soziale oder emotionale Aufgabe zu erfüllen, oder die ihm helfen, grundlegende Bedürfnisse zu befriedigen?

Bietet Ihr Produkt Einsparungen, mit denen Ihr Kunde zufrieden ist? Zeit, Geld, Aufwand
Gewährleistet es die Ergebnisse, die der Kunde erwartet? Qualitätsniveau, mehr von etwas.

Vereinfacht es die Arbeit oder das Leben des Kunden? Geringere Lernkurve, bessere Benutzerfreundlichkeit, integrierte Dienste
Bietet sie etwas, das Ihr Kunde haben möchte? Gutes Design, bessere Funktionalitäten

Spiegelt Ihr Produkt/Ihre Dienstleistung einige der Träume Ihres Kunden wider? Hilfe beim Erreichen von Zielen

Liefert es positive Ergebnisse, die den Kriterien für Erfolg und Misserfolg des Kunden entsprechen?

Erleichtert es die Akzeptanz?

Gain Creators



Pain Relievers



Bietet Ihr Produkt/Ihre Dienstleistung Einsparungen? (In Bezug auf Zeit, Geld, Aufwand usw.)

Verbessert es den emotionalen Zustand Ihres Kunden (Verringerung von Ärger, Irritationen, Dingen, die Kopfschmerzen bereiten)?

Behebt es die Mängel der bestehenden Lösungen?
Beseitigt es die Schwierigkeiten oder Probleme, die Ihr Kunde hat?

Schließt Ihr Produkt/Ihre Dienstleistung die negativen sozialen Folgen aus, die Ihre Kunden erleben oder fürchten?

Verringert es die Risiken, vor denen sich Ihre Kunden fürchten?

Hilft es Ihren Kunden, nachts besser zu schlafen?
Begrenzt oder beseitigt sie häufige Fehler, die sich Kunden erlauben?

Beseitigt sie Hindernisse, die Ihre Kunden von der Umsetzung der spezifischen Lösung abhalten?

Was macht Ihren Kunden glücklich (Zeit, Geld, Aufwand, etc.)?

Welche Ergebnisse erwartet Ihr Kunde, und was kann diese Erwartungen übertreffen? Qualitätsniveau, Gewinne und Gewinne, Einsparungen und Verbesserungen)

Was würde die Arbeit oder das Leben Ihres Kunden vereinfachen? (Mehr Dienstleistungen, niedrigere Kosten, neue Funktionen usw.)

Welche positiven sozialen Auswirkungen möchte Ihr Kunde erreichen? Machtstatus, Zufriedenheit, Motivation)

Wonach suchen sie? (Ein intelligentes Design, Garantien, besondere Merkmale usw.)

Wie misst der Kunde Erfolg und Misserfolg? Kosteneffizienz, Geschwindigkeit, Qualität, Schönheit, wie auf SM)

Was würde die Wahrscheinlichkeit erhöhen, dass mein Kunde die Lösung annimmt? Geringere Investition, längere Garantie, bessere Leistung, Qualität)

Gains



Pains



Was findet Ihr Kunde zu kostspielig (etwas, das viel Zeit in Anspruch nimmt, zu viel Geld kostet, einen hohen Aufwand erfordert usw.)?

Wodurch fühlt er/sie sich schlecht? Enttäuschung, körperlicher Schmerz

Welche aktuellen Lösungen passen nicht zu Ihren Kunden?

Welches sind die größten Herausforderungen und Probleme, mit denen Ihr Kunde konfrontiert ist? (Mangelndes Verständnis der Funktionsweise, Schwierigkeiten bei der Umsetzung usw.) Intellektuelle, emotionale Einschränkungen, etwas zu tun

Mit welchen negativen sozialen Folgen ist der Kunde konfrontiert oder befürchtet diese? (Verlust von Ansehen, Glaubwürdigkeit, Vertrauen, sozialem Status)

Welche Risiken fürchtet Ihr Kunde? (finanziell, sozial, technisch, usw.)

Was hält meinen Kunden davon ab, Lösungen anzunehmen?

Customer Jobs

Welche Aufgaben versucht Ihr Kunde zu erfüllen? (z. B. ein bestimmtes Problem ausführen, ein bestimmtes Problem lösen usw.), alltägliche Aufgaben, Probleme bei der Arbeit

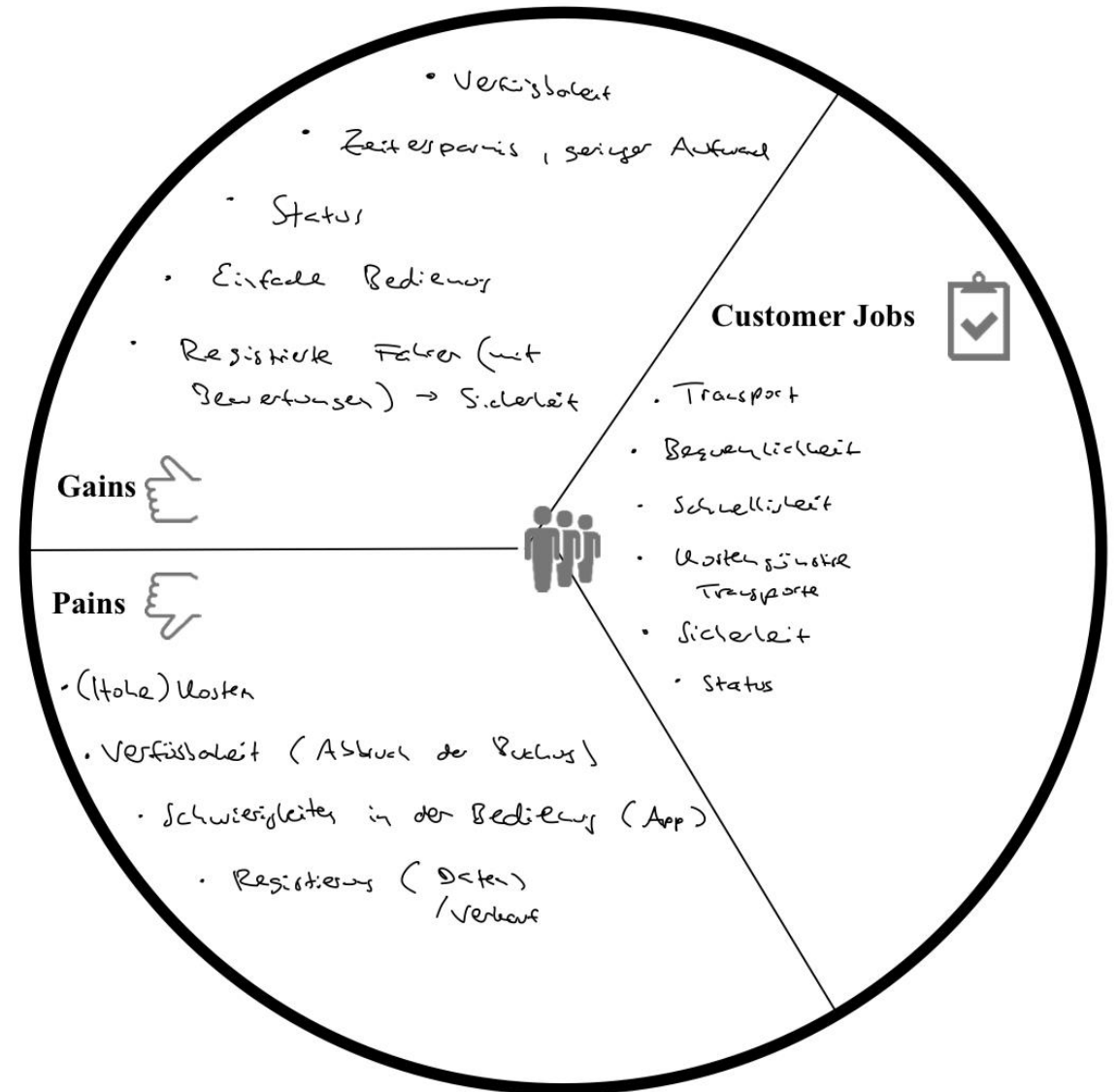
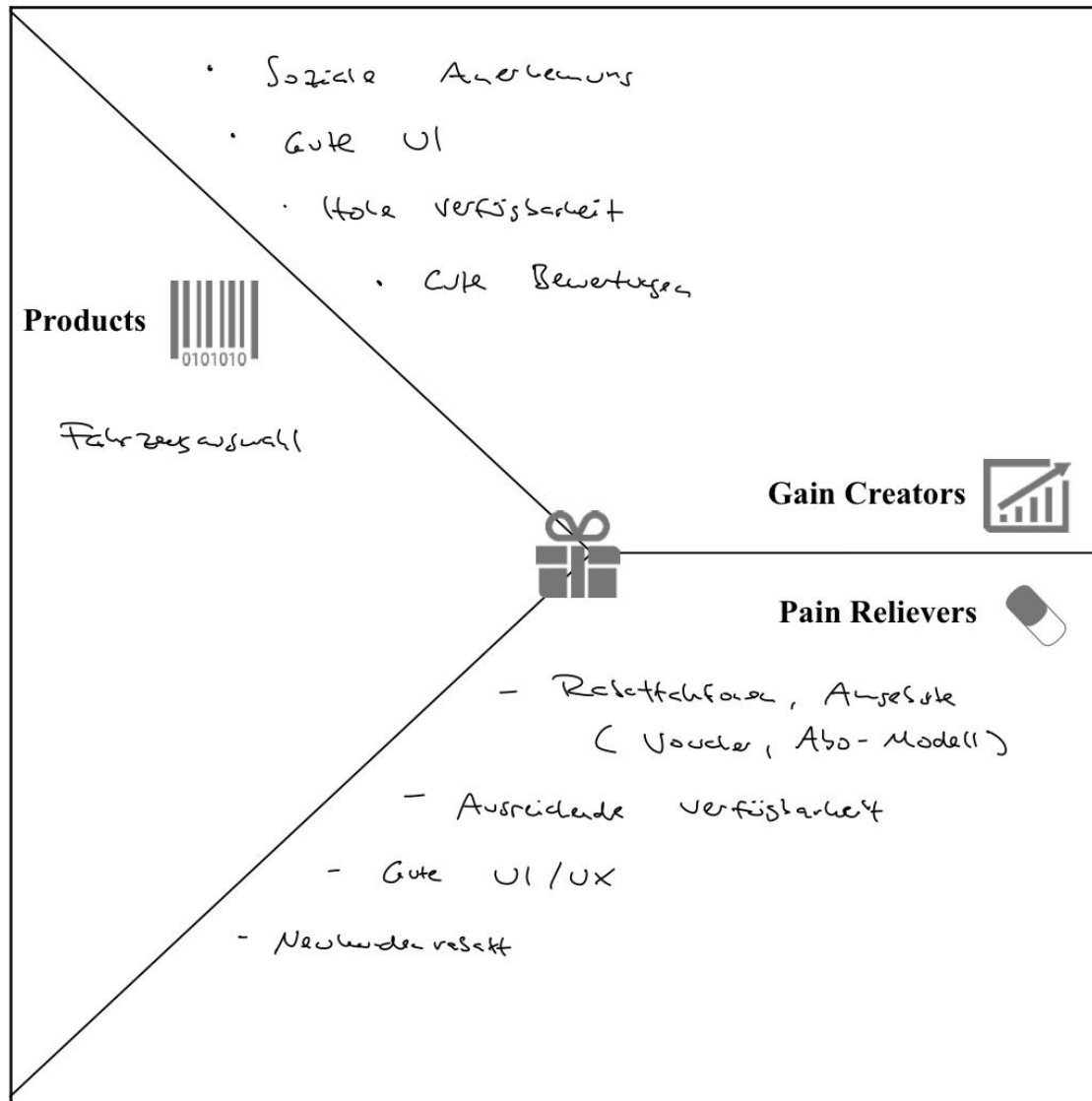
Welche sozialen Ziele versucht Ihr Kunde zu erreichen? Beförderung, Statusgewinn, ein Netzwerk

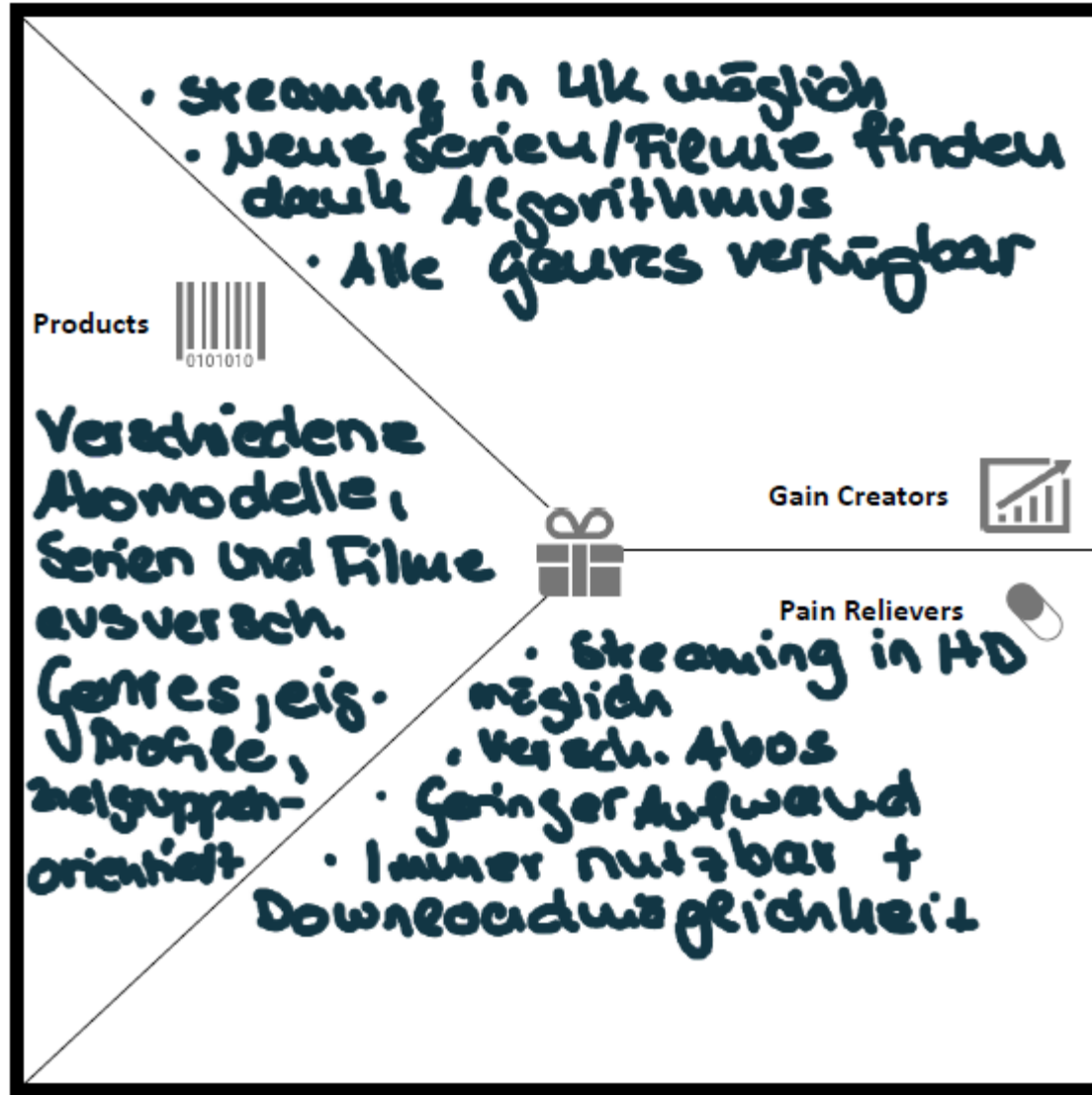
Was sind die emotionalen Ziele Ihres Kunden? In Form kommen, sich gut fühlen, motiviert sein

Mit welchen Tätigkeiten sind sie zufrieden?
Wie wollen Ihre Kunden von anderen wahrgenommen werden?

Was können sie tun, um dies zu erreichen?
Wie möchte sich Ihr Kunde fühlen?

Was muss er/sie tun, um das zu erreichen?
Verfolgen Sie die Interaktion des Kunden mit Ihrem Produkt während des gesamten Konsumzyklus. Was sollte der Kunde in dieser Zeit tun?





Homework:
Think about a business idea

Homework: Think about a business idea

1. What kind of area do you want to re-innovate?
2. Which existing problem/challenge do you want to solve? Think about your every-day life, what would improve your life etc.
3. Which industry does your idea belong to?
4. Which product/service do you want to offer?
5. Be creative 😊

→ Just make some notes, we need these ideas in the next lecture

How to come to a successful business idea?

Criteria of a successful business idea

1. Enthusiasm
2. Market
3. Implementation & Realism

How to get to a business idea?

- „Painspotting“
 - Analyze and understand market needs
 - Who is complaining about what?
 - What could be done easier?
 - What is too important?
 - What are people annoyed about?
- Analyze trends
 - What is discussed at the moment?
 - What are latest product/services?
 - Look for data from market research institutes, reports etc.

How to get to a business idea?

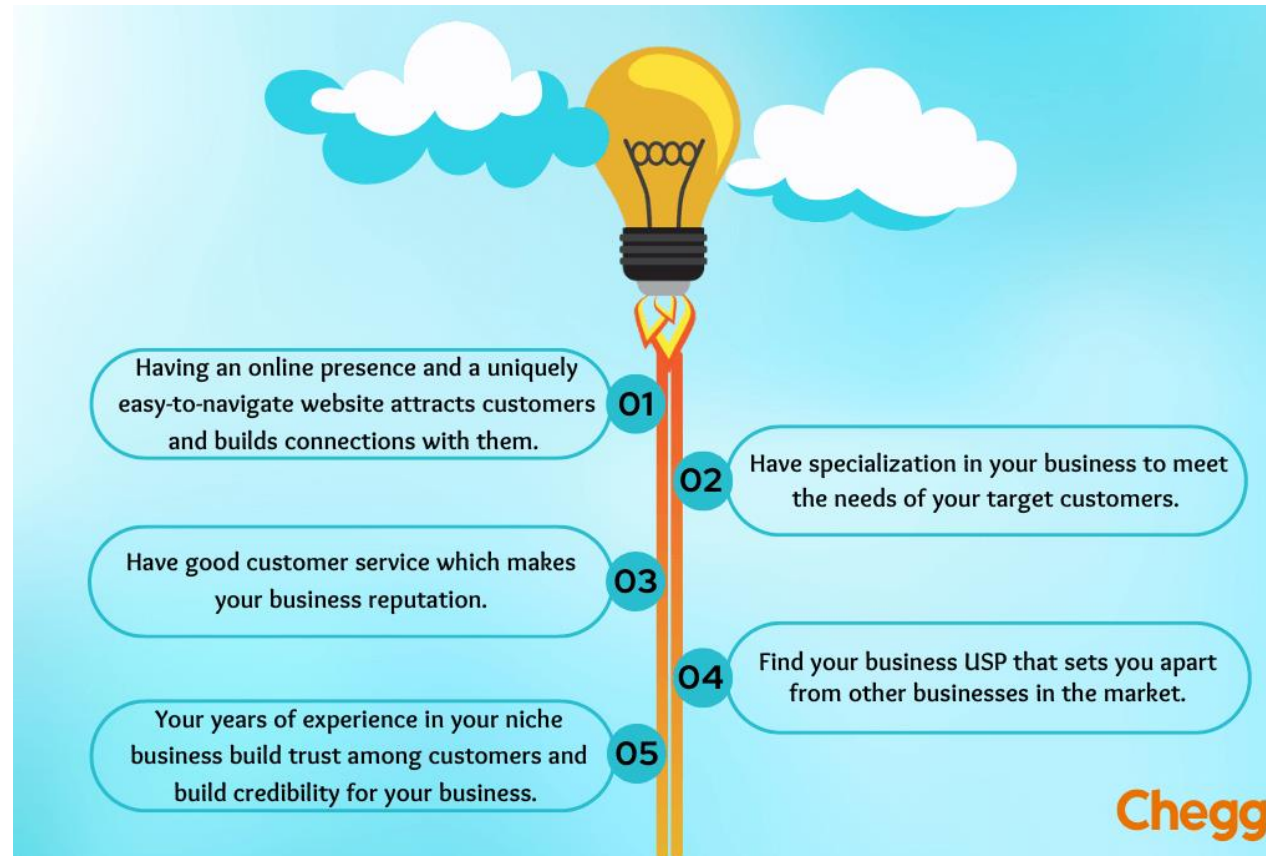
- Solve a problem
- Try different possibilities
 - Completely new, disruptive ideas
 - Optimize, develop existing products and services (adopt to client needs and easy usage)

4P-Strategy

- Around which element do you want to form your business idea?
 - Passion
 - People (Audience)
 - Problem
 - Product

<https://www.visartech.com/blog/tech-business-ideas-ultimate-list/>

How to make your business ideas unique



RECAP

Exam - Overview

Introduction to exam - Overview

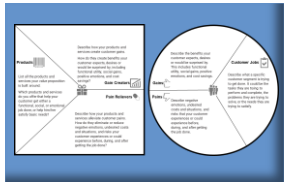
- **Goal/Expectation: Create a business model for a new business idea in a context of a case story**
 - **Description of a new offering and outline of technical solution and related challenges**
- **Examination** will be done by a **Group Project** (Group of max. 3 students)
- **Documentation** [e.g. MS Powerpoint] (**uploaded by 13.12.2023**) and verbal **Presentation of ~45 minutes (15.12.2023)**
- Presentations will be done within the **marketplace on 15th December 2023**
- Each group will **present their business idea to the other students**. All ideas will be discussed and challenged in the round.
- To successfully create and hold the exam presentation, the **attendance in the previous lectures is needed and expected** as all needed topics for the exam will be elaborated within the lectures.

Introduction to exam - expected content



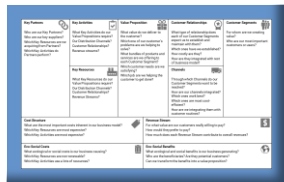
1. Case Story (Company, Market, Business Idea)

→ Chapter 2



2. Value Proposition Canvas

→ Chapter 1-4



3. Business Model Canvas

→ Chapter 1-4



4. IT-Implementation Options and Technical Challenges

→ Chapter 2 & 3 & 4



5. Sustainability aspects of business model

→ Chapter 1-4



We expect...

- That these 5 topics on the left will be covered by your presentation
- That Value Proposition Canvas and Business Model Canvas are used
- The other templates for case story, IT-implementation and sustainability aspects can be used but you are also free in being creative and create other/more slides for these topics to demonstrate and explain your business model
- Max. 20 Content Slides