Digital Transformation and sustainable business models

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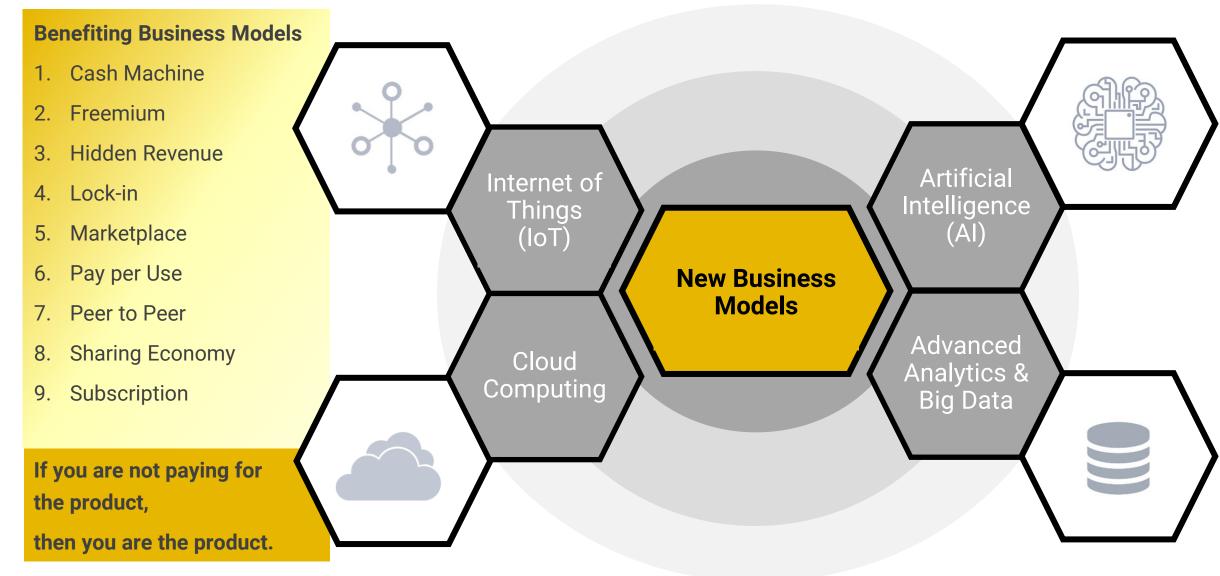
Freitag (ganztags) 20.10.2023 Freitag (ganztags) 27.10.2023	Freitag (ganztags) 03.11.2023 Freitag (ganztags) 10.11.2023	Freitag (ganztags) 17.11.2023 Freitag (ganztags) 24.11.2023	Freitag (ganztags) 24.11.2023	Freitag (ganztags) 15.12.2023
CHAPTER 1 "New sustainable business models"	CHAPTER 2 "Enablement 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

Technologies & Methods

Block 2

Recap

Digital Technologies enables new Business Models



Business Model types (Selection) (1/2)

Business Model	Short description	Type of Services/Products and Implications	Examples
Auctions	Biding option to buy a product/service	model is flexible and scalable, suitable for own and other companies' products	Ebay, real estate
Cash machine	Based on cash conversion cycle – how quickly a company converts cash to goods/services and again to cash	Companies making low-profit margin but surviving by having a disruptive position and an extensive customer based. Cash is generated by selling inventory to end customer before paying its suppliers	Amazon
Direct Sales	Products directly sold to end customer	One-on-one conversation, sales person get share of sale	Tupperware, Thermomix
Franchise	Ready-made business is licensed by company to franchisor	Already tested processes, techniques, value proposition are applied	McDonalds, Subway
Freemium	Free basis version, new/extended features have to be paid for	For products with low marginal costs (add. Costs per add. Customer) or customer information higher value than operating costs	Spotify, LinkedIn, Xing, Dropbox, Google Drive
Hidden Revenue	Users get service for free, revenue from other sources (advertising, leverage of customer data)		Google, Facebook, Instagram, Youtube
Lock-in	High Switching costs lead to loyalty of customers	Binding customers longterm, e.g. HW & SW only compatible with same system	Apple, Android
Marketplace/ Two-sided market	A platform/digital marketplace for economic exchange between two distinct user groups that provide each other with the benefits of a large network. All platforms are two-sided market business models.	The more users there are on one side of the marketplace, the greater the value of the services they receive from the other side, and vice versa. Money is generated via brokerage fees, commissions, fixed transaction costs, membership fees	Amazon, eBay, Uber, ImmoScout

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
- \rightarrow 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 cyles for hardware and devices result in social and ecological challenges in production and disposal

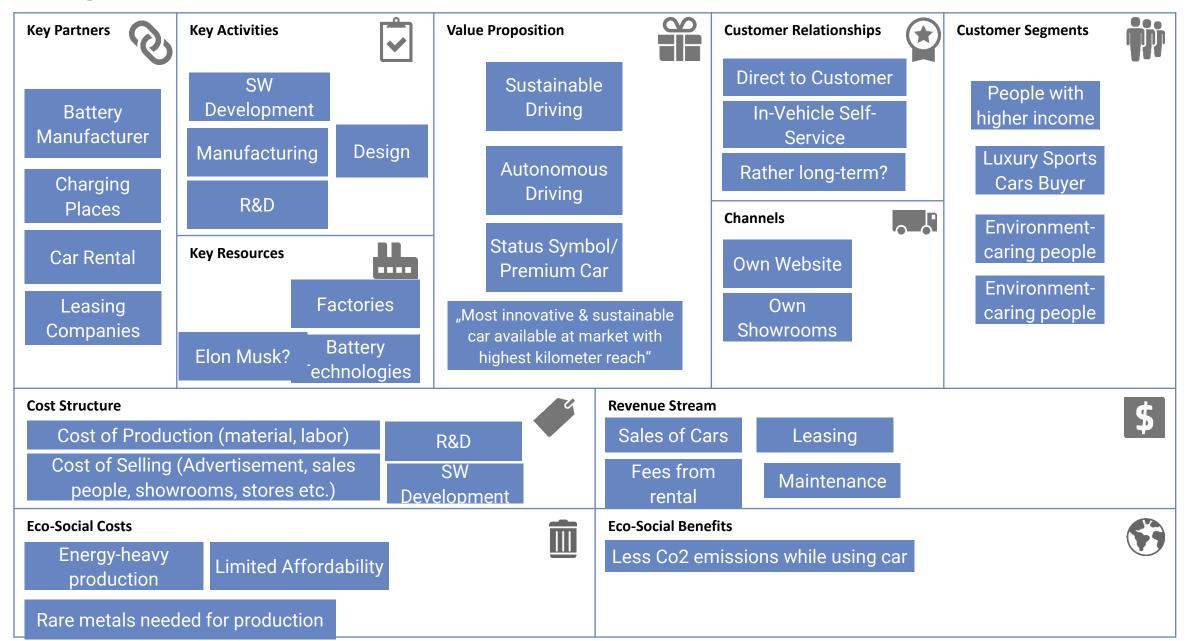
Digitalization fosters Sustainability



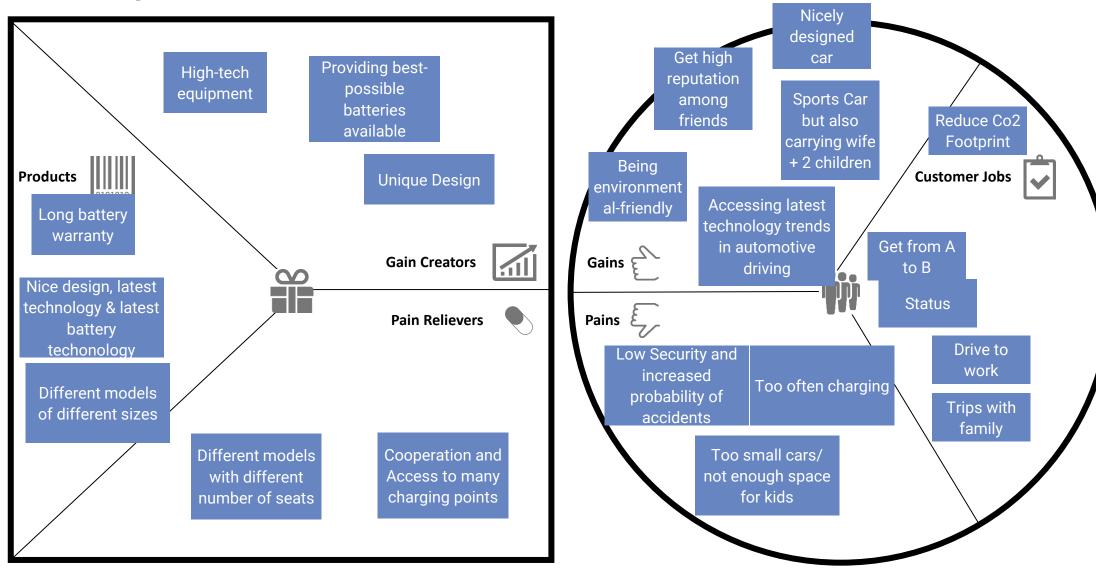
- Digitalization endeavors create profound data basis, which enables
 - making more fact-based and sustainable decisions
 - Better prognosis to achieve sustainability goals
- Creates transparency and trust among all stakeholder groups
- Drives resource efficiency and savings through digitalized processes

Recap - Tesla Business Model Canvas

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Value Proposition Canvas Tesla



Grouping + Idea discussion

Homework:

- 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 🙂
- ightarrow Just make some notes, we need these ideas in the next lecture

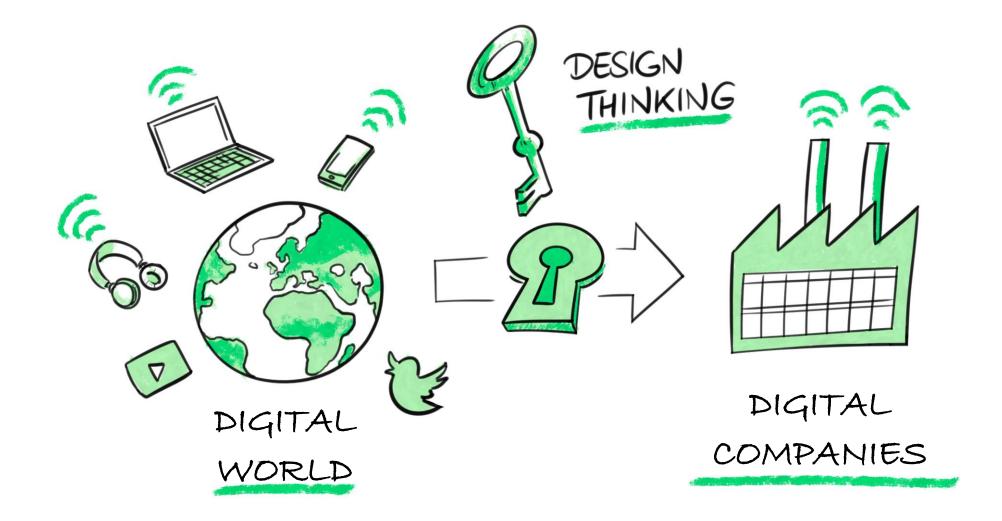
Today:

Discussion within the defined group about gathered ideas

 \rightarrow Decide for one industry, high level service/product etc.

Design Thinking

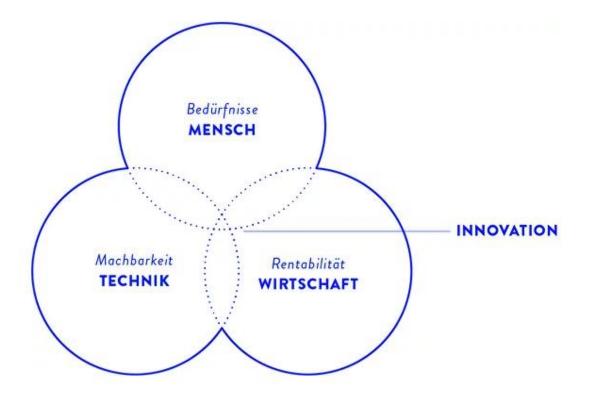
Design Thinking Process



Design Thinking Process

Design thinking is a **holistic innovation method** that focuses on **people** and their **needs** while incorporating new perspectives. This gives you a better understanding of the challenges, creates empathy for the users and puts the focus on the central needs.

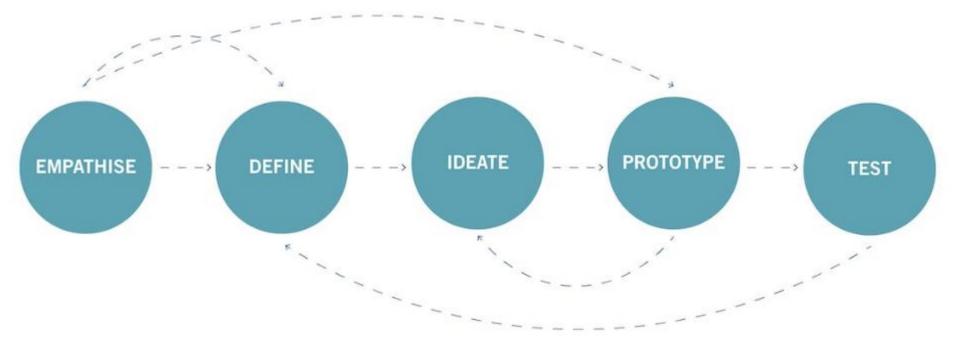
Design thinking is **fast, intuitive, iterative.**



https://www.youtube.com/watch?v=_r0VX-aU_T8

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5 Phases of Design Thinking Process



Learn about the audience for whom you are designing, by observation and interview.

Who is my user? What matters to this person? Create a point of view/problem statement that is based on user needs and insights.

What are their needs, difficulties, barriers?

What is the big user problem that your team needs to solve? Brainstorm and come up with as many creative solutions as possible for your problem statement.

Wild ideas encouraged! Build a representation of one or more of your ideas to show to others.

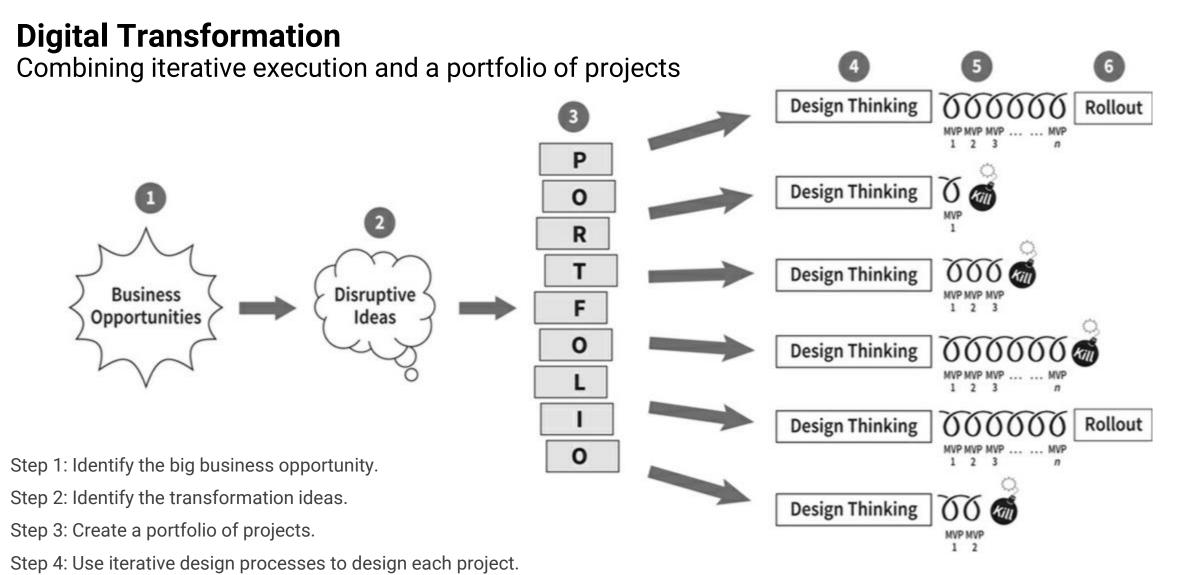
How can I show my idea?

A prototype is just a rough draft!

Share your prototyped idea with your original user for feedback.

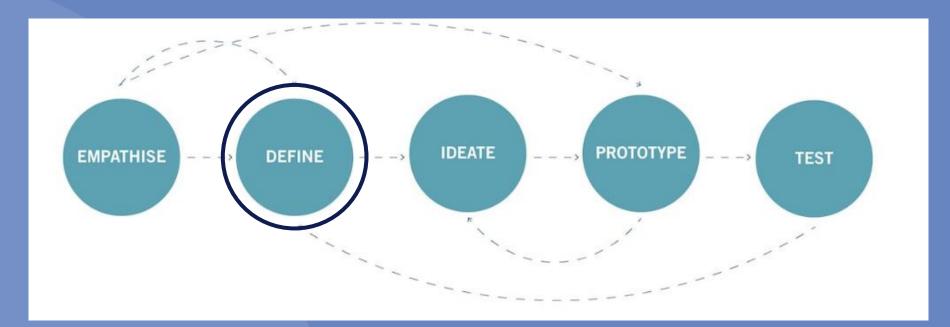
What worked?

What didn't?



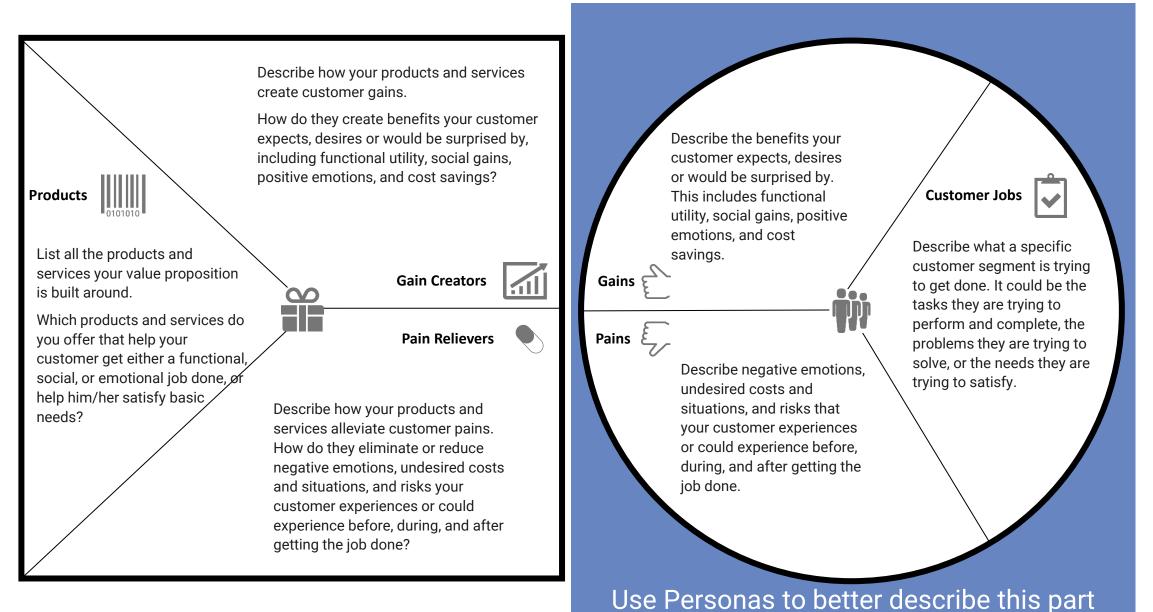
Step 5: Use iterative execution methodology such as lean startup or agile.

Step 6: Roll out only the successful projects.



Define Phase – Personas

Personas are used to better describe Customer Jobs, Gains & Pains of VPC



Persona Method

- Personas = fictitious users of the target group of the product/service.
- Represent the needs, abilities and goals of the target group(s)
- Do not represent the average, but rather a specific user group
- If there are multiple target groups,
 different personas must be created for each one

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Proto-Personas



Büroassistentin "Wenn ein K

Birgit

Wenn ein Kunde vor mir sitzt, muss das System mich bei den entscheidenden Fragen gut unterstützen!"

55 Jahre Ausgebildete Burokauffrau Arbeitet mit 40 Banksystemen, Word & Outlook

Über Birgit

Birget ist gelernte Bürokauffrau. Nach der Geburt ihres Sohnes hat sie ihren Beruf aber lange Zeit nicht ausgeübt. Danach neu ins Arbeitsleben einzusteigen, war nicht einfach, inzwischen arbeitet sie aber schon seit zwei Jahren bei der Elbe-Finanz-Bank.

Ihr Arbeitsplatz ist im Empfangsraum. Zu ihren Aufgaben zählen Telefonate, die Bearbeitung der Post und die Überwachung aller laufenden Vorgänge. Mit dem Kundenverwaltungsprogramm kommt sie gut zurecht, mehr Sorge bereiten ihr die vielen verschiedenen Systeme der anderen Banken. Jedes funktioniert anders, das ist eine echte Herausforderung. wsability.e

Probleme & Herausforderungen Sicherheitswahn: Birgit muss 40 Passwärter

- verschiedener Banken parat haben.
- Vielfalt Jedes Banksystem hat seine eigenen Regein. Wichtige Kniffe hat Birgit sich notiert.
- Fehlende Hilfe: Birgit fragt f
 ür das Anlegen neuer Kunden h
 äufig ihre Kollegen.

Bedürfnisse & Ziele



Persona Canvas

Name City	Age Family Status	Gender	
Job & Education			
Hobbies & Interests			
Values			
Goals & Needs			
Fears			
Attitude towards technology, sustainability			

Why does Persona interact with us? Why does Persona consume our product/service? Trigger?

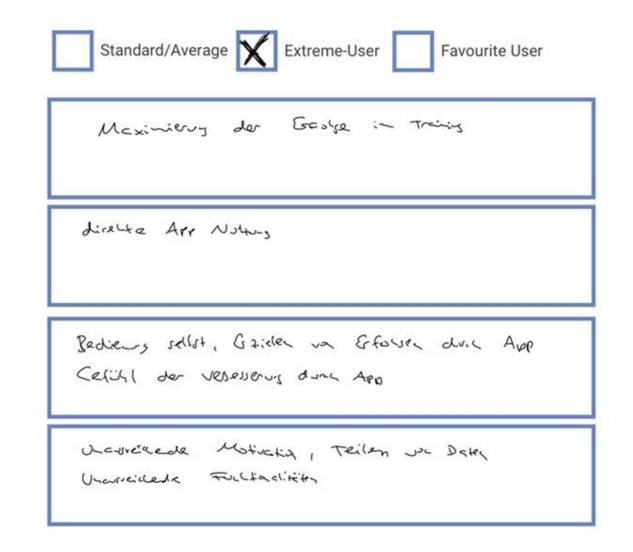
Which medium does Persona use to interact with us? How does customer consume our product/service?

When does Persona feels satisfied with our product/service?

Which pains could Persona have with our products/services? What is the persona trying to accomplish and what is standing in their way?

Persona Canvas

Selects	keine klinder	
	Beliebis (oder Person Brenche	I)
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Usiperlicle Gesu-dhe	Aussenser it, Erichuns,	
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Verleyzours, Unarssensee	Falsclas / inefficient	es Training,



Persona Canvas

Claura 18-30 Student; Hoan Echulbilelung/bernfe. Ausbildung	
2000en/Mare/Statistik allgebreine wirecherchafteiche Wildung mit MINT - Derug	
Fourtenbasiest / rational	
Reacherble Daten, send se Deten, goinger zeitaufwend 1 abtuelle Daten, ausprechende Aufberatung/einfach 24 verstchen	
Verscheich selbst Unseröselfalsche Deta Obswählen, Leeine Enden, hoher Zeit - aufwaud	
Agesdulossen und positi	



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chatbot /website

Passunde Eugebnisse, schuell, passunde tuberatung

2 hone kosten, feldende Autralitat

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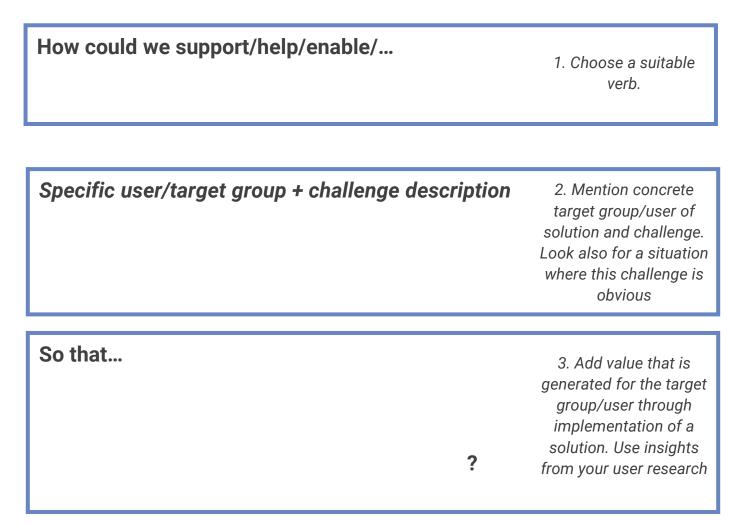
Problem Statement

- Meaningful problem statement steer you in the right direction, start of solution creation
- Without a problem statement you cannot describe what you want to achieve (also not to stakeholders, team members etc.)
- Bridges the gap between current state (problem) to desired state (goal) of service/product
- User problem = unmet need → satisfy user by meeting the need with a product/service you develop
- A good problem statement = human-centered & user-focused
- Rules: Focus on the user; Keep it broad, Make it manageable
- Use all findings from your persona description

Derive Problem Statement "How could we ...?"

To-Dos when formulating: "How could we ..." questions

- Name concrete target group (Persona) to support focused generation of ideas. Negative example: Who could we develop a perfect solution for all our customers?
- Describe an user centric problem and not its solution. To support a broad variety of idea generation, we do not already name possible solutions. Negative example: How could we solve this problem with a smartphone app?
- 3. Name value which is generated for the user when implementing a solution, not the value for the company. Research about users is needed! Negative example: How could we sell more products to our target group to generate more revenue?



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Derive Problem Statement "How could we ...?" Example

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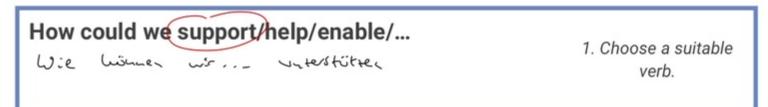
How could we help	1. Choose a suitable verb.
Specific user/target group + challenge description	2. Mention concrete
tourists without English skills during their New York stay to buy a suitable ticket for public transportation for their whole vacation	target group/user o solution and challeng Look also for a situat where this challenge obvious
So that	
so that they can easily use it without any problems.	3. Add value that is generated for the targ group/user through implementation of a solution. Use insight from your user reseal

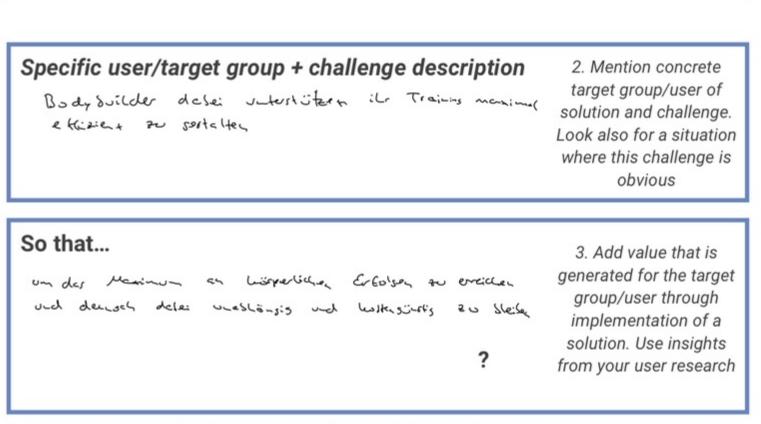
Example: How could we help tourists without English skills during their New York stay to buy a suitable ticket for public transportation for their whole vacation so that they can easily use it without any problems.

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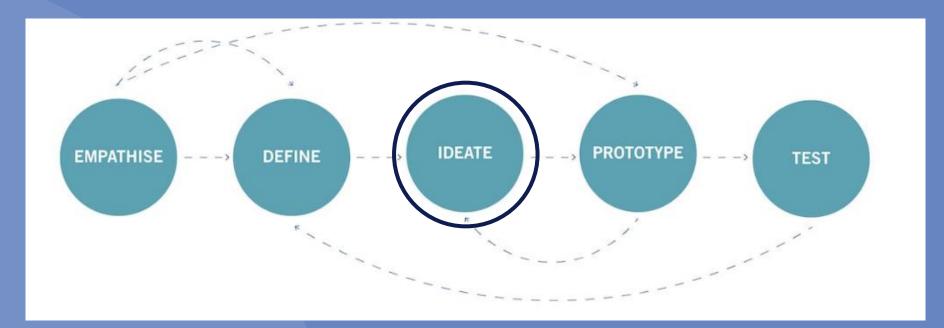
Example: How could we help tourists without English skills during their New York stay to buy a suitable ticket for public transportation for their whole vacation so that they can easily use it without any problems.

Define Persona & Problem Statement for your idea area

Group Work

1. Fill out the Persona template for **one specific target group** of your "idea area"

- We will discuss persona description when you have finished
- 2. Derive one **specific problem statement the persona faces** with regards to your idea area
 - We will discuss problem statement when you have finished



Ideation Phase

Ideation

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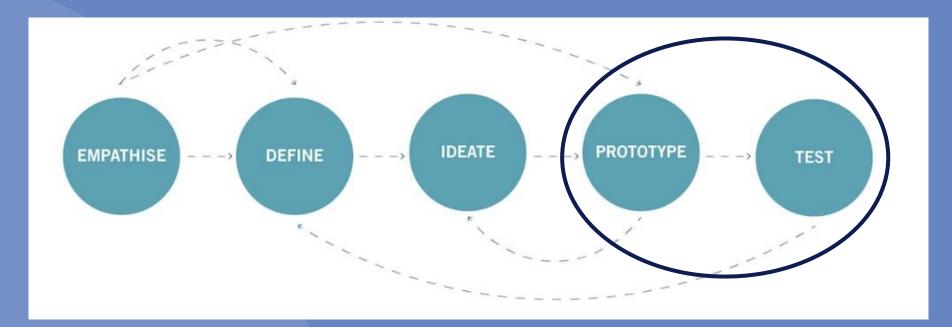
- Derive as many ideas as possible based on your problem statement
- Huge number of ideas welcomed \rightarrow think outside the box, judgement-free

Idea Generation

Problem Statement: How might we...

Idea	1. Further Development	2. Further Development
1. Idea		
2. Idea		
3. Idea		

- Group of 3 persons
- Each person gets the template above and notes down 3 ideas in the 1st column that could solve the problem statement 5 minutes
- The filled template is passed to the neighbour sitting on the right. The neighbour further develops the ideas and notes it in the 2nd column (3minutes)
- Template is passed to next neighbour who further develops the three ideas based on initial idea and feedback
- Exercise is done when each person has its own idea template back
- All ideas will be written on post-its one idea is the summary of the initial idea and the 5 further developments
- Ideas are presented and pint on a whiteboard
- When all groups have presented their ideas \rightarrow break \rightarrow moderator groups similar ideas
- After break: Dot voting \rightarrow decision for 1-2 ideas that are further developed and focus on

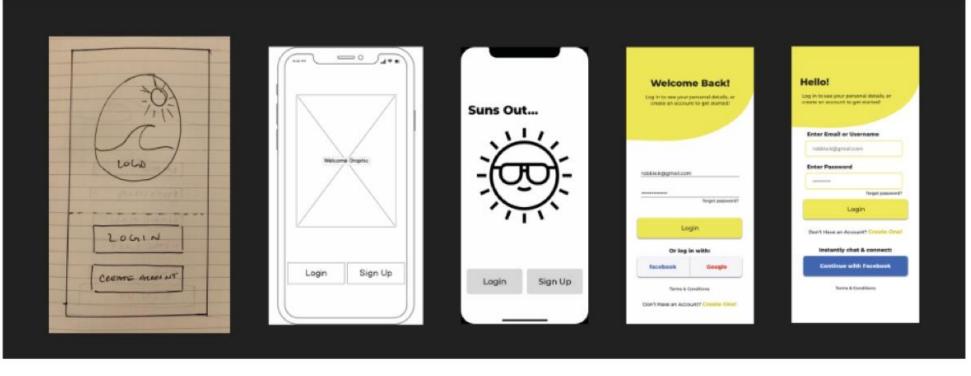


Prototype & Test Phase

Prototyping

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- Prototype = "Scaled-Down" Version of your product
- For testing ideas and design before investing too much time and money in developing the product/service
- Could be paper models but also fully functional prototypes
- Help getting insights how user interact with product/service, test feasibility and need for your idea and help creating best possible solution by creating different prototypes
- When creating a prototype, it is important to set a goal what should be tested (Persona + Problem statement!)

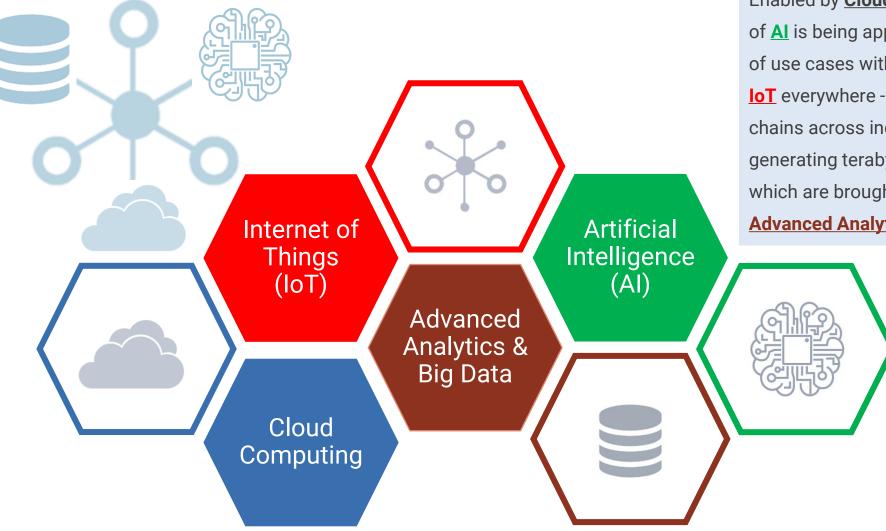


Testing

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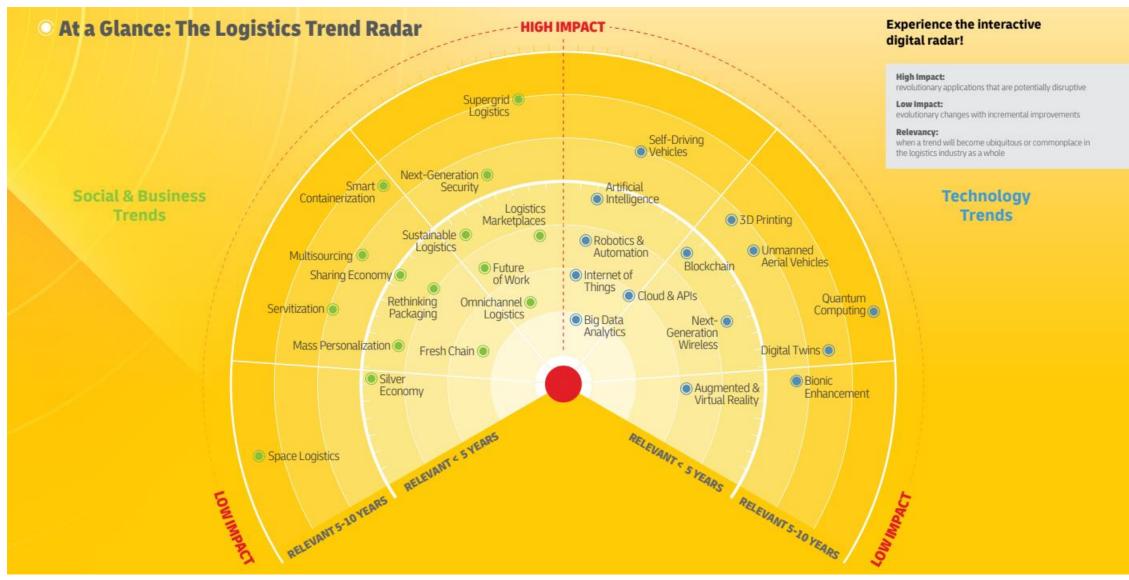
- Let users test your prototype
- Save time and money, reveal unexpected insights, improve user satisfaction, integrate user feedback
- Test early and often, at all stages of your product/service creation
- Early stage: low-effort prototype to test a concept, e.g. concept testing with interviewing users
- Later stage: Digital prototypes, e.g. A/B testing, usability testing, first-click testing
- Different user testing methods
 - Remote vs. in-person user testing
 - Moderated vs. unmoderated user testing

Digital Transformation



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

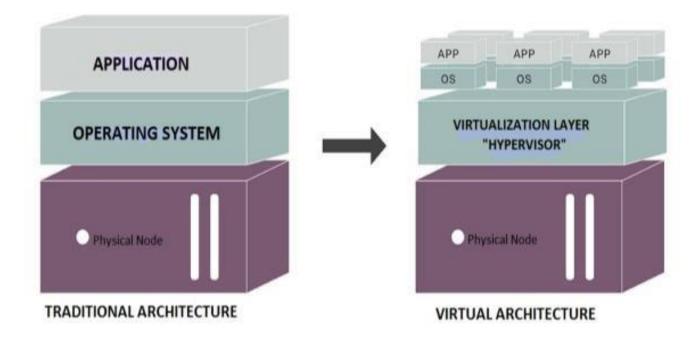
Logistics Trend Radar 5th Edition (DHL)



Cloud

Virtualization enables completely new possibilities

Virtualization enables infrastructure resources to be shared across multiple applications, resulting in a dramatic increase in hardware utilization:



Cloud Computing

Cloud Computing in a nutshell

On-demand deliver of compute power, database, storage, applications and other IT resources through a cloud services platform via internet with pay-as-you-go pricing.

Cloud

Computing

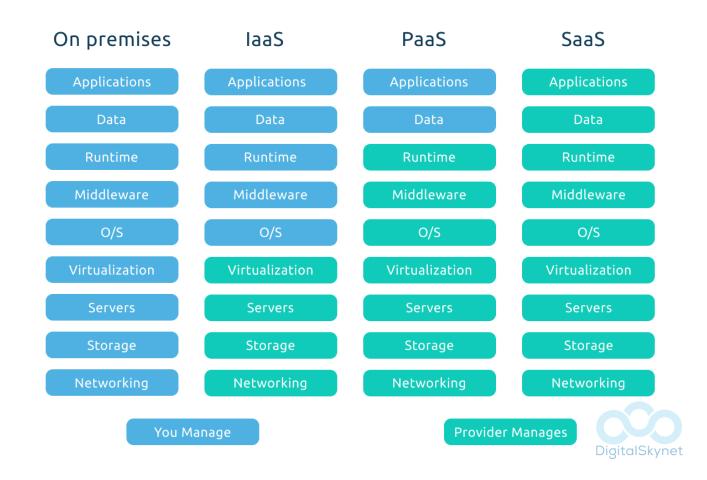
- > **Opex instead of Capex** no big hardware investment upfront; pay for real consumption
- No Capacity guessing upfrint capacity decision lead to expensive idle resources or dealing with limited capacity; scale up and down as needed
- > Economies of scale Usage from lots of users aggregated in cloud, achieve lower variable costs
- Increase speed, agility and innovation Make resources for developer available in minutes (not weeks); access to latest technologies, ability to test/experiment at low risk
- > Concentrate on core business infrastructure (mostly) no differentiator
- > Access to latest IT resources/trends Cloud provider focus on providing newest and efficient hardware
- > Go global deploy application in multiple region in a few minutes, improve latency and user experience
- Be greener Public cloud can help reducing carbon footprint

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Cloud Services Models

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X-as-a-Service (XaaS): Today's cloud computing providers enable organisations to access a range of resources "as a Service" – from infrastructure to software.





<u>Pizza</u> as a Service (as an illustration ⁽²⁾)



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Traditional On-Premises (On Prem)	Infrastructure as a Service (laa S)	Platform as a Service (Paa S)	Software as a Service (SaaS)
Dining Table	Dining Table	Dining Table	Dining Table
Soda	Soda	Soda	Soda
Electric / Gas	Electric / Gas	Electric / Gas	Electric / Gas
Oven	Oven	Oven	Oven
Fire	Fire	Fire	Fire
Pizza Dough	Pizza Dough	Pizza Dough	Pizza Dough
Tomato Sauce	Tomato Sauce	Tomato Sauce	Tomato Sauce
Toppings	Toppings	Toppings	Toppings
Cheese	Cheese	Cheese	Cheese
Made at home	Take & Bake	Pizza Delivered	Dined Out

Source: https://docs.aws.amazon.com/pdfs/whitepapers/latest/aws-overview/aws-overview.pdf#introduction

Cloud Deployment Models

Organisations have a range of choices in cloud deployment models, from a purely public cloud (owned, managed, and operated by a business for anyone's use) to hybrid cloud (a mix of public and private):



- Fully deployed in cloud
- All app parts running in cloud
- Built in cloud or migrated

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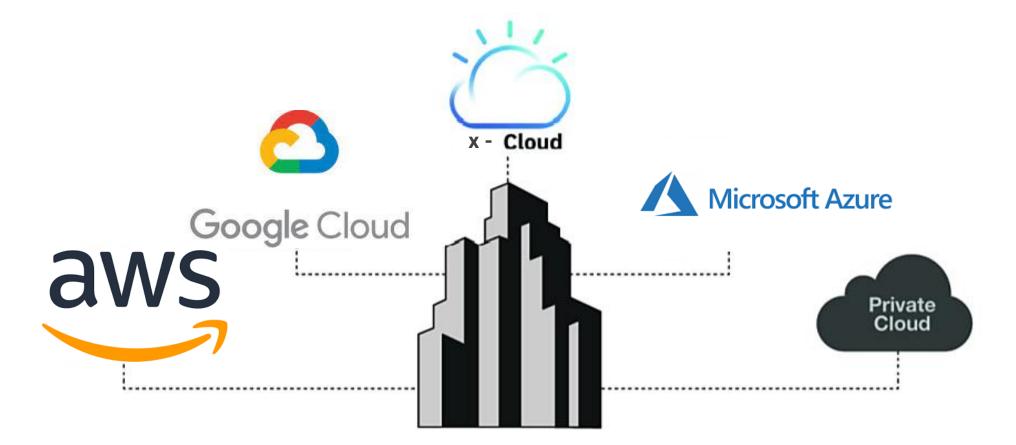
- Also Called "on-premises"
- Not many benefits of cloud computing
- Deployment model often same as legacy IT infrastructure but using app management and virtualization technologies
- Reasons often: Legal, Regualtory



- Connect infrastructure and apps between cloud-based resources and existing non-cloud resources
- Extend, grow infrastructure into cloud while conntecting cloud resources to internal system

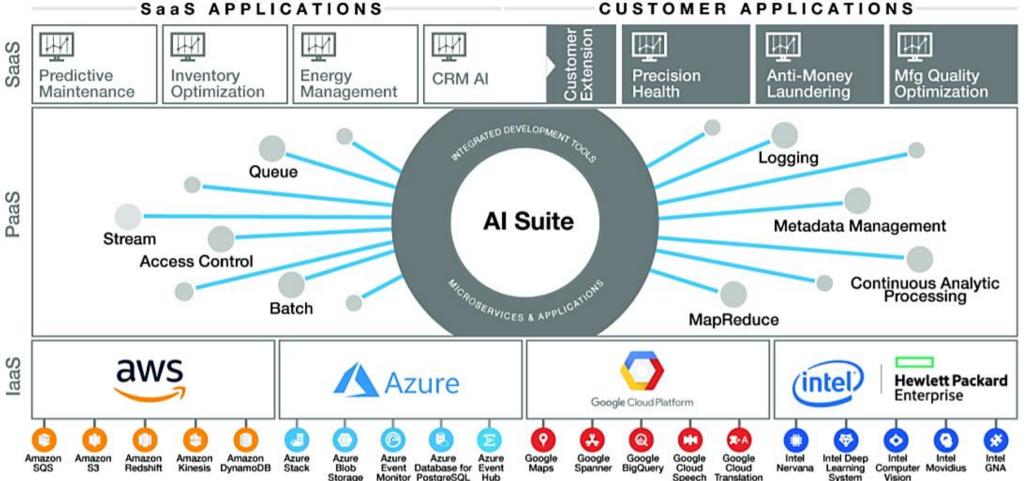
Multi-Cloud and Hybrid Cloud

To avoid vendor lock-in and to take advantage of differentiation among public cloud providers, organisations are adopting multi-cloud and hybrid cloud approaches.



Multi-Cloud Deployment

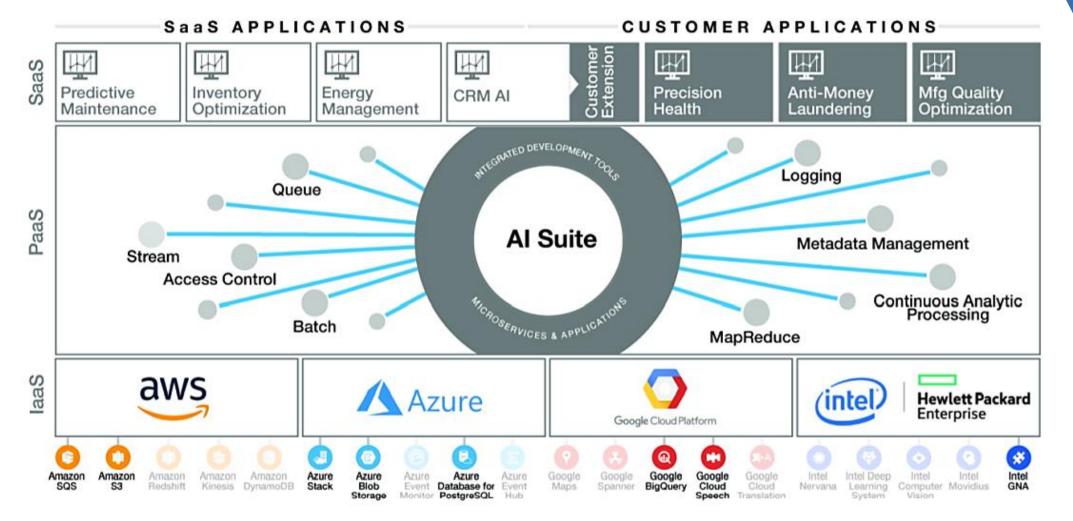
Organisations require an AI architecture that enables them to deploy applications on multiple public cloud platforms as well as on bare metal behind the firewall in a private cloud or data center.



CUSTOMER APPLICATIONS

Polyglot Cloud Deployment

Polyglot capability enables application portability from one cloud vendor to another and the ability to run AI and IoT applications on multiple cloud simultaneously.



AWS



Public cloud platforms like AWS, Azure, and Google Cloud offer an increasing number of tools and microservices, but stitching them together to build enterprise-class AI and IoT applications is exceedingly complex.

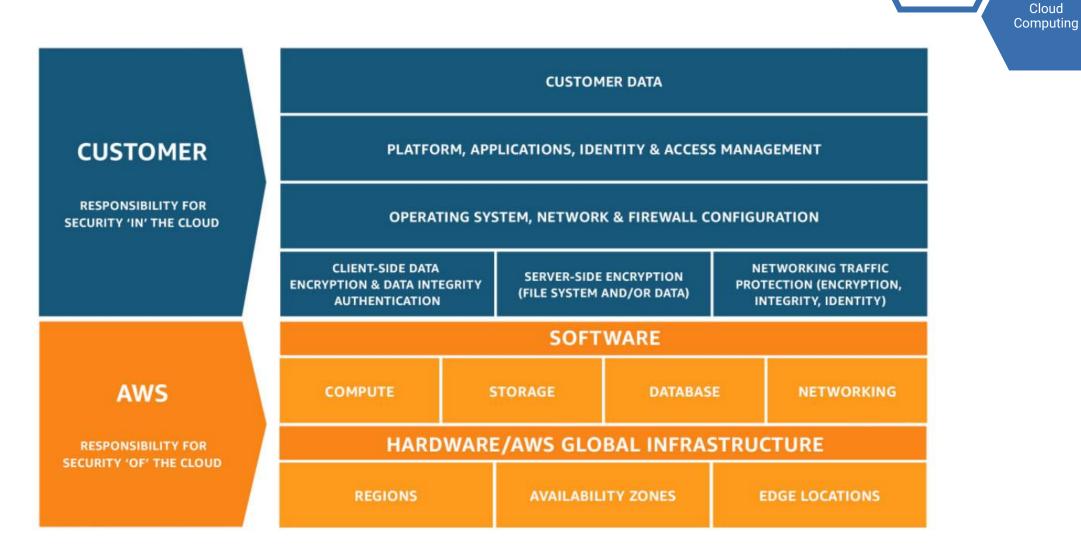
Manager



Cloud Computing

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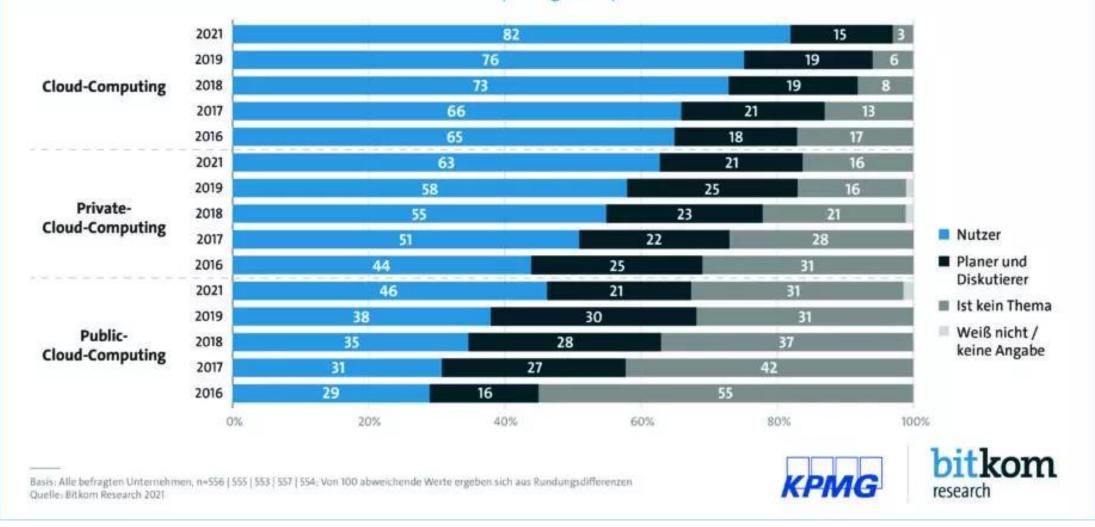
Shared Responsibility Model (AWS)



Cloud Entwicklung

Im Corona-Jahr bekommt Cloud-Computing einen Schub

Inwieweit nutzt Ihr Unternehmen bereits Cloud-Computing bzw. plant oder diskutiert den Einsatz?

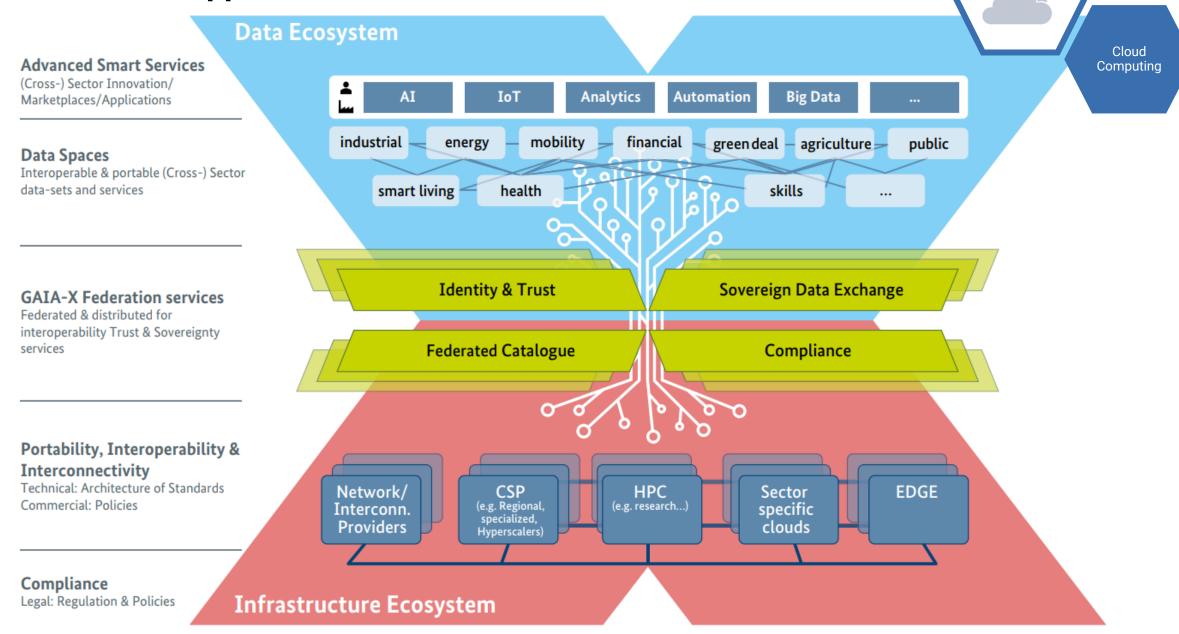


GAIA-X - Anforderungen

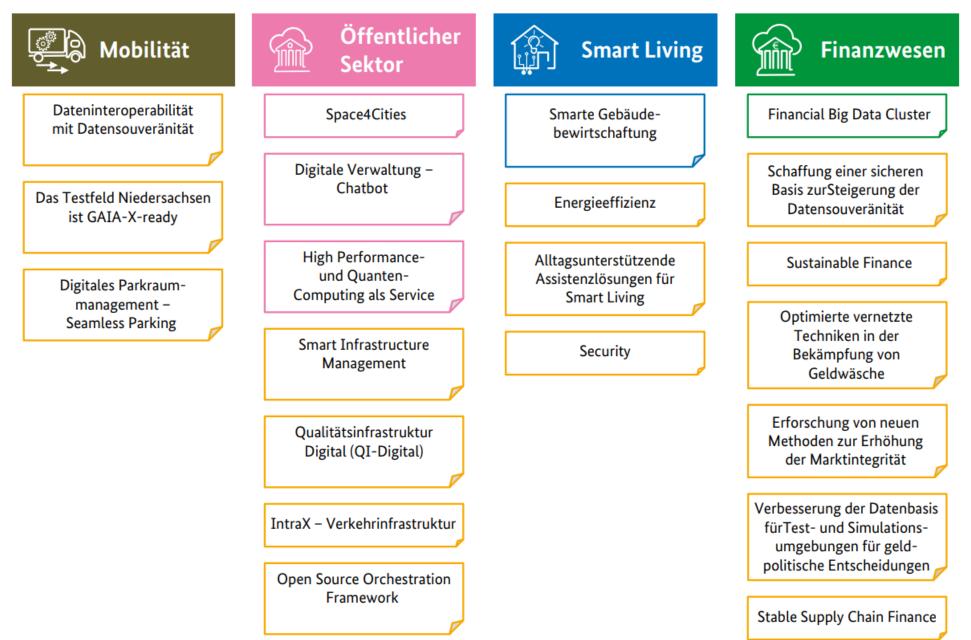
- Offenheit, geringe Hürden für KMU, Modularität, Benutzerfreundlichkeit
- Dezentralität, fairer Wettbewerb aller Markteilnehmer, keine digitalen Oligopole
- Marktplatz bzw. Anreize zum Datenaustausch über verschiedene Akteure im Ökosystem hinweg schaffen
- Datensouveränität als Grundlage: Nutzer von GAIA-X sollen entscheiden können, welche ihrer Daten mit welchen Zugriffsrechten für welche andere Nutzer und für welche Zwecke versehen werden
- Sicherer Datenaustausch, z. B. über ein einheitliches, standardisiertes und offenes Identitätsmanagement, Vertrauenswürdigkeit
- Einheitliche Schutzklassendefinition für Daten und Dienste
- Interoperabilität domänen- und anwendungsübergreifend



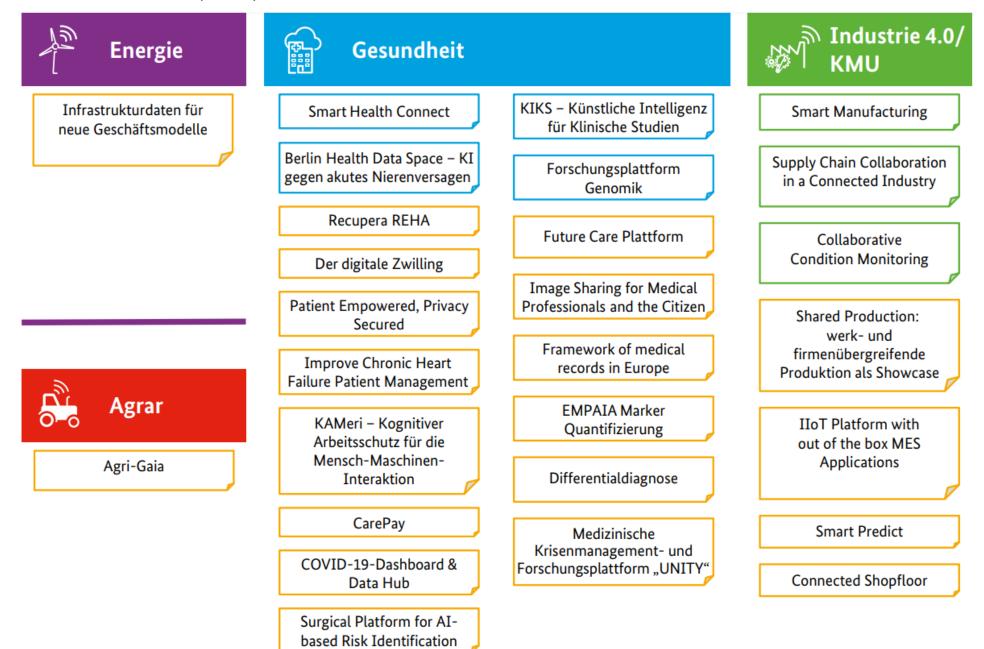
Architectural approach of GAIA-X



GAIA-X – UseCases (1/2)



GAIA-X – UseCases (2/2)



CLOUD Act

US-Gesetz, erlassen am 23. März 2018

Clarifying Lawful Overseas Use of Data Act

- Was ist der CLOUD Act?
- Was regelt der CLOUD Act?
- Warum ist der CLOUD Act f
 ür die EU relevant?
- Zu welchen Problemen führt der CLOUD Act?
- Wie lässt sich das Problem mit dem CLOUD Act lösen?

Was ist der CLOUD Act?

Das Gesetz ermöglicht den Zugriff von US-Behörden auf Daten im Ausland (als Teil des 2.232-seitigen Haushaltgesetzes).

Ziel:

"Ein zeitnaher Zugriff auf die elektronischen Daten von Kommunikations-Dienstleistern ist wichtig für die Regierungsbestrebungen, die öffentliche Sicherheit zu schützen und ernsthafte Kriminalität zu bekämpfen, Terrorismus eingeschlossen."

Dazu wird Kapitel 121 des Buch 18 "United States Code" ergänzt um §2713 Erforderliche Bewahrung und Offenlegung von Kommunikationsdaten

Warum ist der CLOUD Act für die EU relevant?

US-Behörden dürfen auf personenbezogene Daten im Ausland zugreifen.

- Provider muss betroffene Person oder Unternehmen nicht informieren
- Provider darf die Daten nicht mehr löschen (auch nicht außerhalb der USA)

Warum ist der CLOUD Act für die EU relevant?

- Provider mit Niederlassungen in den USA unterliegen dem CLOUD Act
- US-Behörden können Zugriff auf europäische Server mit personenbezogenen Daten fordern
- betroffene Personen werden vermutlich nicht informiert

Zu welchen Problemen führt der CLOUD Act?

- Eine Datenweitergabe an US-Behörden im Rahmen des CLOUD Act ohne Zustimmung eines EU-Gerichtes bedeutet einen Verstoß gegen die EU-DSGVO.
- Gemäß Artikel 82 EU-DSGVO haben betroffene Personen das Recht, gegen den Verantwortlichen (und Auftragsverarbeiter) vorzugehen und Schadensersatz zu verlangen.

Wie lässt sich das Problem mit dem CLOUD Act lösen?

- 1. Ignorieren und hoffen, dass die EU das Problem per Gesetz löst.
- Provider mit US-Niederlassung verpflichten, dass sie über Anfragen im Rahmen des CLOUD Act informieren.
- 3. Keine Provider mit US-Niederlassung auswählen.

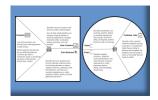
Introduction to exam - Overview

- 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 ~3-4 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



Case Story (Company, Market, Business Idea)
 → Chapter 2



- Non-with the second second
- 3. Business Model Canvas

2. Value Proposition Canvas

 \rightarrow Chapter 1-4

 \rightarrow 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, ITimplementation 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
- \rightarrow Max. 20 Content Slides