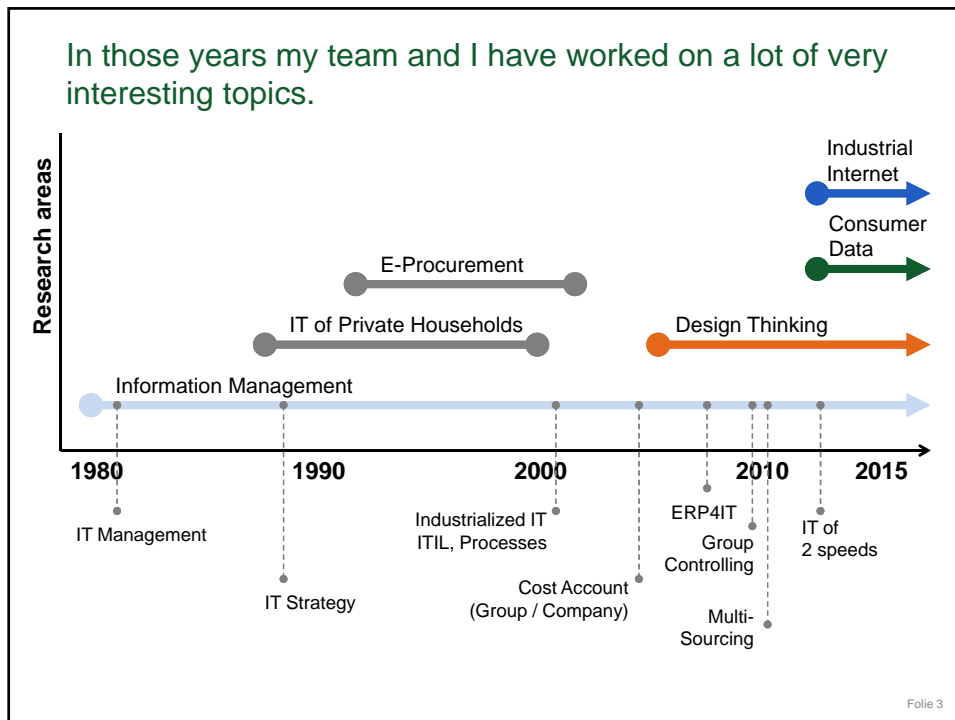


## Welcome in a digitized world

Prof. Dr. Walter Brenner  
Heidelberg, December 1<sup>st</sup> 2015





**We are all living in a  
more and more  
digitized world.**

Who do you believe more? A professional race driver from Audi ...



... or a robot (Audi RS7) programmed by engineers from Audi?



Folie 6

Companies like Airbnb, Amazon, Apple, Facebook, Google and Uber have changed our life and many industries.



Folie 7

**What are the  
characteristics of a  
digitized world?**

A video from PTC shows some aspects of the digitized world and the internet of things.

Folie 9

At least six «building blocks» are used to create the digital world.

- **Internet of Things:** Everything is connected with everything.
- **Cloud Computing:** Unlimited computing and storage computing power is available everywhere and everytime.
- **Big Data/Data Analytics:** Very large amounts of data in all possible formats can be processed.
- **Real Time processing:** Unlimited amounts of data in all possible formats can be processed real time if necessary.
- **Mobile Computing:** Mobile Computing is more important than desktop computing.
- **Social Media:** New ways of interpersonal communication are much more important than classical channels.

Folie 10

Predictive Maintenance is a good example how the building blocks of the digitized world «play» together.



1. Sensors measure actual usage of elevators continuously
2. Sensor data are sent via mobile networks or fixed lines to cloud computing data centers
3. In those data centers all the data from all elevators are stored
4. Algorithms are available that predict «problems» in the equipment
5. The Cloud data centers can apply the algorithms to the big amounts of data and decide whether maintenance is necessary
6. ...

Folie 11

**Digitization will **change** major parts of business and private world. TV and the corresponding media industry are good examples.**







### The next Step: TV Sets with Android





**Change in business world:**

Which were the leading manufacturers of TV sets in the 70ies and the 80ies and which are the leading manufacturers of TV sets today?

**Change in private world:**

How did Television consumption change in the last 20 years? What was, what is the impact on media industry?

**Digitization  
follows new  
«rules of the game».**

Don't accept and don't be afraid of existing **(big) players**

Store all data that you can get forever ("data lake")

**Customer in the centre** **Be aggressive**

Set-up of adequate **infrastructures** and **employee skills**

Nothing is (seems to be) impossible

If you don't do it **someone else** will do it ("cannibalize yourself")

Be **naive** and don't ask questions like:

Is this **possible?**  
What will government say?  
What will the press say?

Question everything that exists

**Speed** is everything

**(Controlled) openness** **Just do it**, show activity on market  
(like Apple, Google/Android)

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**In the last ten years we have seen the «consumerization» of IT industry, the iPhone being the revolutionary product.**

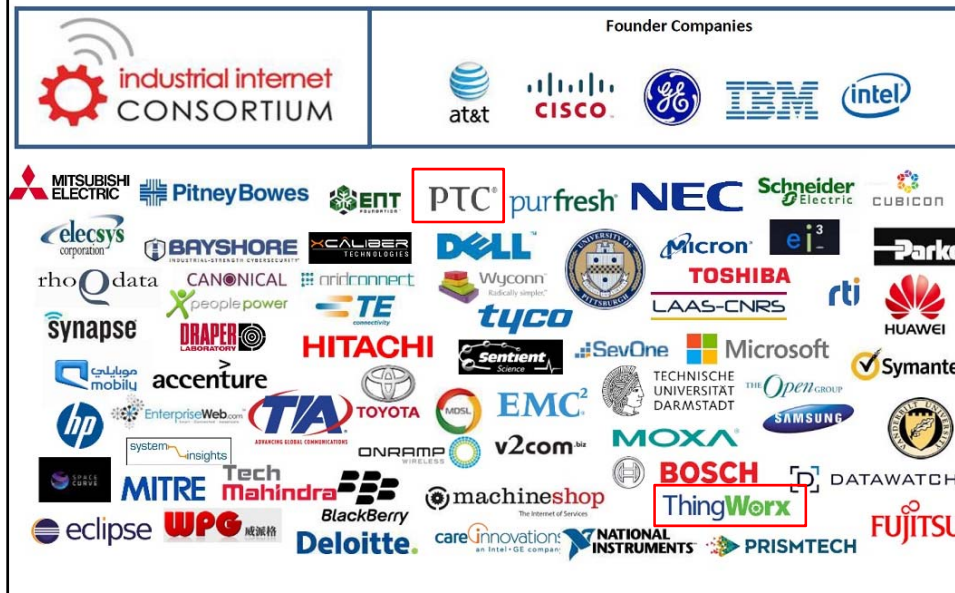
**In the next ten years we will see a **revolution in the manufacturing industry** with more impact on business and society.**



**Digitization of the manufacturing industry is a **global challenge**.**

**The term «Industry 4.0» is mainly known in Germany and in China.**

A lot of companies from different branches have established the Industrial Internet Consortium.



GE has established a new affiliate GE Software to focus on the industrial internet and on data-driven services.

- GE Software located in San Ramon CA has grown from 4 people in 2011 to about 1500 people in 2015 and is still growing.
- GE has invested 1.5. Billion Dollar in GE Software (until 2015)
- GE Software has earnings of about 1 Billion Dollar (in 2014)
- GE Software has a big and growing data-science group

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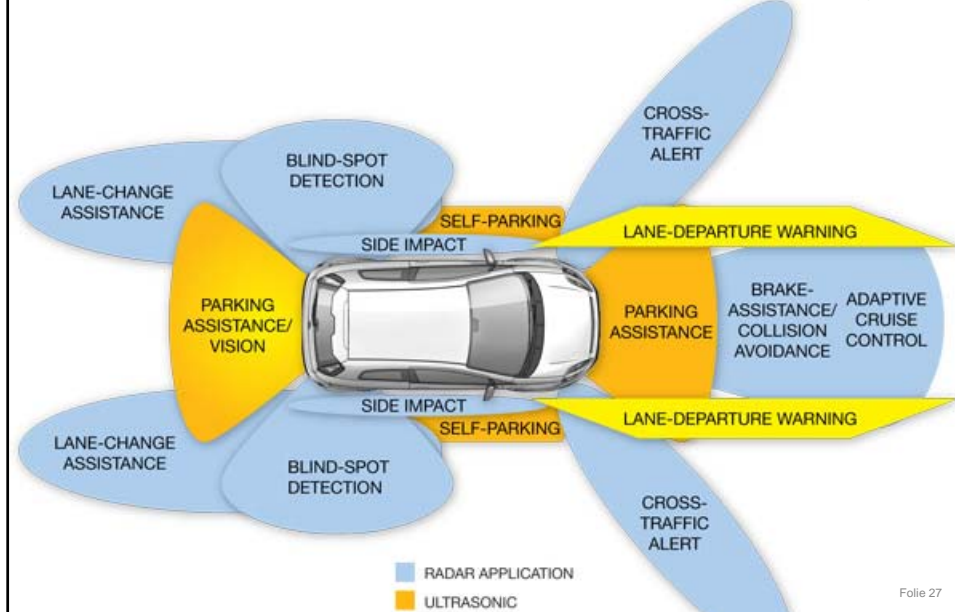
- The most important product of GE Software is Predix, an operating system (platform) for the industrial internet
- Predix will be opened up in 2015 and this should motivate start-ups and competitors to write applications (data-driven-services) on the basis of Predix



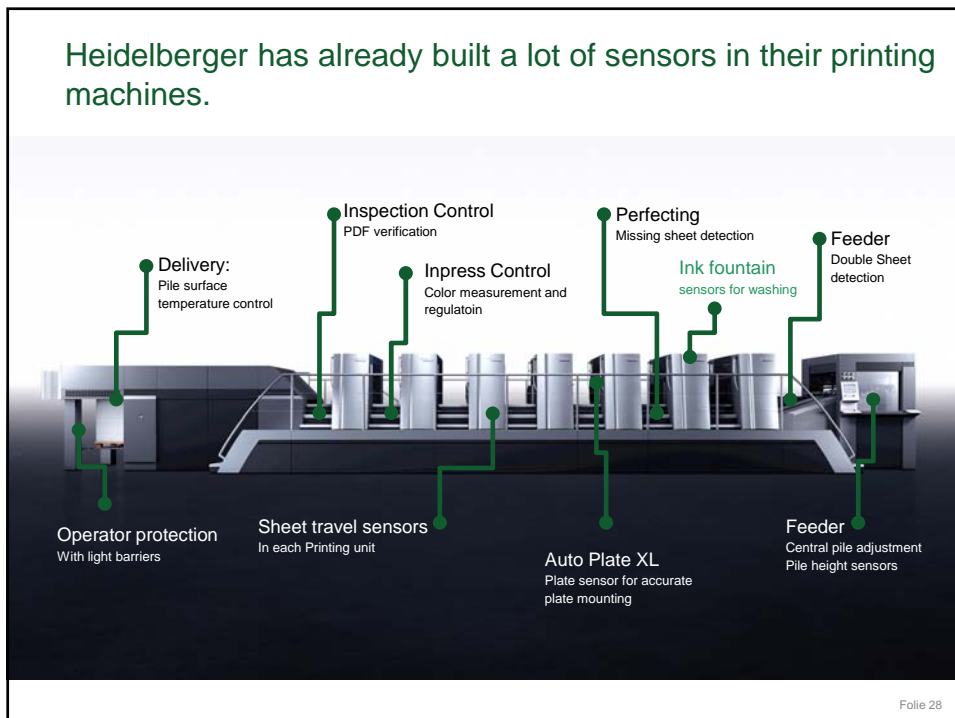
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Folie 25

**More and more classical  
industrial products  
are transformed into  
digitized equipment,  
smart products or  
cyber-physical systems.**

Sensors are key: The amount of sensors used in equipment and the quality of data from sensors is steadily increasing.



Heidelberg has already built a lot of sensors in their printing machines.

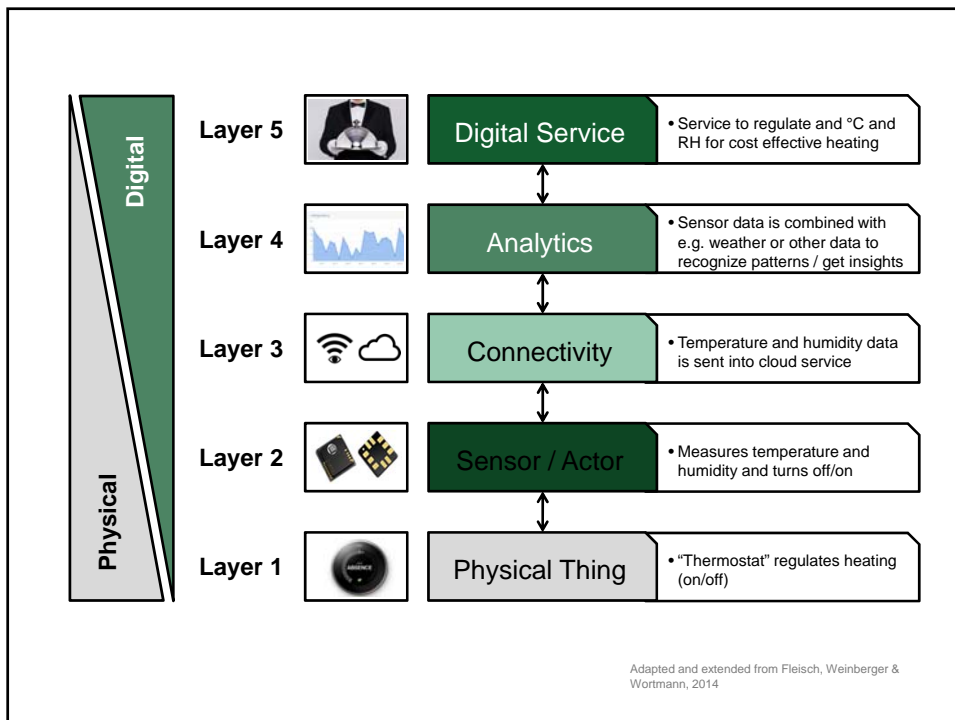
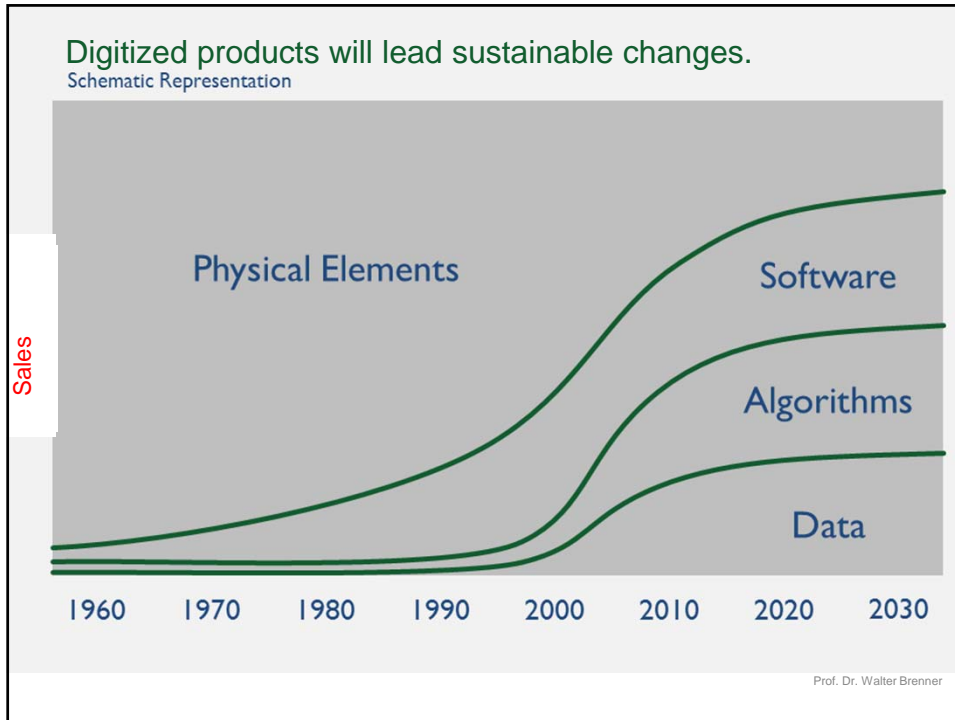




Even in farming we see cool examples of digitization.  
Did you know or expect this?

Folie 29

**Software, data and algorithms**  
will be an important part of  
industrial equipment and  
products in the future.



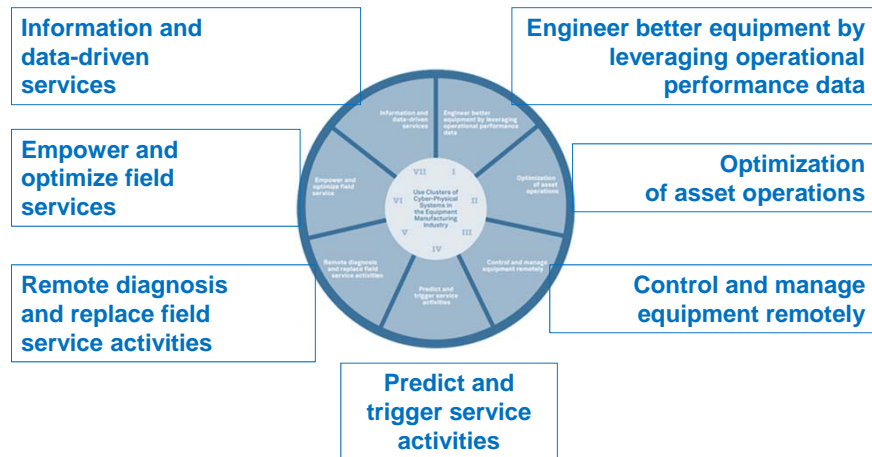
**Digital services will be a key element for equipment in a digitized world.**

In 2015 our research institute worked together with leading manufacturers of industrial equipment and products on an study about service innovation.



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Based on 45 concrete use scenarios, we identified in this study seven clusters of digital services for digitized equipment.



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Data from Heidelberg show the power of digital diagnosis and digital problem solving.

**70 %** of electronic problems on machines can be solved remotely

**90 %** of reported problems on Prinect/CtP Workflow Systems equipment are solved remotely

Average customer savings are estimated at **1,000 Euros** per Remote Services session

Source: Heidelberg 2014

Folie 36

**Finally digitization can  
change equipment and  
products **completely**.**





Folie 39







**And I expect a  
quantum leap  
in the next ten years!**



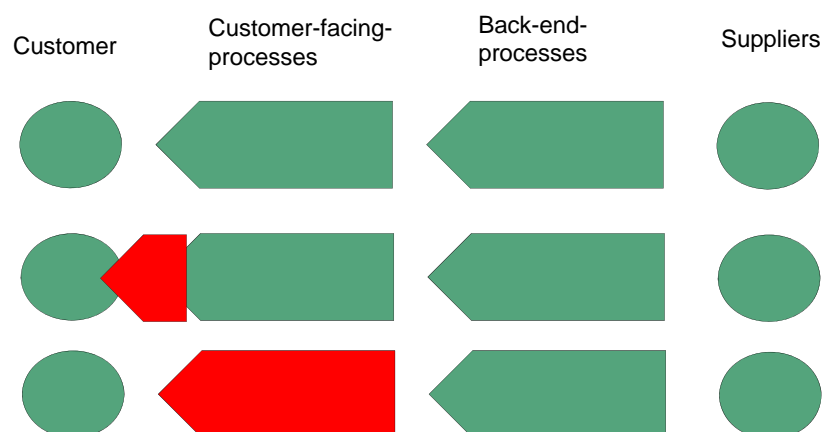
**Internet of things  
will change **engineering**  
of equipment.**

Again PTC is transferring data from sensors in a mountain-bike into a CAD-System to improve engineering.

New **business models** will have in some industries even a bigger impact on companies and industry structure:

- New access to the customer
- Pay per use
- Data-oriented/data-driven businesses
- New sales and communication channels
- New alliances
- ...

**Uber** is everywhere. A lot of start-ups try to attack established players by offering better services to the customer.



Folie 48

Which company has more than 100 Million fans?

Rank	Name	Facebook	Twitter	Total
#1	Cristiano Ronaldo	107,876,397	38,864,636	146,741,033
#2	Lionel Messi (Leo Messi)	81,216,840	1,430,000	81,216,840
#3	Neymar	54,060,888	20,282,993	74,343,881
#4	David Beckham	52,891,679	2,665,676	52,891,679
#5	Ronaldinho Gaucho	32,201,636	12,812,621	45,014,157
#6	Ricardo Kaka	31,812,682	23,782,770	55,595,422
#7	Mesut Ozil	28,995,200	798,173	28,995,200

Folie 49

The most important change in business models will be the emergence of **performance oriented business models**.

**What will be the impact of performance oriented business models on printing industry?**

**Remember: What was the impact on IT-industry!**





**Digital ecosystems are  
a mighty instrument  
of digitization.**

Amazon, Google and Apple are «world champion» in developing and operating digital ecosystems.



Folie 52



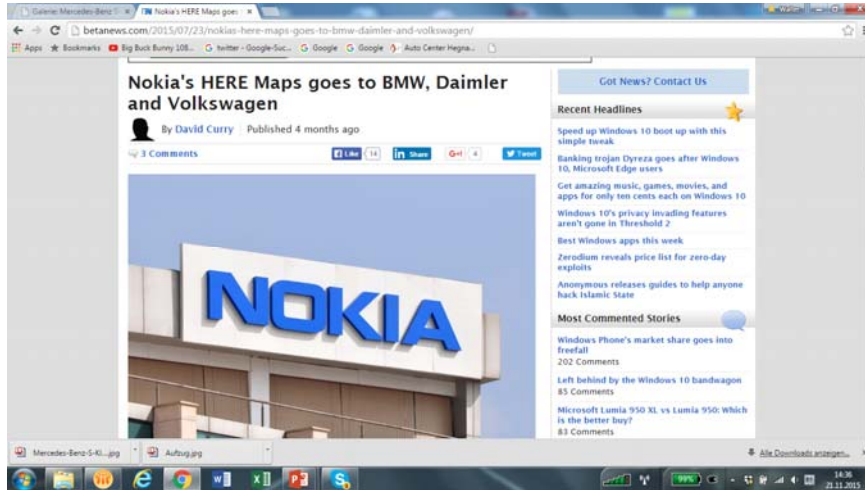
We will see the same development in industrial business. Printing equipment can be in the **centre** or **part** of a digital ecosystem.



Folie 53

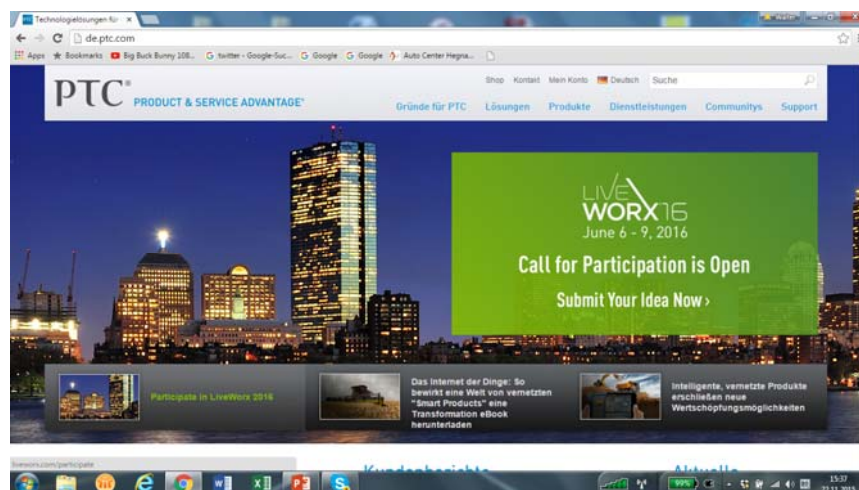
**New forms of cooperation and unbelievable alliances will be the basis of new equipment, services and business models.**

Audi, BMW and Daimler teamed up and bought HERE from Nokia.



Folie 55

Heidelberger is cooperating with PTC a leader in the world of internet of things.



Folie 56

And General Electric (Predix) is working together with PLC (CAD/internet of things).



Folie 57

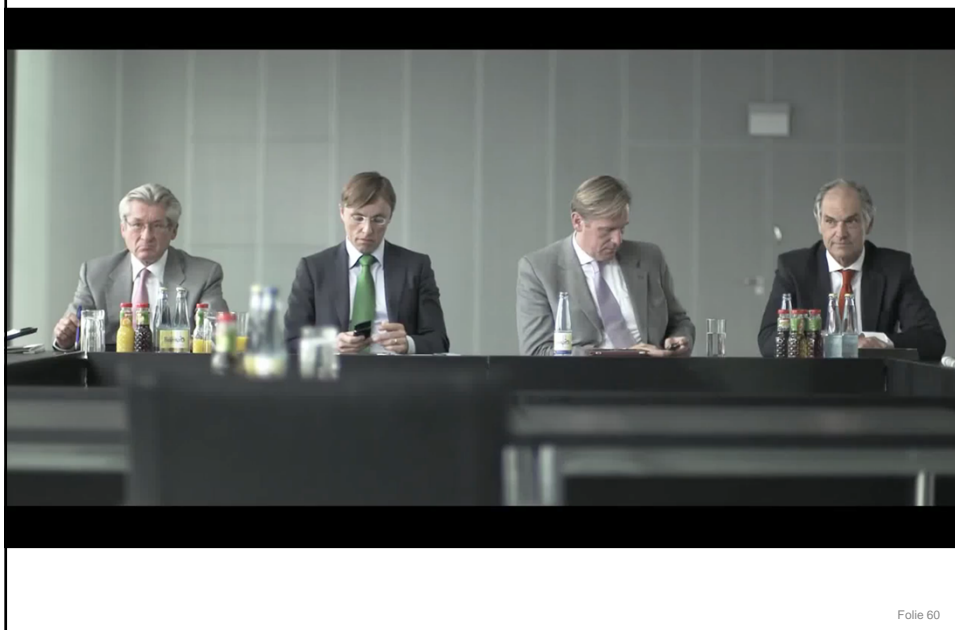
**Digitization will change  
a lot in companies.**

**At the end the CEO and the  
board will have to take  
care of it.**

Companies like General Electric have changed priorities. Jeffrey Immelt wants to transform GE in a software company.



The board of Axel Springer has shown in a video already some years ago how far involvement of the board can go.



Folie 60

**In St Gallen we are  
closely watching the  
«Race for the  
digitized world»**

**Who is participating in this “race”:**

- **Traditional manufacturing companies**
- **Hybrid hi-tech companies**
- **Software companies**
- **Internet Giants**
- **Specialized data analytics companies**
- **Start-ups**
- ...

**Security** is another important factor in the digital world. This is a private, corporate, national and international challenge.

**Trust** was key in the classic world and will be key in the digitized world. In combination with digital innovation it can be a success factor for established players like Heidelberg.



Instead of a summary: What are the key success factors for digital transformation?

- Establish and live a digital (learning) **culture**
- Build a digital **innovation process**: Build prototypes and test them with your existing and potential customers, fail often and fail early, ...
- **Speed** is not everything but is important: Start early, ...
- Build (digital) **trust**: Do the change, deliver what you have promised, ...
- Build new **alliances**: Work together with new partners, ...
- Build and leverage **platforms/ecosystems**: Be the Apple/Google/Amazon of your industry, ...
- ...

Prof. Dr. Walter Brenner  
Folie 65

Thank you for your attention.  
Now I am ready to answer your **questions**.



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