Banks and Digitalization: Of Customers, Data, Transformation – and Payments[1]

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ABSTRACT

We are told that digitalization changes everything. The great disruption comes and will sweep us all away if we don't throw everything overboard that we have stuck to so far: hierarchies, proper clothing, serious business bills. Should we believe that? Short answer: No. But digitalization forms a triangle of technology, economy and human behavior/society – where the decisive interdependencies between the three factors are often missed. This article is a plea for an engineering-like approach to digital transformation and tries to make enemies equally on all sides.

For about 30 years we have seen information technology play a significant role in the mass of companies; meanwhile, IT is not only the nervous system of the company, but, if you add everything up, it typically accounts for more than 50% of the costs.

For about 20 years we as individuals have started to inform ourselves electronically and communicate electronically, and later also to carry out transactions.

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[1] This text is based on a speech given by the author at the ECB-NBB conference on retail payments in Brussels on 26-27.11.2019.

For about 10 years we have started to do all this not only on the (laptop) PC, but increasingly also on mobile devices, especially smartphones, which change our behavior significantly.

It has long been clear to experts that this development will not only change the life of the individual very much, but also the life of every company – no matter how small or far from technology. For some time now, this trend has also covered the mainstream media under the heading "digitization" (a term, that is as shortened as the depth of the discussion is). No matter which newspaper you open, digitalization is on everyone's lips and every consultant has become an expert. In addition, an army of digital mavens explains the Silicon Valley to us and make it clear to us that we are not suited for the upcoming times, already disqualified by our clothing and leadership style.

With all due skepticism: We actually see a number of large and small companies that suddenly find themselves in difficult waters, get competition out of nowhere or lose customers or business massively. Maybe we should take off our tie and follow the hip young people? Let's look at a few things that have actually changed and then try to answer the question.

Which the triggers are…

The essence of digitalization is nothing more than to create a connection between the virtual and the real world in such a way that they eventually merge. If you build a modern factory today, you first create it simulated in virtual space, in which you first extensively test and optimize it. Only then will you build the real factory as an image of the optimized simulation model, using integrated IT functionalities and extensive sensors to be able to continue to monitor and continuously optimize the operation of the factory based on real-time data in the virtual model. Finally, actuators can be used if you want to operate individual functions or the entire factory using the virtual model or want to control them remotely, for example for set-up processes.

The technical triggers of this development are above all the steadily increasing computing power and miniaturization of classic IT components, which enable their ubiquitous integration in technology of all kinds, especially in conjunction with:

- area-wide use of sensors and actuators including audio and video recording as well as robotics of all kinds,
- use of mobile electronic communication technologies for networking and automated communication with very low latency times,
- comprehensive collection, archiving and processing of very large amounts of data using big data techniques,

- various machine learning techniques,
- advanced forms of human-computer interaction, in particular interpretation and output of language, as well as techniques for simulating reality for humans *(virtual reality)* and supplementing reality for humans with electronically assigned information *(augmented reality)*.

The combination of these factors in particular leads to *new potential for comprehensive automation in the cognitive and mixed mechanical-cognitive area*. A currently discussed example for the former is the automated comparison of contract texts, for the second the autonomously driving vehicle or the autonomously flying drone.

When it comes to integrating technology, the focus of development is on cyber-physical systems, for example in the area of production under the keyword Industry 4.0. On the other hand, when it comes to integrating people into digital processes, the smartphone is the central element.

How the mechanisms work...

First, let's look at people and their smartphones. Dealing with the little Tamagotchi is sometimes a bit bizarre. Apart from the excesses: Within just 15 years of relevant market presence, this device has meant that not only almost everyone of us owns one, but also carries it with him all day – never before has a pioneering technology got ours so fast and deep everyday life permeated. Looking for an explanation, we find a very old and a very new side of the coin.

For the very old side of the coin, we have to look back a few thousand years. When man was still living in the forest with his clan, his worst nightmare was to be separated from the clan. The deep layers of our brain still tick like this. And this device can take away the nightmare from man: he is constantly in connection with his clan, he can constantly seek status and support, he is constantly up to date – basic needs of our subconscious are met. *That is why our behavior with this device is often so difficult to control.*

A couple of years ago, we revealed the very new side of the coin in an internationally acclaimed study (Pousttchi and Goeke 2011). If we look at the reasons for using mobile services and apps, we find that all types of efficiency criteria are in fact not significant: save time, save money, support my work activities. Forget about these factors. If they are available, the user is happy to take them with them – however, they do not trigger action. But what triggers action? If the user is honest, we find exactly one reason that far outweighs all other reasons: *kill time*. The people are bored. This is the second, the very modern side of the coin of using smartphones with their mobile services and apps.

And together these two shape the behavior of people with the device on the one hand and determine the future use of technology on the other: *Standard access to the digital world will in future be the mobile device in all scenarios, even where it is not efficient, perhaps not even effectively or where it makes no sense at all.* Because people tick the way they tick. This may not apply to everyone, but it applies to the vast majority of users, and that is deciding the game. Depending on how you design systems, these effects can be used to the benefit or disadvantage of people and society.

A second interesting mechanism of action can be found behind the way we deal with data. When it comes to the human, the smartphone continuously collects data about him, his activities, his preferences, his behavior patterns - not yet to mention implant chips. When it comes to cyber-physical systems, for example, almost complete data sets are created for every intelligent factory, every modern car (which does not have to be self-driving for that) and every automated access control. In the future, this will also apply to every household, every street, every smart city and much more. But what happens to this data?

Digitalization is changing the way data is handled. Big data is not (only) data usage or data mining of the old kind, now with more data. In a classic data analysis, the scientist ponders a lot about how a situation works (trying to understand the causal relationships, usually through preliminary studies). Then he sets up hypotheses, combines them into a causal model, collects a sample of data that is as representative as possible and draws conclusions from the sample to the population. *Big data (in its most exciting and most important application, predictive analysis) goes exactly the opposite way: You collect all data and draw conclusions about the individual data point.*

The "big data" paradigm includes: *Causality is declared to be dispensable due to the large amount of data, only correlation is taken into account.* In the simplest case, all theoretically conceivable quantitative models are automatically generated, tested with historical data and the one that has the best forecast quality ex post is selected as the most suitable and used ex ante for forecast. And since the amount of data increases over time, this process is repeated regularly – *the machine is learning.* If you generalize the past/future relationship to known/unknown data, it is simply the n-dimensional variant of "Customers who bought this book also bought the following other books". The weaknesses of this approach are easily recognizable – but also the accuracy of the prediction when used appropriately!

But let's now look at the third mechanism of action, the digital transformation of companies and their impact on the value chain in the end customer business. There are three dimensions here (Pousttchi et al. 2019):

The first dimension of digital transformation is the *value creation model*, i.e., the question of how the organization and processes of the company have to change in order to use the

possibilities of new technologies. We have been dealing with this for 25 years. Actually, we know relatively well what to do under the keyword Business Process Reengineering. For large companies in particular, however, this poses special challenges, since often dysfunctional organizational forms, which are also reflected in the IT organization and in the system landscape, stand in the way of successful digital transformation.

The second dimension of digital transformation is the *value proposition model*, i.e., the indirect and direct impact of the use of digital technologies and techniques on the improvement of existing products and services, on the offering of new or even new products and services, and on changes in the associated revenue models. This is what everyone who talks about digitalization talks about today. However, the use of these new possibilities is often subject to considerable limitations in classic companies if the digital transformation of the service provision model has not yet been completed, while emerging competitors like BigTech or FinTech can act without this mortgage.
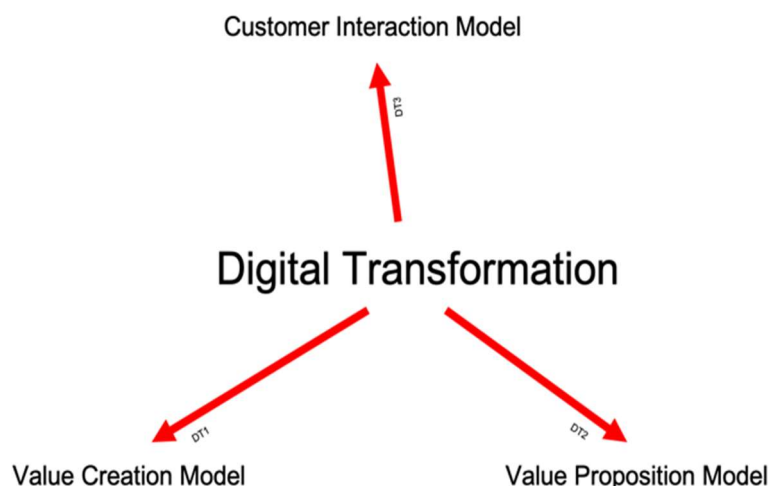
The third dimension of digital transformation is the *customer interaction model*, i.e., the question of how companies and their customers will interact with each other in the future. There is already a lot of talk about that today, under the keyword Platform Economy. According to the consultants' slides, every company should (and can) become a platform along the lines of Booking.com, Uber or Airbnb. Apart from the fact that this becomes difficult (or, strictly speaking, impossible for most companies), the analysis of the underlying problem is also much too short, like almost all analyzes that are restricted to looking at yesterday and today from Silicon Valley.

But what is the most important bet there for the future? It has little to do with startups, but more so with the customer interaction model – albeit an abstraction level above the platforms. Because the digital market leaders urgently need growth and growth fantasies in order to be able to maintain their stock price. In the digital world, however, they cannot grow sufficiently as long as 80 percent of revenues still takes place in the real world. So they have to expand their market dominance from the virtual to the real world.

And now we find that some of the aspects considered in the previous sections can work together in an interesting way, for instance in the retail sector. *After all, if you have very large and cross-sectional end customer data and can apply big data techniques – especially with the automated use of inductive statistical models – you will be able to set up new types of recommendation and marketing systems with which the end customer interface can be largely monopolized ("first point of contact for the customer"), which can then be mediated to the actual service provider as an auction (i.e., micro-economically viewed with a complete takeover of the service provider's margin).*

And as we saw earlier, due to its properties and user behavior, no instrument provides better data for this than the smartphone. Such market power arises primarily through the control of market-leading smartphone operating systems (i.e., Apple, Google), also through dominant social networks (i.e., Facebook / WhatsApp, WeChat) and dominating electronic retailers (e.g., Amazon, AliBaba). *In contrast to platforms which always act at the level of a single industry, this type of interface monopolization affects all industries which offer or manufacture products or services for end customers – including platforms.* We should keep that in mind in everything we do.

What the special role of payments is...

Mobile payment, i.e., the use of the end customer's mobile phone for initiation, authorization or implementation of payment processes, is at the center of this development. In 2004/2005 I was a young researcher to head the National Roundtable Mobile Payment for the German Ministry of Economics, with which we were able to bring German banks and mobile operators to one table for the first time (on the basis of the Mobile Payment Reference Model 1.0, documented in Pousttchi 2008). You have to let that melt in your mouth: that was 15 years ago.

At that time, we were very early and of course we did not yet think about the data game. Back then, that was neither in reality nor in our imagination. If you had had market participants at the time who could have managed to take a comprehensive approach and the extensive cooperation required to do so ("co-optition"), we would still be in a completely different position than we are with Apple, Google, Facebook and Amazon today. However, even when countries like Spain or the Netherlands later showed large-

scale cooperation between banks and mobile operators, the behavior of market participants proved they were not really set up for real cooperation and neither realized the opportunity nor the upcoming threat by asymmetric competition.

Looking back to role of payments and payment data today, let us consider briefly how a purchase process works. We scientifically examined and published about this in an international journal some time ago (Pousttchi and Dehnert 2018). The process consists of three stages: 1. search, 2. evaluation and 3. decision. And if you have a system that uses appropriate prediction (and thus manipulation) techniques, you can either omit phase 1 or even phases 1 and 2. Then there is exactly one who controls the customer, owning something that we researchers call *universal recommendation power*, with obvious microeconomic consequences. You can roughly imagine how this works on the market and which players are left behind.
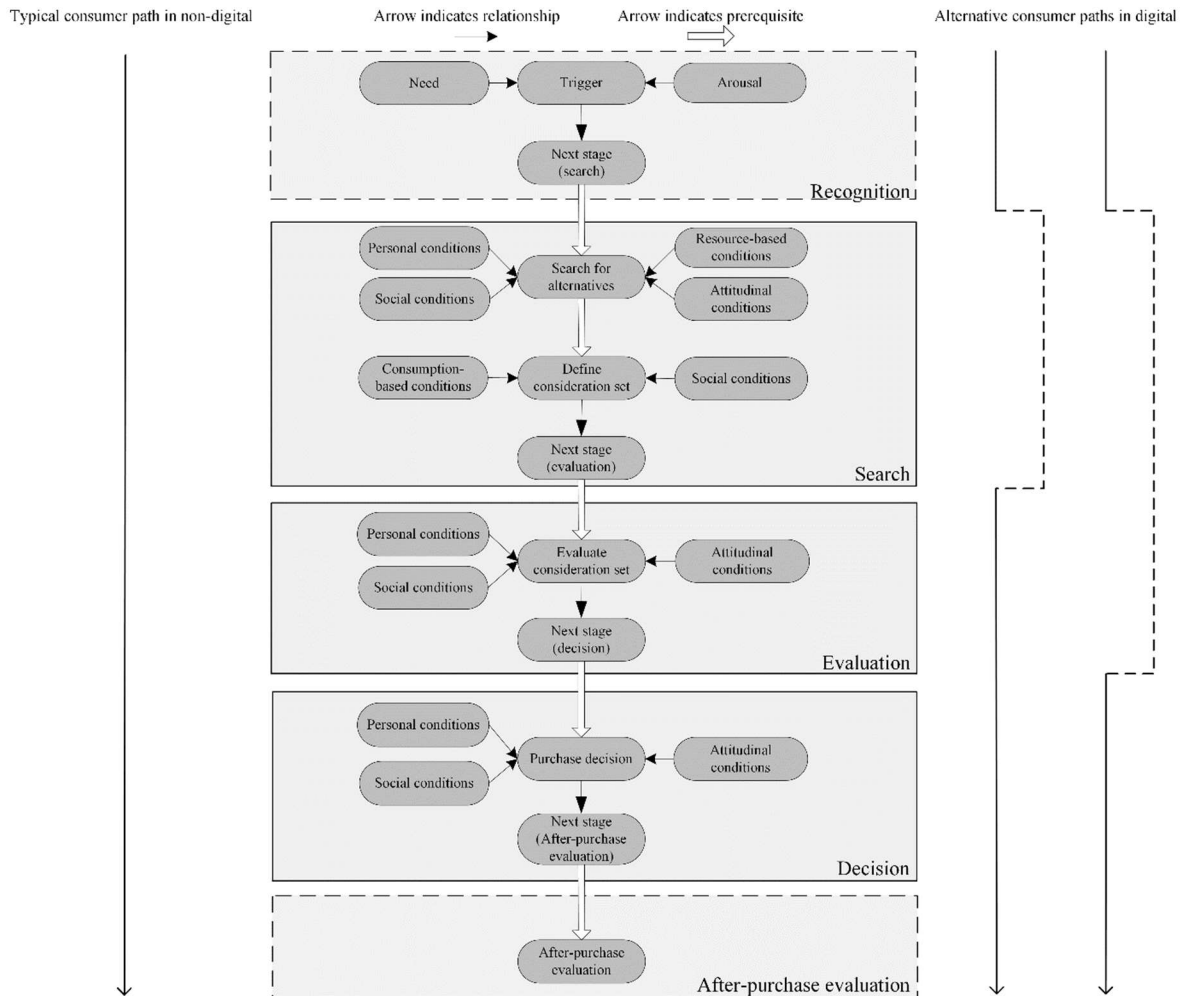
What does this mean for the big North American data players? So, there is someone who has a huge amount of data about you. For instance, if someone controls the operating system of your smartphone, they know 24 hours a day where you are, who your friends are, what kind of messages you have with them, what you are looking at on the Internet (and what you were looking at 5 years ago on the Internet, what you have long forgotten) and they know all of this for all of your contacts, too. The Cambridge Analytica case impressively showed the power auf using this data with automated modeling as described above (if you like, call it artificial intelligence or at least machine learning). But this huge amount of data is not linked to real-world customer behavior, the buying behavior. It is therefore very difficult to monetize. However, if these players now receive payment data from the real world via a mobile payment process, they have the missing link: they become able to connect the large amount of data from the virtual world to every customer's real-world buying behavior. *And that is the strategic interest for these companies, and it will pose a macroeconomic threat for the classic economy. Payment data represents the desired link of their vast amount of data from the virtual world to the vast revenue potential in the real world – including the opportunity to sack the margin of the classic business-to-consumer economy by monopolization of the end-customer interface.* That is a good reason not only to operate payments for free, but also to bring in additional money for the opportunity to do it. And as we stated regarding platforms, this effect is not only valid in retail, but for virtually every industry selling to or producing for end-customers. By the way, of course this monopolization of the end-customer interface includes the opportunity to move in-between banks and customers in banks' core business (as well as for insurance, see Pousttchi and Gleiss 2019).

Where the journey is going for banks...

When we count all this together: Difficult for banks to compete in the digital age, especially as they are not only technology laggards themselves, but also handcuffed by the vast amount of new regulation, forced to open up their customer data to asymmetric competitors such as BigTech/FinTech and see their honest interest-based business model subducted by ECB's policies.

However, if we concentrate on banks' own options for action, we have to realize that over the past 30 years, they have not acted very customer-friendly, using IT primarily to keep customers away from the branch. Because they could afford it. Today, this balance of power has reversed. Their only chance is to have a positive and personal relationship with the customer. The more they have that, the more likely they can – strategically effective – be their companion in the digital world, in the financial world and beyond. They have to use IT for this. To be "the bank at the customer's side", as a famous German commercial once stated. Because the technology companies only pretend personalization and that's

where traditional banks can grab them - if they are technologically modern enough but remain personal and deliver real added value.

We should not overestimate the importance of FinTech companies, it will remain a tactical one. This does not mean that they have no meaning. But first, the chances of a single player's real market breakthrough are very slim. Second, the business models of most tend to indicate that they will follow the path of other tech startups – that is, to let themselves be bought up either by the classic market participants or by the large technology companies. However, if you compare their war chest, the good FinTechs will go to the banks and the really good ones to the BigTech-players Apple, Google, Facebook and Amazon – who own the large and cross-sectional data sets enabling them to play the above-describe big data game. *And here you have the really dangerous, asymmetrical competitors for the banks – there will be no peaceful coexistence, as some bank managers dream of.*

One thing is clear for classic banks: They can't survive with façade digitalization. The situation perfectly compares to the old auto industry versus Tesla. Therefore, a digital banking core (representing the first dimension of digital transformation, the digital value creation model) is a necessary condition, without which *serious* digital transformation in the second and third dimension will not be possible. This means to completely re-engineer business processes, using a cloud-based architecture. I hear a lot of banks talking about big data, AI and other technological aspects these days. They are of course part of the game, but they are just the toolbox (Pousttchi et al. 2019). Because an IT strategy might be called "strategy", but ultimately remains an operational question. However, there is only one really strategic question for the Executive Board of a bank today: What is our unique selling proposition, our range of services and our business model of the future? Everything else must be derived from this. As I recognized above, the environment for banks in Europe is difficult. However, if, as a classic bank, they no longer have a unique selling point, the game is over – no matter how good their IT might be.

Digitalization is changing a lot in payment and banking. However, the important things are rarely seen in public discussion. We live in exciting times. See you!

(*Disclaimer: If you expected more details on mobile payments in this article: from a researcher's view, nothing new under the sun since 10 years ago – please feel free to refer to our comprehensive work on engineering mobile payment systems and value networks in the references on the next page.*)

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