PREDICTIVE ANALYTICS TO ENSURE CUSTOMER CENTRIC BUSINESS MODELS AND AVOID MARKET SHARE LOSSES THROUGH DISRUPTION

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Abstract: *This publication is part of a broader examination with regards to digitalisation in the banking sector and the necessity of customer centric business models. The study also considers the importance of perpetual alignment between business models and customer needs to avoid market share losses. Furthermore, it focuses on newcomer in the market as non-/near-banks which could cause disruption. This research paper examines at the extent to which digitisation in the banking sector is needed and why customer centricity plays an important role as a competitive advantage in terms of market shares to avoid disruption. Customer data, digital ecosystems, and predictive analytics as foundation for customer centricity and trend setting will be described accordingly. This article presents recommendations for banks in terms of the foundation for customer centricity and why the use of predictive analytics is not a small project to implement. However, digitalisation in the banking sector is not only an ongoing trend, but also poses a significant challenge to most institutions. This article picks up on this and presents key challenges as well as opportunities for financial institutions to deal with it. An overview of the financial technology sector will be presented. It then takes a closer look at drivers for change, customer centricity, distribution channels, and customer needs. The link of predictive analytics and customer centricity will be outlined. The article is rounded off with a view on the future customer proposition. This article supports the wider objective of an elaboration to define a model to enable the banking industry conducting a continuous analysis of defined input factors and resulting from that changed customer behaviour to derive recommendations for action to change or keep the business model customer centric.*

Keywords: *banking, digitalisation, customercentricity, disruption, predictiveanalytics, digitalecosystems*

1. Predictive analytics

Predictive analytics has not been newly defined. It is almost a natural behaviour for humans to apply predictive analytics consciously and unconsciously. Humans often consciously use experience from the past to act accordingly in the future. There is also an element of unconscious actions driven through experience in the past, mostly known as "gut feel". The systematic use of predictive analytics in the business context is relatively rare (SaS Institute Inc, 2022). Predictive analytics could be used to ensure a greater customer experience by learning from the past to for the future. In other words, this could help the organization to get a better view of the expected benefits.

"Customers do not inherently want to buy products. Products cost money and, for corporate buyers, reduce profits. Customers buy products for the benefits that the product features provide"(Winer, 2004). So, while automotive companies produce

and sell cars, customers buy transportation, image, and freedom. Customers are focused on benefits rather than the product itself. Key for successful companies is to translate those benefits into products and services and communicate those effectively to customers (Deshpande, 2014). Some companies offer beneficial products but aren't successful due to an ineffective communication others oversell products in terms of benefits through misleading marketing. For successful companies it is important to not only identify the right benefits but also to communicate them in the right way. A false identification of benefits will lead to wrong products and services which consequently result in market share losses. To identify the right benefits for the customer it is essential to consider customer value. In principle customers attempt to receive the greatest benefits from products and services from the lowest possible cost. That principle is called Customer-perceived-value (CPV) *(Blokdyk, 2020)*. CPV can also be summarized in the following equation: **Customer perceived value = benefits - cost**

Intelligent use of customer data combined with an effective and value adding ecosystem contribute to a higher CPV which ultimately increases market shares and reduces the potential for disruption. However, in order to derive the right conclusions from customer data and ensure the most valuable products and services proposition in the ecosystem, predictive analytics is indispensable (Abbott, 2014). "Predictive analytics is the use and interpretation of data, statistical algorithms, and machine learning techniques to identify the likelihood of future outcomes based on historical data. The goal is to go beyond knowing what has happened to providing a best assessment of what will happen in the future" (SaS Institute Inc, 2022).

Effective predictive analytics to derive the right conclusions from a products, services and business model perspective is not only to protect or increase market shares but also essential be on front foot from a trend setting perspective. The combination of predictive analytics, continuous review of the business model including the associated operating model and future innovation thinking are key success drivers for a corporate to be successful in future (Abbott, 2014). The largest challenge for banks now is the amount of unstructured data. Almost 80 % of the data is unstructured and therefore a challenge for systematic predictive analytics (FIS Global, 2022). The basis for a successful implementation of predictive analytics is therefore not a small project, it is a transformation of the whole organization incl. IT, people, process, data, and mindset. Banks legacy systems and the amount of unstructured data e.g., captured through unstructured documents must be transformed to a data driven operations. Many banks have already projects underway to remediate their current data and set standards for future data models.

To apply predictive analytics. A model must be agreed and setup. The model must predict values for different or new data e.g., data changes based on current results. Depending on how sophisticated the model is a continuous improvement of the model could be achieved using artificial intelligence. Through modelling predictions would show results and the probability of the target variable e.g. customer satisfaction based on estimated significance from a set of input variables (SaS Institute Inc, 2022). Nevertheless, there are also limitations about predictive analytics. Predicting future events based on historical events is like predicting curves by looking in the rear-view mirror. Basically, it assumes that there is a correlation between historical behaviour of customers and future behaviour (Indriasari *et al.*, 2019). Accordingly, a continuous trend analysis to complement the findings is indispensable to draw conclusions with sufficient certainty. In other words, it is not enough for a company to simply analyse historical data and not make any innovative contribution of its own.

In the past so called descriptive models have been applied. Descriptive models describe ex-post why certain events or behaviour happened. Predictive analytics reinstates "gut feel" into corporate decision making. In other words, it is not an abstract exercise for leadership teams. However, there are barriers to usage. Several barriers can prevent organizations from implementing predictive analytics. Barriers for organizations could be (Indriasari *et al.*, 2019):

1. Complexity. Banks have several divisions, geographies, products, and customer types. On top of this in some areas there is an evolving strategy. Developing sophisticated models has traditionally been a slow, iterative, and intensive process where a certain dynamism is expected.

2. Data. Most banks are still operating with legacy systems with a fragmented IT architecture. This often leads to significant data inconsistencies and errors. Furthermore, data availability is a challenge as some data is stored as unstructured data in either central or decentral data/document repositories. Clean, formatted, and consistent data is mission critical for predictive analytics.

3. Processing Challenge. The model often becomes a set of complex analytical queries and scoring processes which requires IT capacity to operate.

4. Knowledge. Experts for modelling and analysing the data are difficult to find and retain. This also drives the cost for these resources.

5. Interoperability. Banks are often managing processes across multiple systems. Predictive models require access of data across multiple systems and platforms as well as the ability to move data from one system to another.

6. Pricing. The total cost to build and run a predictive analytics model with the required software and hardware is beyond the reach of most midsize organizations or departments in large organizations.

Nevertheless, predictive analytics are essential for banks to derive the right conclusions to predict future customer needs. Banks have the advantage with customer data as an asset to detect future customer needs, set new trends and maximize revenues through cross selling opportunities (Law and Chung, 2020). If banks used this asset correctly, they would have a competitive advantage compared to newcomers as potential disruptors. Ultimately the quality of the model supplemented with innovation will be an important success factor and competitive advantage across banks, non- and near banks. Predictive analytics not only open up opportunities to retain customers or grow market shares, it also enables cost reduction through focusing on more profitable customers or customers with a growth potential (Ramesh, 2017). A good data analysis would crystalize less profitable customers. Due to the lack of data analytics banks often service profitable and non-profitable customers in the same way which ends up in a less customer centric average customer service (Deshpande, 2014). And lastly good data analytics would increase the level of risk management through better transparency on customer transactions and behaviour. Models can be designed to visualize relationships between different behaviour factors. Following are four algorithms of predictive modelling (Larose, 2015) (Khosla and Howlett, 2005):

1) Classification

The Classification Model is the simplest model in predictive analytics. It classifies data into categories based on what it has learned from historical data. The model best answers yes or no questions and provides a comprehensive analysis that is helpful in guiding action.

2) Regression

Regression means predicting the target value by building a model based on one or more predictors. This method is useful for predicting continuous outputs. "That means the response to the question is represented by a quantity that can be flexibly determined based on the inputs of the model rather than being confined to a set of possible labels"(Larose, 2015).

3) Clustering

A cluster is a subset of homogenous data. Clustering means dividing a dataset into several homogenous groups such that the members of each group have the biggest communalities, and different groups are as dissimilar as from one another. This method allows users to divide a large data set into consumable groups.

4) Association Rules

Association Rules is a rule-based approach for finding out interesting relations between different variables in large databases. The aim is to find strong rules discovered in databases. The expression for an association rule is $X \rightarrow Y$, where X and Y are sets of items. This rule effectively says that transactions of the database which contain X tend to contain Y. For example, customers requesting premium credit cards (X) drive expensive cars (Y).

2. Financial technologies as potential disruptors

Financial technologies are companies that have become new competitors in the financial sector with innovative developments and new products through digitalisation (Brühl and Dorschel, 2017). As a rule, these are start-up companies that use modern technologies to make traditional and common financial services more efficient and customer-oriented than traditional banks. Efficient not only means from a customer experience perspective but also from a cost perspective. This is the reason why they are being seen as the largest disruptors in the industry (Alt and Huch, 2022). The entire financial services industry has some catching up to do in the digitalisation of its business models, partly due to increased regulatory requirements (Brühl and Dorschel, 2017). This makes it easier for financial technologies to establish themselves on the financial market. In principle, financial technologies are IT companies that expand their previous business areas to include financial services and thus expand (Oswald and Krcmar, 2018). The term "financial technologies" or its abbreviation "FinTech" was created in this context to represent the development described (Oswald and Krcmar, 2018). The word pair "financial services" and "technology" are the origin of the term "FinTech" (Fend and Hofmann, 2022). Another group of a new sector are Regulatory technologies so called RegTechs with pretty much the same disruption potential as FinTechs.

FinTechs have disruptive potential. This arises not only from the combination of already established technologies, but also from the creation and use of new technologies (Fend and Hofmann, 2022). A concrete example is the blockchain technology behind Bitcoin. "Blockchains are counterfeit-proof, distributed data structures in which transactions are mapped in chronological order, traceable, unchangeable and without a central authority"(BaFin, 2022). This new technology makes it possible to encrypt data completely and also increases the security of data

manipulation. As a network of participants, the blockchain takes control of the transactions and ensures maximum security so that both sides can fulfil the transaction financially (Erner, 2019). It can be seen that blockchains function as an intermediary between the payer and the payee and thus replace the service of the bank (Erner, 2019). Not only FinTech start-ups but also large technology companies such as Apple are expanding their business fields through Apple Pay, for example, in order to create a digital alternative to the classic credit card (Tewes, Niestroj and Tewes, 2020).

FinTechs can be divided into four different segments. The first segment comprises the payment sector and focuses on payment services and the processing of payments. There is also the cryptocurrency sector, in which virtual currencies are created on the one hand and digital exchanges for trading cryptocurrencies such as bitcoins are managed on the other (Fend and Hofmann, 2022). Fintech companies offer the online merchant segment to facilitate payment processing for their customers by offering FinTechs the integration of "software as service"(Fend and Hofmann, 2022). The last segment comprises the factoring and controlling of sub-FinTechs take over invoice purchases and dunning and, if necessary, also offer a financing platform for the liquidity of their customers (Fend and Hofmann, 2022). In the financing sector, FinTechs also offer financing solutions in the form of capital from crowdfunding due to the long processes and lower risk appetite of established commercial banks. Companies or private individuals in need of capital receive capital via these platforms, which is provided by investors. The investors can also be companies or private individuals who are trying to achieve a higher return at the agreed risks, as the low-interest phase in the classic investment sector no longer leads to a return. In addition, FinTechs create their own rating and scoring models using data analytics methods to weigh up opportunities and risks for both sides (Brühl and Dorschel, 2017).
The central starting point for digital business models is the usage behaviour of customers. Customers are sometimes actively involved in the creation of the product or service in order to increase customer benefit and customer satisfaction (Blokdyk, 2020). It is evident that customers take advantage of the substitutive solutions offered by FinTechs, such as ETFs or cash withdrawals at supermarkets, because they save time and money (Brühl and Dorschel, 2017). Financing of FinTechs has increased in recent years through invested venture capital. Specifically, this means an increasing interest and potential of FinTechs in terms of innovation activity and an increase in competition in the financial services industry (Alt and Huch, 2022).

3. Competitive situation in the industry

Currently, the business models of banks must be questioned due to macroeconomic trends and the existing information technology, as a dynamic and continuous development of the bank is not compatible with a stagnation of information technology (Seidel and Liebtrau, 2015). The increasing regulatory measures to prevent another financial crisis like the ones in 2008 and 2009 make it more difficult for banks to be profitable on the one hand and efficient on the other. The tightening of equity capital regulations and the stipulation of various requirements for a bank's risk management lead to an increased cost structure. This can be measured in terms of personnel costs, which are triggered by the corresponding control staff. Traditionally, most banks work with a structured customer segmentation. Within this standard segmentation, the bank always tries to form new business relationships from on-balance sheet products. This strategy has so far served to form high volumes in the provision business through affiliated partners such as insurance companies,

investment companies or building societies and thus to at least offset the interest expenses (Grussert, 2009).

In addition, the changed behaviour of customers is another influencing factor (Deloitte, 2014). The motivation of customers to buy and use banking products depends on their updated needs and changed plans and goals (Deloitte, 2014).

Increasing globalisation is having both a regulatory and innovative impact on the financial services industry. Among other things, the introduction of PSD2 has led to the standardisation of payment processes within the European Union. At the same time, internationalisation opens up the possibility for banks to connect and cooperate with each other. Particularly in the development and establishment of applications for mobile devices, the sharing economy within the banking industry can bring advantages both on the revenue level and in terms of customer loyalty (Heckel and Waldenberger, 2022).

The socio-demographic developments have an effect on the fluctuation of young customers aged 25 to 44 on the one hand and on the demand for provision products on the other. The migration of this customer segment leads to, among other things to a reduction in commission income in the areas of old-age provision and hedging, since most hedging contracts are concluded in this age range in particular (Benölken, 2021). One possible reason for this churn effect is the failure to make adjustments to anchor products such as the current account, which for years served as the basis for the offers of established banks (Benölken, 2021).

The term digitalisation is often used by banks as a positive substitute for the closure of branches due to changed customer behaviour, which is demonstrably the case (Mertens, Barbian and Baier, 2017). Currently, deficits in the implementation of a digital strategy are apparent due to weaknesses in information technology and also in the structure and organisation of the bank (Mertens, Barbian and Baier, 2017). In addition to a multi-channel strategy, the requirements for a digitalised bank are also requirements for a needs-based technological infrastructure in banking (Brühl and Dorschel, 2017). The focus on cost reduction within the credit institution is relevant due to the circumstances listed and also because of the increasing regulatory requirements and their effects on the established business model (Brühl and Dorschel, 2017). In addition to the reaction to customer demands, there is also a process of change in the hierarchies and executives up to management level (Mertens, Barbian and Baier, 2017). In concrete terms, this means that within the organisation of a bank, a sometimes-rigid structure collides with the agile and disruptive characteristics of the digital transformation. Among other things, the rigid structures within the bank mean that technological innovations are often only established through external influences instead of being actively introduced into sales. One example is the COVID-19 pandemic, which has forced many companies to hold online meetings (Benölken, 2021).

The increasing globalisation of the economy and the accompanying demand for high- performance and internationalised banking services is also exerting an influence.

Banks operating a branch network in Germany are subject to competition with each other on the one hand and to the pressure of revolutionised business models of financial technologies on the other (Deeken and Fuchs, 2018). Platforms such as Amazon or Facebook now enable an easily accessible structure and equally facilitate interaction between providers and customers driven by data (Benölken, 2021). Financial technologies are also increasingly taking market share in the area of financing, as they offer uncomplicated and fast financing through crowdfunding via

their platforms (Heinemann, 2013). Demand is also present in this area, especially from smaller and new companies, which are increasingly choosing alternative financing via crowdfunding platforms due to the slower approval processes of established banks (Deeken and Fuchs, 2018). In contrast to the past, the internet takes over the function of the intermediary and brings together capital seekers and capital providers, which makes the monopoly of the banks is endangered in the long term (Benölken, 2021). The effects on branch banks are in some cases, the closure of branches and extensive job cuts were made in order to increase efficiency (Seidel and Liebtrau, 2015). In the meantime, the first tendencies towards establishing systematic innovation management in traditional banks and savings banks can be seen (Alt and Huch, 2022). Due to the competitive situation caused by FinTechs or platforms from outside the sector, traditional banks are faced with the decision of either being forced out of the market or founding their own competitive platforms and thus regaining market share.

4. Customer needs and business models

In the financial services sector, there is basically no differentiating feature in terms of products and services, as these are almost identical and substitutable. As a result, banks are faced with a greater challenge in terms of what they can offer their customers, which is also made more difficult by the competitive decline in the prices of banking products. In the past the connection between the bank advisor and the customers was characterised by a basis of trust and a special quality of advice (Seidel and Liebtrau, 2015). Nowadays, customers attach importance to transparency, especially with regard to costs, and also to user convenience, and are at risk of churning if they have a bad experience with the advisor or the service provider.

The representative online survey shows that up to now, most customers have kept their accounts with traditional branch banks for reasons such as trust, competence, and proximity, but also for reasons of user-friendly online banking. Ambivalent to this is the desire for online support. This can be understood on the basis of customer demands such as convenience, simplicity, productivity, fun and image (Seidel and Liebtrau, 2015). Customers use their otherwise unproductive time productively, for example, while travelling by public transport through mobile devices and digital applications, in order to ultimately have more free time and greater user comfort. For example, established banks need to adapt the deficit within their digital infrastructure so that customers can make case- closing or preparatory decisions independently via online banking, and likewise to shorten advisory meetings digitally or in person on the basis of digital preparation options so that they meet customer needs. For some processes, customers have to wait longer because they have to be completed by employees and the capacities are not optimally used due to long counselling sessions and incorrect allocation of staff. Employees, especially of the younger generation, also demand digitalised processes due to their own usage behaviour (Auge-Dickhut, Koye and Liebetrau, 2014).

In a VUCA world, which encompasses a volatile, uncertain, complex and ambivalent environment, customer needs become uncertain and difficult to predict (Hellenkamp, 2016). In principle, changes in the behaviour and needs of customers are also apparent at an increased speed. On the one hand, customer needs can be obvious by being verbalised, on the other hand, they can also be hidden (Hellenkamp, 2016). In the case of the needs already listed, these are obvious needs that are communicated by customers or can be identified through action. Hidden customer needs can be, for example, co-design or the desire for self-determination, as this can

only be ascertained through a qualitative analysis. Qualitative analyses are harder to measure, but can be used for the design of the strategy and product management provide added value (Mayring, 2015).

In recent years, the importance of digital channels for customers has grown and become normal. In the 1990s, customers visited the bank branch several times a week for their banking transactions. This has changed in particular due to the emergence of the World Wide Web and the associated increase in the speed with which information can be obtained. The rapid disruption, which is particularly evident in digital innovations, leads to uncertainty and fluctuating demand among customers due to low knowledge and increased complexity, as customers nowadays choose their communication and action path spontaneously and want to have maximum choice regarding the contact path. Therefore, it can be stated that it is necessary to understand the psyche of the customer in order to bind him to the credit institution through trust, care, individuality, commitment and appreciation (Bruhn, 2005).

Customers can now receive information about their status quo immediately while on the move via their mobile devices such as smartphones or tablets and can also make use of products and services online. The development of digital applications adds more freedom of information to the three buying phases at the customer interface. Customers are made aware through targeted marketing and in the pre-purchase phase they search for information and compare the product or service with alternatives. It should be noted that demographic differences are relevant at this point, as the use of digital media can differ depending on the age segment. In the purchase phase, the customer makes a concrete purchase decision and uses the product or service accordingly in the purchase phase (Seidel and Liebtrau, 2015). It is therefore necessary for banks to design their marketing processes in such a way that they derive the maximum economic benefit from consumer behaviour. Another trend that has an impact on changing customer needs and usage behaviour is the principle of sharing. Customers use digital processes in particular to use products and services instead of buying them. A classic example of the so-called sharing economy is the streaming of films and series via digital platforms such as Netflix, Amazon Prime, Sky or Disney+. Physical objects are also shared by customers (Hildebrandt and Landhäußer, 2021). These include cars, scooters, and bicycles, for example, in order to reach the desired destination in the shortest possible time in cities or between cities. In principle, the principle of sharing economy is not new. However, for the less internet-savvy generation, it is an effort to follow the current trend due to a lack of trust in the system.

It is noticeable that customers have become more price-sensitive in recent years. The financial products and services of a bank have partly developed a commodity character and are thus subject to tougher price competition, since customers, especially in the area of financing, often rely on the more favourable interest rate or the lower costs (Brühl and Dorschel, 2017). Price sensitivity is important for However, the customer is not the only factor that leads to a concrete purchase decision. It is also important that the products and services are equally accessible to them in a quick and uncomplicated way, but also that they are so individualised that they fit exactly to the customer's life situation (Brühl and Dorschel, 2017). Communication and interaction are still of central importance for most people today. The possibility to join in, comment, network, share, and rate is appreciated by most people.

However, what used to be communicated in person is now increasingly communicated via social media, especially when opinions are expressed publicly. Using keywords that are identified by a hashtag, it is easier than ever to comment, to inform and to ensure speed, transparency, and low complexity. The internet is

fundamentally a universal medium that also allows synchronous or time-delayed interpersonal communication between humans and machines. Data is no longer necessarily stored on the hard drive of the end device, but in a cloud (digital storage space on the internet). Almost 85% of people in Germany use social media at least once a week by sending text and voice messages, conducting video conferences or viewing or sharing pictures and videos (Jayachandran *et al.*, 2005).

This trend can also be seen in banking, as banks have so far created applications almost entirely beyond the website in order to give their customers access to their products and services at any time and from any location. Many banks also use social media to draw attention to themselves. It should be noted that at this point the desire for individualised product suggestions and financial services is expandable, as the suggestions also depend on the provider of the social network. Social media offers a bank the opportunity to derive the usage behaviour of customers for itself and thus differentiate itself from the other competitors through personalised and intelligent services. It is possible to conduct an online customer analysis and determine the customer segment, customer structure, customer value, customer potential, customer profitability and customer development (Jayachandran *et al.*, 2005). By analysing social media, the bank's level of awareness and profit can be increased by focusing on optimised and demand-oriented offers for existing and new customers.

Due to the high usage rate of social media, it is evident that it is important for customers to be able to use several channels individually and appropriately via one application.

5. Final Remarks

The pressure on the bank to act is particularly high in a situation of cut-throat competition, where digitalisation also allows global non-banks, near-banks, and banks to enter existing markets. A delayed or insufficient reaction to digitalisation could mean that customers would change their bank connection and thus both the business model and the existence of the bank would be threatened. The biggest challenge for traditional banks is the speed and the level innovation of newcomers e.g., FinTechs. FinTechs don't have to build around difficult and outdated legacy technology they usually start on a greenfield which allows them to deliver the proposition in much faster time then traditional banks. Time to market is a key factor retaining market shares as the loyalty of customers has been reducing steadily where digitisation further enforces this trend due to the lack of personal relationships. Winning back customers is not only 25 times more expensive than keeping them, but it also makes it almost impossible in some cases driven through digital ecosystems. The reason for this is that the barriers for customers to switch ecosystems are too high, or in other words, convenience is kept very high. To make matters worse, customers increasingly do not value the fact that only companies that were originally intended to provide the service do so. The focus is on the customer experience of the service, which can be measured directly via the CPV. So, if the products and services or the "what" are necessary and the selling company, i.e., the "who", is indifferent to the customer, then the banks should deal with the "how", i.e., with the question of how the value proposition must be designed and reach the customer.

It can be stated that banking in the sense of banking products and services is indispensable. The basic functions of banks are also indispensable for an economy. However, those who fulfil these functions and provide the desired banking products and services are becoming increasingly uninteresting to the customer.

In the context of customer centricity of business models, customer data and its intelligent use play a crucial role for the customer experience. Intelligent use of customer data, which presupposes its availability and accuracy, not only represents a more tailored offer for the customer, but is also the basis for predictive analytics, i.e., to predict behaviour and needs from past data with sufficient certainty. The ex-post view is only one component for predicting future events. This would assume a relatively high correlation of past behaviour with the future. To account for the delta between the full correlation and the actual correlation, i.e., the deviation of future behaviour in anticipations, an ongoing trend analysis is required. This addition mitigates the unexpected change in behaviour. To go one step further, this should ideally be supported with innovation by the respective company to set trends and thus actively influence customer behaviour. Basically, by intelligently applying all three components, past analysis, trend analysis and innovation power, a priority pioneering position can be achieved. These results in combination with the customer proposition result in the core of the business model, which must be designed flexibly overall regarding the other factors included.

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