Banking Industry Architecture Network

Skin the Financial Services Onion

A capability-based model to explain the (r)evolution of the banking industry

Organization

Authors		
Name	**E-Mail**	**Company**
Christof Hasse	ch.hasse@gmail.com	UBS Business Solutions AG
Ante Plazibat	ante.plazibat@bei-sg.ch	Business Engineering Institute St. Gallen AG
Martin Rindlisbacher	martin-o.rindlisbacher@ubs.com	UBS Business Solutions AG
Stephan Sachse	sachse@wifa.uni-leipzig.de	University of Leipzig
Adrian von Aesch	adrian.von.aesch@dxc.com	DXC Technology

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BIAN

1 Abstract

Using technological breakthroughs nimble startups and FinTech businesses can quickly grow into major competitors for established players in the Financial Services Industry. This white paper proposes a framework how a capability-based approach can be used to assess multiple stressors and their possible impact on current business models. The presented CONCENTRIC[1]-model uses a unique customer and capability perspective and shows how evolving customer demands coupled with technological advances are challenging traditional business models. The model allows for strategic analysis of industry sector capabilities and how the emerging mesh business models may affect these.

The work presented in this paper was conducted as part of BIAN's "Banking Models Working Group" with its objective to:

- Definition of a banking reference model as a global public domain industry standard that describes economically worthwhile business entity roles in the financial services markets.
- Description of these business entity roles based on elemental business capabilities (BIAN service domain).
- Determine the influence of a business entity role to its constituting elemental business capabilities (BIAN service domain).

The work can also be seen as input for BIAN's "Banking Business Capability Model Working Group" which is developing a generic banking business capability model that can be used as a reference or starting point for creating one's own specific model.

2 Introduction

Observing today's rapid technical and social developments is exciting. Various financial services are provided to a wide community in a number of ways. Some predict the end of the traditional banks while others dismiss it as a hype which will fade away sooner or later. Regardless of the outcome, it is beneficial to understand the nature of change. This understanding might help especially incumbent banks to steer their development and adoption to stay relevant in the future - it is about finding or playing a role in a transformed financial services landscape.

The main drivers are the possibilities arising from the increasing IT capabilities like processing power, connectivity/networking, storage, data and algorithms. The implications of these increasing IT capabilities are commonly called "digitalization". However, this goes far beyond digitizing a form a customer had filled in and still being processed internally along the traditional "analogue" way. It means a true transformation of business and operating models [1].

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[1] CONCENTRIC-Model stands for "out**C**ome **O**rie**N**ted **C**ustom**E**r *waNTs*-add**R**ess**I**ng **C**apability"- Model

In their book "BOLD" [2] Diamandis and Kotler identified 6 key phenomena – the 6 D's as the drivers which are disrupting today's incumbent companies [3] and enabling upstart entrepreneurs to go from 'I've got an idea' to 'I run a billion-dollar company' far faster than ever before [4]. Besides 'Digitization' (the foundation), this is 'Deceptive' growth (or underestimating potential) resulting in 'Disruption', 'Dematerialization', 'Demonetization' and 'Democratization'. The last three are for us the key drivers which we will keep in focus during our investigations because the financial system was and still is a very closed industry with a rather limited focus on monetary aspects.

In this paper, we will address the question: What are today's essential building blocks of banking and how are these building blocks affected by future trends? During our investigation we will ask three fundamental questions:

- What is the outcome of each building block that makes up banking?
- How is the outcome accomplished?
- Who accomplishes the outcome?

and the following three questions addressing the key stress factors to any business model

1. Is the value proposition (outcome) still needed tomorrow?
2. Is the outcome efficiently accomplished?
3. Are there others who can accomplish the same outcome?

The document is structured as follow:

We introduce our "outcome"-oriented approach where the outcome fulfills the client's *wants* followed by some basic principles about capabilities and the introduction of the fundamental banking capabilities. Subsequently, we explore the impact of the major trends (fueled by the increasing IT capabilities) on business models and banking capabilities in general. We conclude the document with a view on BEI's[2] financial services periodic table which forms a basis of their FinTech radar.

For the purpose of this paper, we will focus solely on banking, ignoring insurance-related capabilities.

3   Satisfaction of wants

The phenomena of 'democratization' emphasize the role of the customer in today's business environment. Thus, a strong emphasis on applying of the customer's perspective delivers new insights into understanding the purpose of banking.

Traditional means of business modeling and optimization based on narrow definitions of customer journey typically fall too short. In [5] it is correctly stated that business process modeling (clarifying the 'how') is not business modeling (defining the 'what' as the value exchanged between actors). We go a step further because even business modeling and narrow definitions of customer journeys, which only focus on

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[2] BEI: Business Engineering Institute St. Gallen (http://bei-sg.ch/en/home)

the journey of the customer along the touchpoints of the provider, bears the risk of a biased inside-out view[3]. It does not explain why the customer should get in touch with the provider at all.

Ultimately, someone's[4] *wants*[5] should be fulfilled. Consequently we move away from a provider's product and services view to an outcome-oriented view where the outcome fulfills a specific *want*. The difference is rather fundamental and is amplified by the process of the dematerialization, demonetization and democratization. In the former product and service-oriented view, the customer gets something sold (maybe not even really wanted) while in the later outcome-oriented view, the customer seeks / buys something he/she wants. Today's technology (internet, search engines and platforms) allows searching globally until someone is capable to satisfy such *wants*.

However, this emerging market structure poses new challenges for the consumer, such as an overwhelming complexity due to the variety of alternatives and potentially his/her low expertise. Given this background "secondary" wants such as "simplicity", "convenience", or "trustworthiness" become differentiating factors. If two or more offerings provide the same functional utility fulfilling a "primary" want (e.g. transferring money abroad), the consumer facilitates "secondary" wants (non-functional attributes) to select the most appropriate alternative [6]. In this paper, we will mainly focus on "primary" wants and address "secondary" wants only where necessary.

3.1 Structuring of wants

Figure 1: Want categories

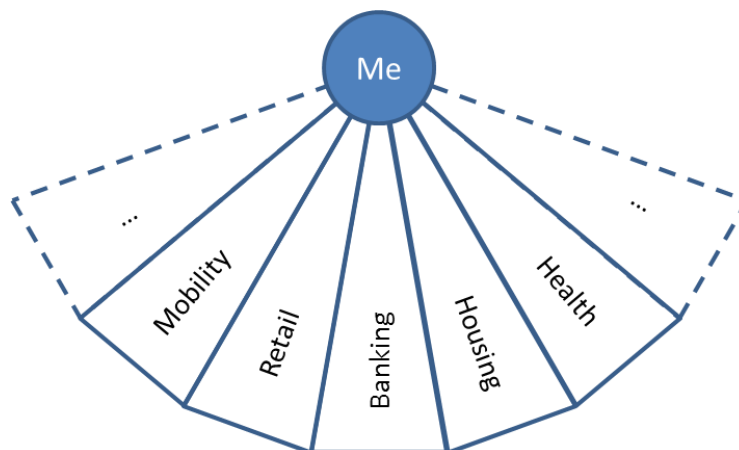[3] See BIAN Service Domain Landscape describing a blueprint for how a bank can implement Application Functions as part of an IT Model

[4] Natural persons as well as a body corporate

[5] Needs are basic requirements (e.g. see Maslovs hierarchy of needs) and may turn into wants if not satisfied (wants imply some kind of lack). Note that there are many more wants than needs. Not everything wanted is needed.

To better understand current economic changes, such as the FinTech trends, we place the individual into the center, take a look through its eyes ("*Me*") and introduce an open, non-exhaustive categorization of his *wants* which resemble classical industry sectors as shown in Figure 1: Want categories. As we shall see later, consumers do not necessarily think in these categories and often have *wants* spanning categories, e.g. one wants a house which might lead to the requirement of a mortgage in case one has not enough money or one wants a TV set which implies a payment.

This simplified model shows the variety of *wants* customers have. Driven by these *wants*, companies usually react by offering products and services to fulfill these customer demands. This value proposition is enabled by the ability of a company to perform actions that provide some value to the customer. So, the plethora of customer *wants* (demand side) finds its counterpart in the number of capabilities that businesses offer through their products and services (supply side). These capabilities are the focus of this work.

This out**c**ome **o**rie**n**ted **c**ustom**e**r *wants*-add**r**ess**i**ng **c**apability (CONCENTRIC) approach together with the proposed categories clarifies the nature of the disruption currently happening. It is worth mentioning that whether or not something new becomes disruptive ultimately depends on the customer accepting the new and rendering the old orthodoxy obsolete. It is not subject of the document to investigate how the customer decided for the new. The document will focus on the underlying nature of the stresses that lead to disruption and what could be done to address the threat of disruption.

4 Capability basics

A capability is the ability to accomplish a specific outcome and is a disposition of some bearer; and when the bearer performs its capability, the bearer becomes an actor and a certain outcome is accomplished. We are not interested in just doing something without an outcome (so-called activity). Also, because the bearer may never perform / use its capability, a capability has only a possible outcome. Hence, it is useful to distinguish between the possibility of accomplishing an outcome (possible state) and an actual occurrence of having reached an outcome (actual state) as shown in Figure 2: Capability foundation. In short, we can say that a capability is the ability to accomplish a specific outcome and reach a desired state.
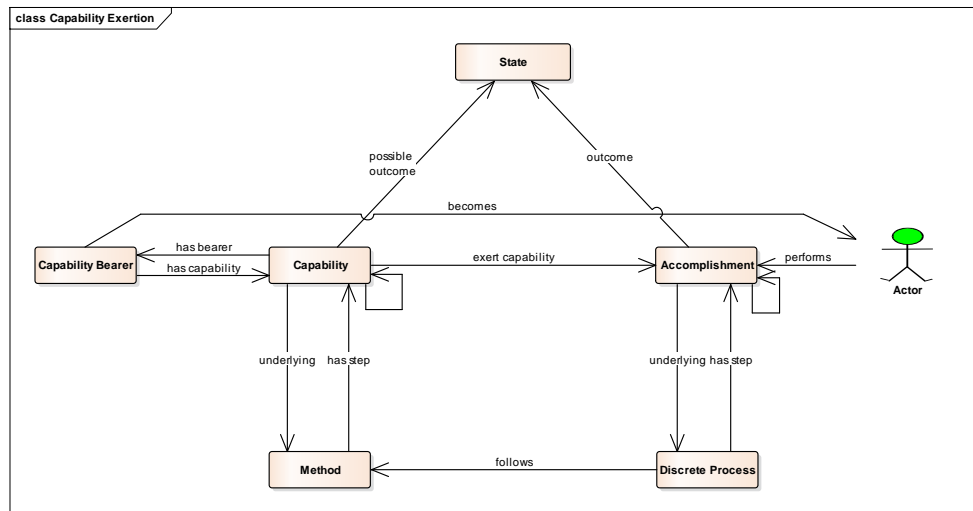
Figure 2: Capability foundation

When we look at a capability, we can recognize a method or script associated with the capability describing how the capability is assembled. When the capability is performed, a process follows the associated method. That process accomplishes the desired outcome and makes up an accomplishment[6]. So, when a performed capability turns into an accomplishment, the possible outcome becomes real. Note that different methods can be behind a capability, but they all must lead to processes having the same outcome as defined by the capability's possible outcome.

That different methods can be underlying a capability is a desired property of a capability and is often referred to as "a capability hides / abstracts from the underlying process" (hiding the "how"). Another often referred property of capabilities that "capabilities hide persons / organization" needs a closer look. The statement is true with respect to the involved parties in the underlying process. However, these parties must be clearly differentiated from the bearer of the capability or the actor of the accomplishment. The bearer (or actor) of the capability represents the group of the parties involved in the process. This is the same as the difference between a set (e.g. the company known to have a capability) and the members of a set (e.g. the hidden employees or partners of the company involved in the underlying process).

4.1 Sub-capability vs. Specialized capability

With our model, we can also clarify a few misconceptions about the breakdown of capabilities into subordinate capabilities. There are two kinds of how capabilities can be put into a relation.

The first kind follows an 'is-a' (specialization) relationship implied by the 'is-a' (specialization) relationship of the outcome (state). The general capability "transfer of

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[6] We explicitly include situation where the bearer initially is not "aware" of its capability and accomplishes "accidentally" an (beneficial) outcome. He will then become aware of its capability and the underlying method.

ownership" (state: owning something) can be specialized to "transfer of money" (state: owning money) following the specialization of "something" to "money". So any instance of money is also an instance of something, and we can also say that any instance of "transfer of money" is an instance of "transfer of ownership". We will call this kind a "specialized capability".

The other kind results from the (recursive) de-composition implied by the associated method. The underlying method assembles / composes the sub-capabilities into the superordinate capability. These sub-capabilities (de-compositions) do not have outcomes that can be brought into an 'is-a' relationship with the outcome of the superordinate capability. These are the incremental outcomes that, on the path (execution) towards the accomplishment, contribute to the final outcome of the superordinate capability. We will continue referring to this kind as "sub-capability".

For example, the "transfer of money" capability typically assembles the following sub-capabilities: order capture / origination, regulatory / compliance check (e.g. AML check), booking, instructing intermediary / receiving bank[7].

4.2 Business model innovation and stress (basics)

In our work within an economic context the outcome should fulfill someone's, typically the client's / customers, *wants*. We will later become more precise in what the various states are. So much in advance: our taxonomy of capabilities will be implied by the taxonomy of states, that is, the capabilities' possible outcomes.

With our few concepts (capability, bearer (of a capability), method, outcome) one can identify three main causes of stress to a business model. The order of stressors described below indicates a level of stress (descending) to the existing business model.

1. The client's *want* changes and a new capability fulfilling the new *want* emerges. There is no need to discuss whether first the *want* changed leading to seek for new capability or the capability changed leading to a change in the *wants*. It is only relevant that the new outcome is given preference over the old outcome which causes the old capability to become less relevant than the new capability.
2. The method behind the capability changes, that is, a new method has been found typically leading to a more efficient realization of the capability. In other words, a new, typically more efficient way has been found to accomplish the same outcome.
3. Other bearer of the capability emerges leading to more competition e.g. from a quasi-mono-/oligopoly to a polypoly. In other words, the markets become more diverse as new players emerge.

These causes of stress may appear in combination.

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[7] The BIAN Service Domains in Figure 4 can be seen as the 'automated' behavior of those capabilities

4.3 Perspectives on Capabilities

The second kind of subordinate capabilities, namely sub-capabilities, leads to the observation that the notion of a capability is highly overloaded and perspectival. In our previous work, when we combined the BIAN service landscape and CC Sourcing financial network model, we identified three categories of capabilities which were distinguished by the type of the capability bearer.
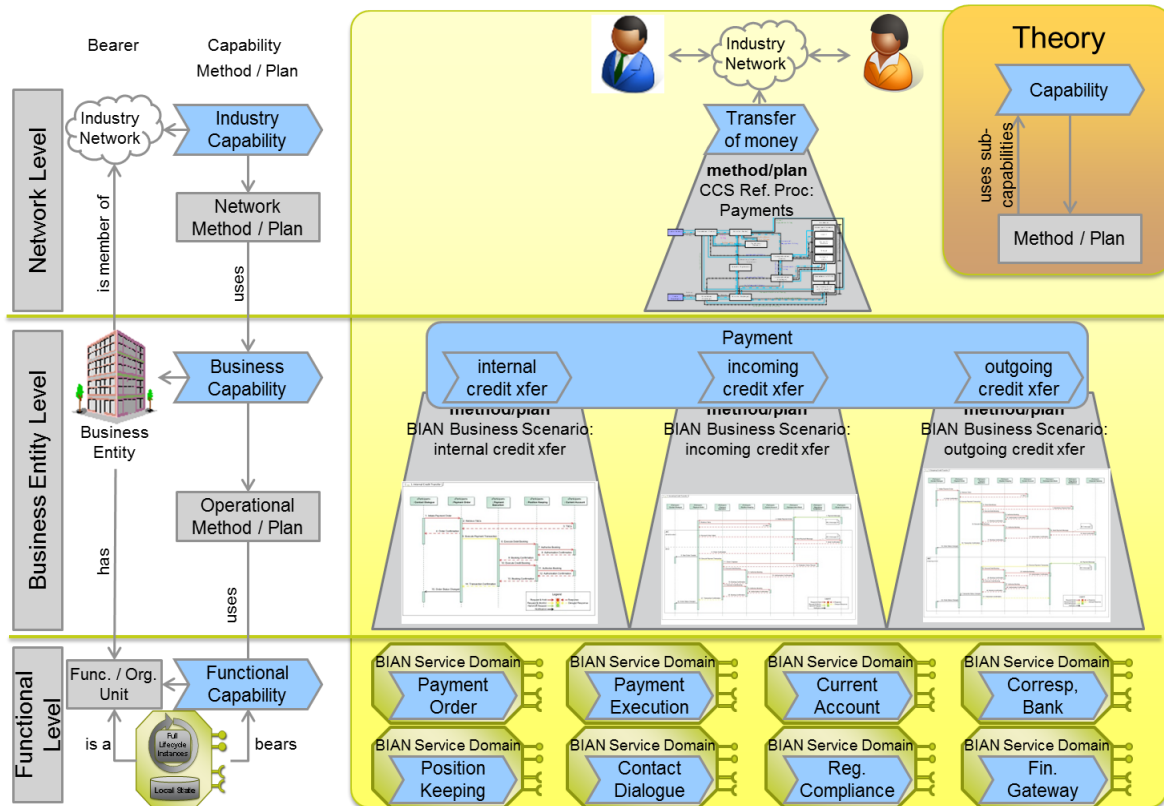

Figure 3: Combined BIAN and HSG capability model

- ***Network capability:***

  A capability for which a group of business entities[8] is the bearer as it requires them to collaborate (network method) to accomplish an outcome satisfying a client *want*. Traditionally, industries, including the financial industry, are organized in networks of business entities in which individual business entities take on one or multiple roles. The collaboration with other business entities (partners) along the value chain generates the desired outcome (accomplishment) for the client.

  An example would be an inter-bank money transfer where the transfer originating bank cannot accomplish the fulfillment of the *want* on its own.

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[8] In principle these could be natural persons as well e.g. where the network is a community like the open source community. We have a business focus with entities having a legal standing to hold claims and obligations.

Another good example is today's "trading" because matching and the actual transfer of ownership (settlement) is performed by other business entities.

- ***Business capability:***

  The bearer of a business capability is a single business entity[9]. Note, that the outcome of a business capability may not always directly satisfy a client *want*. When the *want* is not directly satisfied, the outcome of a business capability will be a contribution into a network capability which will then (hopefully) satisfy the *want*.

  Examples are advise and portfolio management (as a kind of controlling).

- ***Functional capability:***

  Business entities are typically internally structured into organizational units sometimes also called functions. Their capabilities are called functional capabilities and contribute with their outcomes to the business entities capabilities. They, therefore, do not satisfy any client *want* solely.

- ***Application capabilities:***

  But also applications have an autonomous behavior (they are as well autonomous agents[10].) and can, therefore, be viewed as bearers of applications capabilities. AI even magnifies the application capabilities.

Given the focus on outcomes that satisfy someone's *wants*, we are interested in either network or business capabilities. Functional and application capabilities are not in scope[11]. They reflect the business entity's internal, typically optimized structure (typically the level on which business process modeling is applied).

We can also look at a capability from an outcome perspective. Following the structuring of *wants* (see: Structuring of wants) we can identify "domain" capabilities. In other words, the banking capabilities belong to the domain "Banking" while retail capabilities belong to the domain "Retail".

5 Banking Capability

A banking capability is a capability with a financial related outcome / state[12]. Note: depending on the bearer, a banking capability can be either a network capability or a business capability, but this is a detail that is irrelevant in this context.

By defining a banking capability through the definition of a financial related state we are able to abstract from the current peculiarities of the financial industry. This approach is fundamental in order to be able to understand that a particular financial state might be accomplished by other means than found today (remember that a

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[9] A business entity is a legally recognized entity able to enter into legal binding contracts

[10] Financial Industry Business Ontology (FIBO) http://www.edmcouncil.org/financialbusiness

[11] We leave Decentralized Autonomous Organization (DAO) aside as their legal standing is not yet clear

[12] Financial state is in a broad sense e.g.: fulfilled owe money obligation, (change in) ownership / possession of an asset, know a beneficiary financial situation (advice)

capability may have different methods associated with it but still accomplishing the same outcome / state).

We define a banking capability on the basis of a more generalized capability. This means that we firstly describe a more generalized state like "own something" and the related capability, e.g. "exchange of ownership". We then refine the state to a financial related state like "own money".

Furthermore, we can distinguish between *basic capabilities* and *additive capabilities*. Basic capabilities stand on their own while additive capabilities influence or steer the basic capabilities. This categorization helps to understand some other kind of pressure on business models as we will see later. Obviously, this categorization can be applied to banking capabilities as well resulting in *basic banking capabilities* and *additive banking capabilities*.

Figure 4 shows the pivotal (banking) capabilities. The financial industry centers around these capabilities and any kind of change may have a significant impact on their existing business models. Even though, as mentioned earlier, the outcome / state is the driving element in defining a capability, the normative definition of the outcome / state can be found, due to its complexity, in a separate document. In this chapter, only an informal definition is provided in order to increase readability.
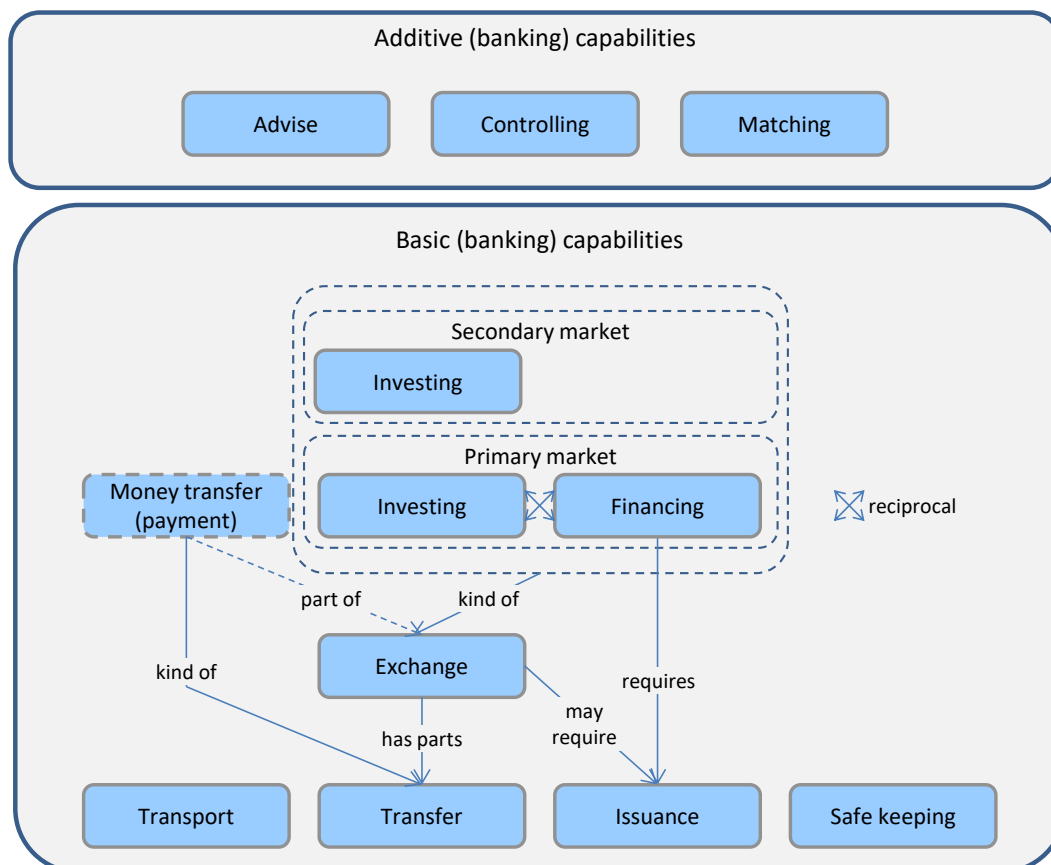

Figure 4: (Banking) capabilities

5.1 Basic Banking Capabilities

Capability	Definition
Safekeeping	In the broadest sense, safekeeping shall maintain the state of ownership or possession (or both) over a time period. The "thing" that is supposed to be kept safe is from the safe keeper's perspective an instrument of his/her safekeeping. From the owner's or possessor's perspective it is an asset, because otherwise there is no need to keep the thing safe.[13] In the banking world, the "thing" is typically a financial instrument; however, if we look at a safe deposit box, the "things" might be other things than financial instruments.
Transfer	We define, or one may say restrict, the transfer as a change of ownership or possession (or both) of something.
Transport	With transport, we refer to a change of the (physical or virtual) location where something is. There is no change of ownership or possession involved with it, which would be a transfer[14]. This distinction is rather important and some of the peculiarities of the current financial system will become obvious as we will see later. The location where something is located is often related to the safe keeper.
Exchange	We define exchange as "the act of giving or taking of one thing in return for another thing" and "reciprocal giving and receiving" [Merriam Webster] which forms the basis of the economy [7] [8] and not in the sense of a venue or market often used in the financial industry. This is important to note as we will see later in the definition of "matching". In the broadest sense, an exchange is, as already indicated above, the "reciprocal giving and receiving" or transfer, that is, the change of the state of ownership or possession (or both), of two things (instruments from the exchange perspective) leading to two transfers between two parties[15]. On purpose, we do not associate a change of location (transport) with an exchange. A special case of an exchange is, if one of the instruments is "nothing", e.g. a donation. However, this is rarely the

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[13] Please note that the safekeeping capability must not be confused with a savings account which is a product! The difference will be discussed later.

[14] Note that in today's financial industry transfer and transport are in most cases packed together.

[15] N-ary exchanges of N instruments among N parties can be broken down into multiple binary exchanges.

	case and quite often there is actually something, but that something is hardly recognized e.g. reputation, peace of mind or by the giver assumed insignificant data, which is an information asset to the receiver.
	In some cases, the "to be transferred" thing might not exist, yet. In these cases, the creation or, in banking, issuance of the related thing is required. In banking this thing is a bundle of claims and obligations formalized through a contract ranging from an OTC contract to a bond (debt) and shares (equity) as we will see in the financing section.
	We consider an exchange as punctual and hence as an achievement, well aware that the implementation is currently anything else but punctual leading to coordination overhead and problems[16]. As a consequence, there is the desire that the implementation of exchanges become punctual and a corresponding implementation would be given preference by users.
	There are various kinds of financial exchanges which we will discuss next.
Investing and financing	We split the following discourse into what is commonly called the primary and secondary market.
	In the primary market context, investing and financing refer to the same exchange. They are respective views to the same exchange from two opposite (reciprocal) viewpoints. One instrument of the exchange is typically money from the investor. The other instrument is some kind of formalized promise. We leave the discussion about the involved claims and obligations aside, that is, we don't discuss what exactly makes up the various kinds of equity or debt. Important is, that these claims and obligations are conferred by an agreement which is formalized by a bilateral contract (e.g. a loan contract) or a transferable contract commonly known as financial instrument like a share or a bond. Formalizing the transferable contract is subject of the issuance capability[17] and discussed below.
	In the secondary market context there is no financing, only continued exchanges of things, typically money against the above mentioned financial instrument, but not necessarily limited to such.
Issuance	Issuance is the act of making something available. In the

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[16] Latency, settlement risk, necessary reconciliation etc.

[17] We will generalize the issuance capability to bilateral financing contracts and other contracts having a value that is, are perceived as an asset.

	banking domain these are bundles of claims and obligations related to financial states, conferred by an agreement and formalized by a contract. The properties of the agreement may state that the agreement is bilateral and/or transferable. Traditionally these bundles of claims and obligations are referred to as assets or liabilities or more general as financial instruments like shares, bonds, structured products, derivative contracts etc.
	However (in huge capital letters), the things which will be considered a financial instrument is about to change dramatically. With the increasing capabilities to digitally formalize almost any claim and obligation into digital (smart) contracts together with the dematerialization (tokenization) of physical things, whose ownership can be stated without a trusted party, totally new kinds of 'value things' will arise which can be considered as financial instrument.
Payment / Money transfer	A money transfer[18] is in most cases one part of an exchange of something against money. Because a money transfer is part of an exchange, we consider a money transfer as punctual, too. Again, the current implementation of a money transfer is anything but punctual leading to lots of problems and dissatisfaction.
	Up until recently, banks and selected roles within the financial network controlled the money transfer (and transport). This led to an independent treatment of money transfers losing the causal relation to the exchange where a money transfer is embodied in it. This is an important aspect in order to understand the payment business model disruption the traditional financial industry is facing today which will be discussed later.

Peculiarities of the current financial system

We strictly separated transfer (change ownership / possession), safe keeping (preserve ownership / possession) and transport (change location). The current means to document ownership / possession is an account. Hence a transfer implies a transport which may involve many participants in the financial network.

Also a transport without a transfer involves many participants in the financial network even though nothing really changes to the client. For example, when the owner of some money transports his/her money from one of his/her account at one bank to another of his/her account at another bank, no transfer of ownership is involved. He/she remains the owner.

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[18] We consider money transfer the same as payment

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5.2 Additive Banking Capabilities

In what follows is the description of the additive banking capabilities. As mentioned earlier additive (banking) capabilities influence or steer the basic (banking) capabilities.

Capability	Definition
Advise	The outcome of advise (verb) is an advice (noun) which is a "suggestion about a favorable state to be in and what someone should do to achieve the favorable state" to reach a particular goal. A goal is a state in which a *want* is satisfied. As financial or banking advice is a financially relevant state which should be achieved (goal) by performing some basic banking capabilities correspondingly.
Controlling	The outcome of controlling is to keep a particular system in a (pre-)defined state. As such, it is a complex additive capability. Controlling involves the capability to monitor the current state of the system and compare the current state against the (pre-)defined (target) state as sub-capabilities and initiate appropriate measures by invoking other capabilities. Depending on the controlled system the (pre-)defined target state might be provided by an external entity like clients, auditors, regulators.
Matching	We define matching as finding a state where reciprocal interests are satisfied, that is, where one party would like to be in a state another party was in before and vice versa. However, achieving the particular states is realized by an exchange.

6 Product and Service

In this section, we look into the relation between capabilities and products and services. Please note that various kinds of definition for product and service exist. In order to have a formally grounded basis we define product and service in the following way:

1. They reflect a commercial perspective of a continuant respectively of an occurrent thing
2. Product is a relative perspective onto a continuant thing.
   i. Relative, because from a commercial perspective the outcome (the continuant thing) of a "production" is called product.

    ii. Ownership and possession can be associated with the product (the continuant thing)

3. Service is a relative perspective onto an occurrent thing
    i. Relative, because from a commercial perspective an accomplishment[19] (the occurrent thing) is called a service
    ii. Ownership and possession cannot be associated with it. One can only experience a service.

In order to produce a product or accomplish a service, various capabilities are required. There is an n:n relationship between products and services and the underlying capabilities.

Business entities bundle, and with that also constrain, their business capabilities into marketable products and services. Because the bundling is at the discretion of individual business entities, comparing products and services directly is cumbersome. This confirms our focus to elaborate business capabilities satisfying someone's *wants*.

As mentioned above the terminology regarding "product and service" is anything else but unambiguous. Various examples exist. Often a continuant thing (concrete or abstract), after it has been created / produced, is correctly called product of the creator / producer but from then on it is only taking part in services rather as an instrument than a product. Also, the delineation into physical (goods) and intangible (service) is hardly powerful enough to be proven sufficient in the context of dematerialization / tokenization.

7 The traditional financial system

To visualize the impact on today's financial system we start with the *want* categories around the *Me* (Figure 1: Want categories) and place layers of business entities bearing capabilities (similar to Figure 4: (Banking) capabilities) around the *Me* just like layers of an onion or concentric circles. It is important to note that in the CONCENTRIC diagrams the symbols denote business entities bearing the respective business capability[20] and not business capabilities itself. With this approach we're able to illustrate disruptive effects from outside of the banking domain.

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[19] We assume a telic, that is outcome-oriented activity

[20] A business entity may bear multiple business capabilities but this is not relevant for our discussion
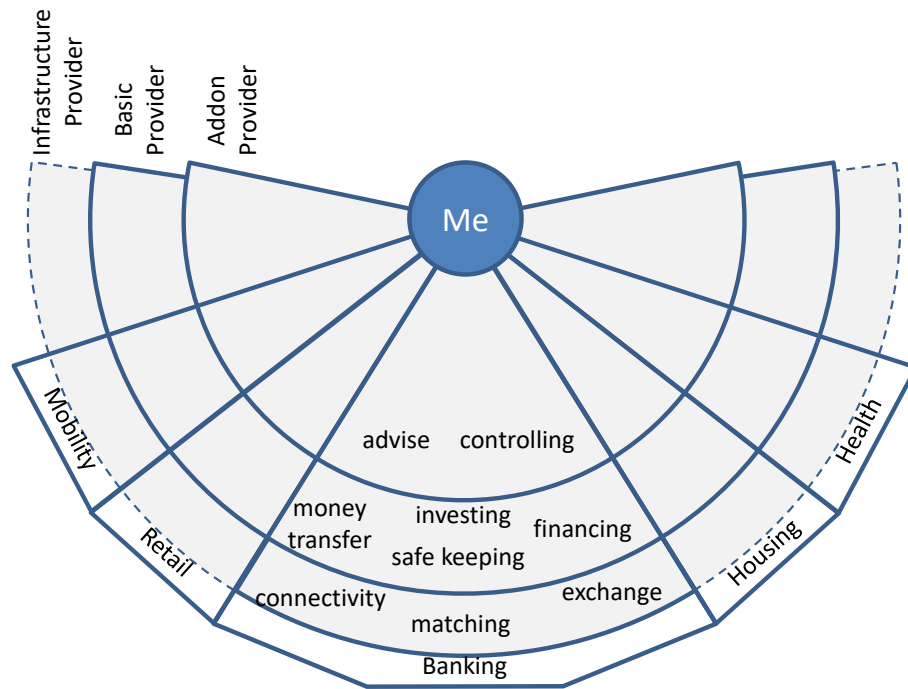
Figure 5: CONCENTRIC layers of the traditional financial system

Today's financial system has evolved over decades, and little has changed with respect to the involved business entities and their functions[21] within the financial system.

There is a layer of infrastructural services providing a standardized connectivity among the participants (e.g. SWIFT), matching[22] of demand and supply of financial goods / instruments and exchange[23], that is, transfer of ownership of financial goods. These infrastructural services are in some cases restricted in how they can be accessed. Only selected banks have access, e.g. to exchanges (venue).

Banks then provide the next layer of basic capabilities of safe keeping, money transfer, investing, and financing. However, depending on the context, banks may actually only provide access to capabilities provided by the infrastructure parties. Inter-bank money transfers and especially international money transfers rely on the underlying infrastructure services as well as the whole secondary market.

Building on the basic services banks and other financial services firms provide add-on services (e.g. advise and portfolio management as a kind of controlling).

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[21] Here: purpose of a business entity in the context of the superordinate financial network (2. order system theory)

[22] Happens at the commonly called exchange (venue)

[23] Commonly called settlement

8 Business model innovation and stress trends

In 'Figure 4: (Banking) capabilities' we showed an ordering of the banking capabilities: "additive (banking) capabilities" > "basic (banking) capabilities". However, as shown in 'Figure 5: CONCENTRIC layers of the traditional financial system' there is a difference in the ordering of the bearers of banking capabilities and ordering of the banking capabilities itself. This creates pressure on the financial system.

8.1 Trend I: Connectivity / OpenAPI

Today many of the infrastructure services, namely matching and exchange, are only accessible by a restricted number of parties.
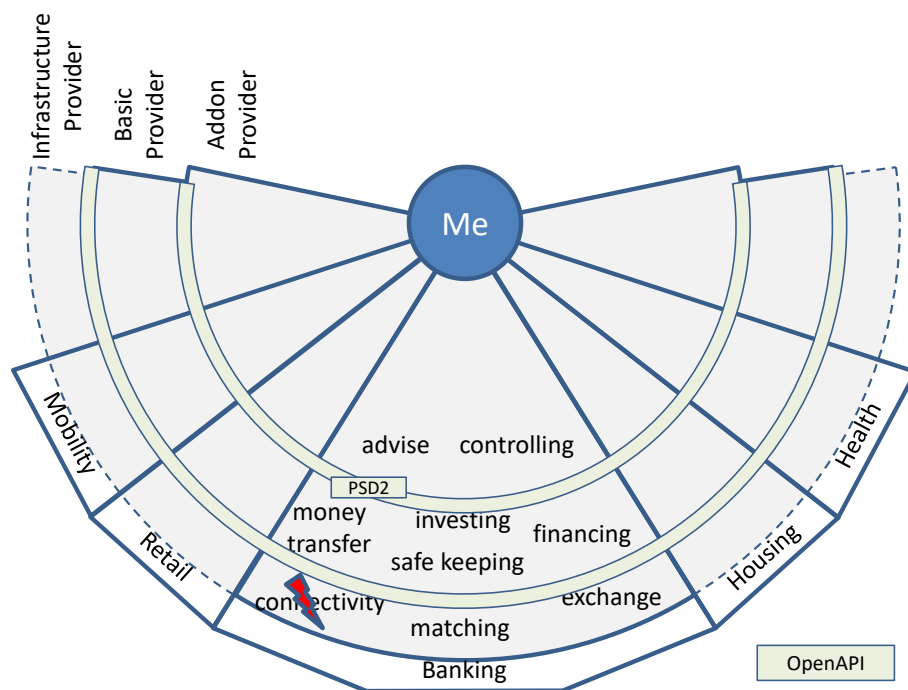
Figure 6: Trend OpenAPI

However, today IT in general and the internet in particular gives literally anybody the possibility to reach out to anybody else. Making access publically available fuels unbelievable opportunities and democratizes many areas. Connectivity is not proprietary anymore. Standardized Interfaces open to 3rd parties (OpenAPIs[24]) give the possibility to overcome unnatural positioning of capabilities and to mesh-like business models as we will see in the next section.

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[24] See also the BIAN – CMU – PNC research paper on Open APIs and results of the BIAN Semantic API working group

8.2 Trend II: From pipeline to mesh
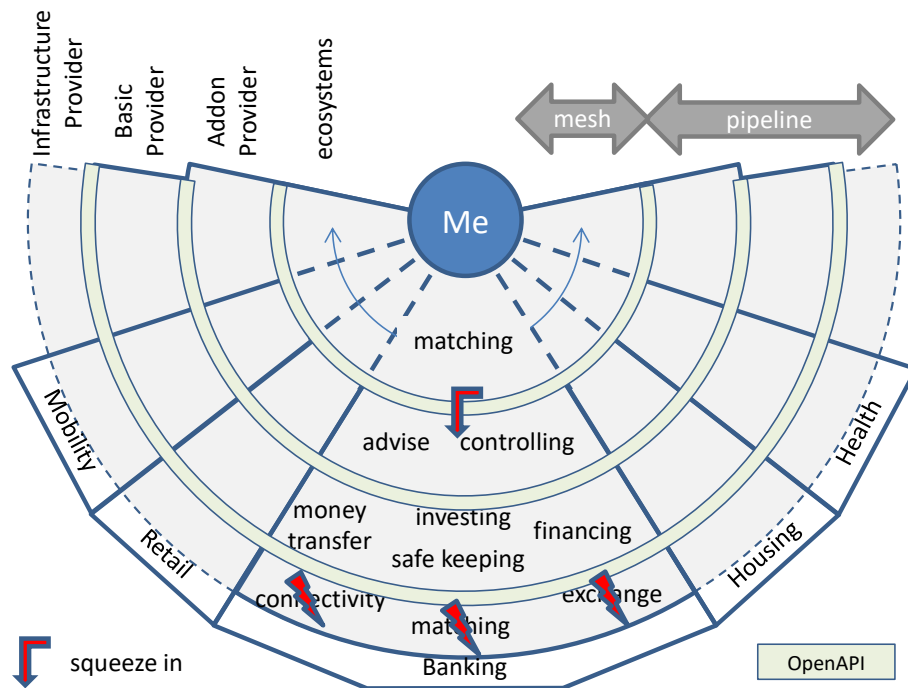
Figure 7: Trend from pipeline to mesh

Traditional business models follow a pipeline model, that is, the supply needed to create the value object for a customer is sourced from sub-providers selected by the provider of the value object. It is part of the provider's competitive advantage to know how to find suitable sub-providers and how to connect to them.

Through the increasing availability of the connectivity capability meshes could evolve where everybody is able to reach everybody else. This helped to democratize the matching and exchange capabilities which become more and more available through new business entities bearing these capabilities. The interesting phenomenon is, that these business entities, especially for matching, "squeeze" themselves between the customer and the traditional pipeline-oriented business entities serving the customer. These "matching" business entities help the customer to find the best provider.

- **Market Places:**

  Market places are multilateral platforms where the match-making between the demand (resulting from one's *wants*) and offerings from suppliers takes place. Market places can be very specialized and only support a very narrow set of services and participant or can be very broad. Examples in the banking domain would be crowd-funding and P2P Lending or more recently ICO's (initial coin offering). The latter is an example of disruption in the very lucrative primary market.

However, many of one's *wants* do not reside within the banking domain and only indirectly involve banking capabilities. A typical example is the payment (money transfer). In most of the cases, the payment is not the *want*. The *want* turned into the demand for some product or service which typically implies a payment obligation one wants to fulfill.
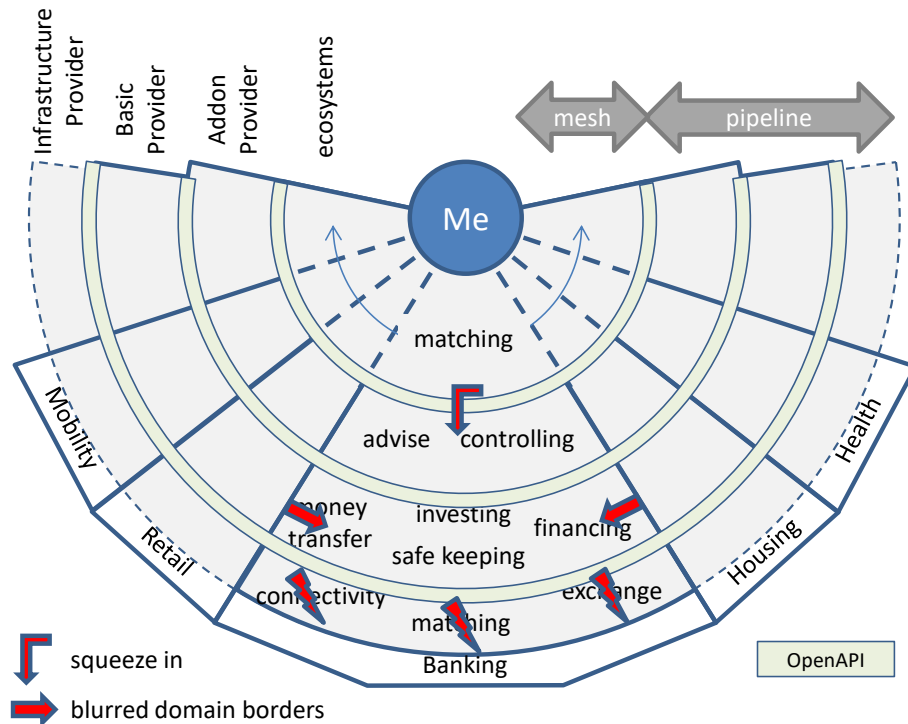
Figure 8: Blurring banking domain

These product and service providers may now also provide the necessary banking capabilities as well or at least parts of it. The past sharp borders of the banking domain with their banking business entities starts to blur as indicated in Figure 8: Blurring banking domain. This leads to banks losing their clients or at least the touchpoint to the client.

A downside, however, might be the risk that the matching provider again monopolizes the connectivity capability.

- **Demand Aggregator:**
  Platforms covering a wide scope and *want* categories, such as search engines like Google or offering platforms such as Amazon or Alibaba. They serve as first 'goto' places if an individual is looking for something less familiar or when it's unclear from which provider the *wants* can be fulfilled.

To overcome this downside, we envisage two possibilities:

- **Equality Eco-System:**
  A mesh specialized capabilities shared multi-faceted value proposition
- **Augmented Me:**
  In some (probably not too far away) future the limited capabilities of the *Me* will be enhanced through artificial intelligence to an *Augmented Me*.
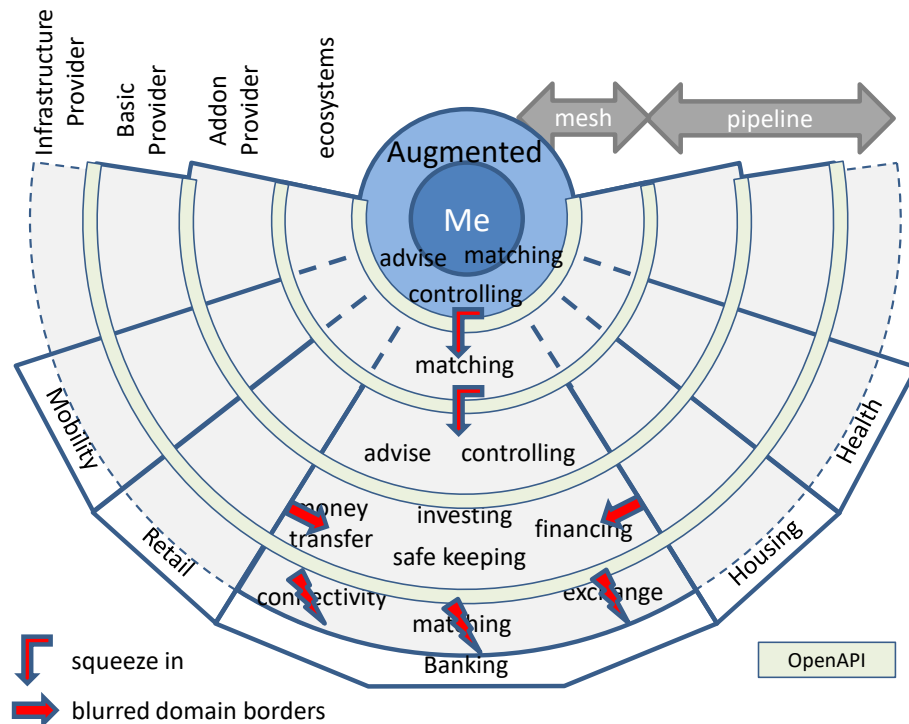
Figure 9: Augmented Me CONCENTRIC model

An *Augmented Me* becomes part of the *Me*, acts as the *Me* and bears, and thereby extends, the *Me* in at least the following capabilities:

- **advise**, such that the (*Augmented*) *Me* knows a favorable state to be in and what should be done to achieve the favorable state
- **matching**, such that the (Augmented) *Me* knows how to / who can fulfill its *wants*
- **controlling**, such that the (*Augmented*) *Me* can control complex processes

We intentionally leave open how the *Augmented Me* will be realized. It is more food for thought of potential long-term impacts.

Today the segregation between the '*Augmented Me*' and the 'Demand Aggregator' is blurred because the available digital assistants are all provided by demand aggregators like Amazon (Alexa), Google (Google Home), Apple (Siri) or Samsung (Bixby). However, the main difference between Demand Aggregators and the *Augmented Me* is the accountability of aggregated contractual obligations which, in contrast to the Demand Aggregator, lies with the *Me*.

Recall the chapter Business model innovation and stress (basics) where we identified three main causes for business model stress namely: changing (client) *wants*, changing capability method and changing capability bearer.

So far we have mainly looked at the impact when the bearer of a capability changes. But currently, we can also identify two major trends how the underlying method of some capabilities change, namely through artificial intelligence and distributed ledger powered by the blockchain.

8.3 Trend III: Artificial Intelligence (AI)

Based on the definitions in [9] "intelligence is the ability to accomplish complex goals"[25], artificial intelligence has a high impact on the additive capabilities namely advise, controlling and matching. Client's *wants*, the underlying information base, and the possible solution space become increasingly complex demanding for new methods. Traditional programmatic methods increasingly fall short to cope with the ever-increasing complexity and new heuristic methods are emerging, e.g. artificial neural networks, leading to better outcomes.

It appears that the ability of "high tech" companies to apply the heuristic method to more and more domains is higher than the ability of the incumbent companies in a specific domain with their programmatic methods to adapt a heuristic method. Incumbent companies for example would apply AI to further automate their existing (programmatic) methods often labeled as "intelligent automation" or "robotic process automation". But this would not change the DNA of the method and would hinder the superordinate capability to get to a next level, e.g. in considering much more input parameters.

8.4 Trend IV: Distributed ledger, Blockchain and Smart Contracts

Today the word ledger is mainly used in a commercial context and refers to (a set of) accounts to which credits and debits are posted. Looking closer into the specifications of blockchain one can actually identify a (software) layer which refers to the original (etymological) meaning of ledger as "a book laying or remaining regularly in one place" [10]. A distributed ledger is hence a distributed book to which one can write to, that is, append records, and all "copies" of the book reflect the same state. The blockchain is an implementation of a distributed ledger and provides in addition methods to reach consensus about the to-be appended records and to guaranty immutability in an adverse environment through cryptographic means.

The records of a distributed ledger may contain arbitrary information. Currently in most cases the information is about ownership of new non-traditional currencies commonly known as cryptocurrencies in recognition of the cryptographic means of the blockchain. This current currency focus narrows the interpretation of the term ledger to the above-mentioned accounting view. By widening the focus and realizing what can be stored as "digital" information in the records of a distributed ledger, totally overwhelming new opportunities become available. They range from further dematerialization (aka tokenization) over simple contracts to smart contracts (having state and behavior) to even distributed autonomous organizations (DAO).

The impact of the distributed ledger technology (DLT) on the financial industry is tremendous since many core capabilities such as safekeeping or transfer of ownership is becoming commoditized and is therefore challenging important revenue streams. However, DLT goes far beyond to be just a replacement of the current methods behind current capabilities. It will enable totally new outcomes hence new

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[25] Which is in line with the definition of a "rational agent" in [11]

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capabilities to fulfill today's hidden or upcoming new *wants*. This will put tremendous pressure on the business model of incumbent companies.
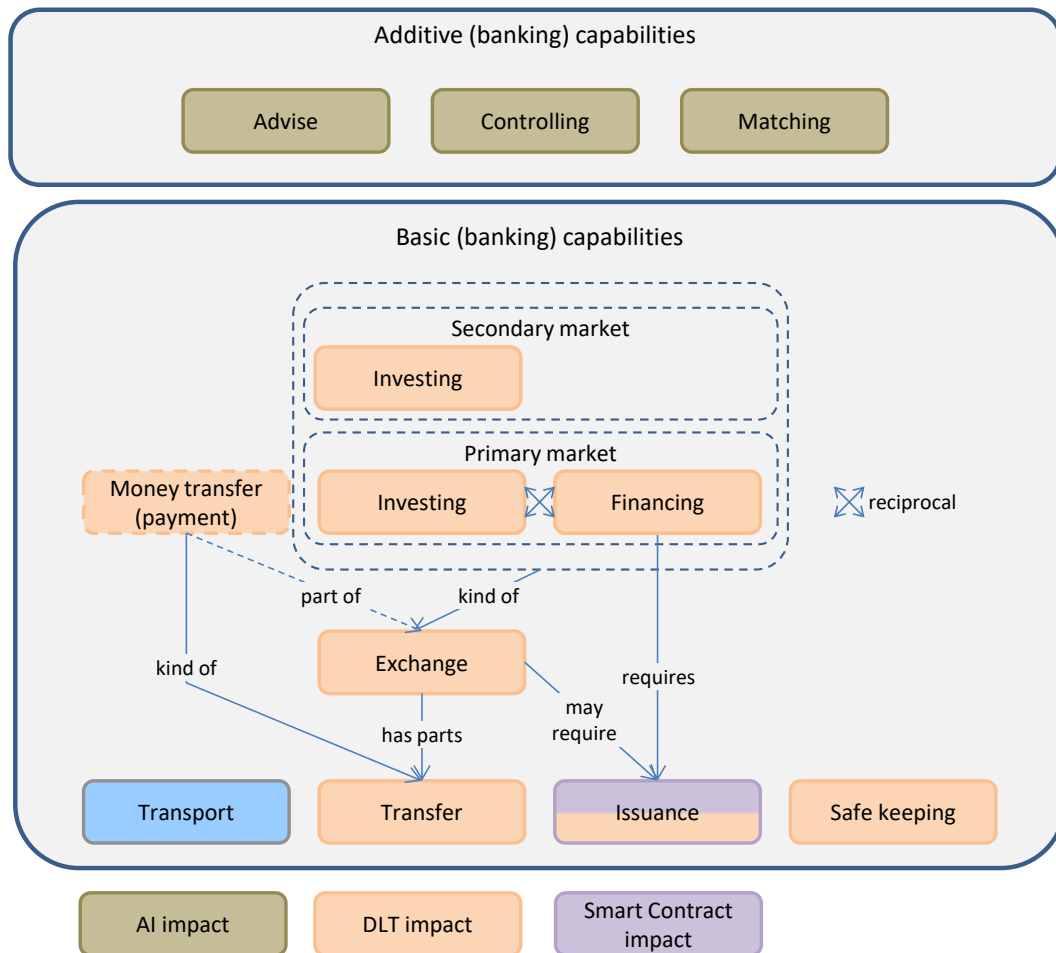

Figure 10: Impact of AI, DLT and Smart Contracts on banking capabilities

9 BEI's financial services periodic table

As shown in the previous chapter, there are many trends impacting the banking sector:

- Democratization of access to (banking) capabilities, e.g. through OpenApi's
- Emerging mesh business models
- Blurring banking sector boundary
- Artificial Intelligence
- Distributed ledger technology

These trends are implemented / commercialized through new business entities within the banking sector, often called FinTechs[26], but also from Internet platform giants like Amazon and Alibaba from outside the banking sector.

The BEI maintains a FinTech radar where the new banking related product and service offerings are recorded and categorized.[27] BEI's categorization aims to establish a periodic table similar to the one for chemical elements. So far, we have not found stringent ordering criteria unlike the original periodic table for the chemical elements. However, applying the BEI's basic structure of payment, investing and financing combined with the (CONCENTRIC) layers introduced in this document, one gets a very good first categorization.

Figure 11: BEI's financial services periodic table

Given the fact that the periodic table shows product and service, which, as explained in the chapter Product and Service, are bundles of capabilities, the elements of the periodic table should be further tagged according to the involved (banking) capabilities. This would allow for in-depth analysis of the current FinTech trends.

10 Conclusion

The paper had three main objectives. First, using a CONCENTRIC (outcome oriented customer *wants* addressing capability) framework for banking we explained how current product and service based business models are under increased stress

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[26] The term FinTech arises from the fact that these new banking related products and services typically apply some kind of technology in a new way

[27] see http://ps.banking-innovation.org

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to satisfy customers' *wants*. As outlined in this paper there is an implicit shift in the core value proposition towards a customer-driven orchestration of capabilities which renders today's product and service based business models obsolete.

Second, we were able to demystify current products and services in the Financial Services Industry by decomposing them into a few underlying fundamental capabilities. Through our CONCENTRIC model, we evaluated how the financial services industry is losing their monopoly position by showing how different industries can take over the role of orchestration and therefore the interface to the customer.

Third, we showed how technologies such as blockchain or artificial intelligence can commoditize banking capabilities questioning the banks right to exist in the future.

10.1 Call to action

To be successful in the new world of mesh business models, businesses in the Financial Services Industry should develop CONCENTRIC-based strategies, using relevant and differentiated offerings, to counter the blurring of sector boundaries.

Businesses should identify their core capabilities, assess how they will be affected and reorient their strategy as well as their product and service portfolio towards the customers *wants* so that the customer interface can be kept as close as possible.

The financial industry has to assess the disruptive potential of innovative technologies such as blockchain or artificial intelligence have on their core capabilities and explore new capabilities, which gives them the right to exist, as soon as technologies have reached their maturity level for diffusion.

Possible strategies range from further specialization to become valuable contributors in an existing ecosystem to establishing new orchestration paradigms and ecosystems that may span what today would be multiple industry sectors.

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