
Abstract

As traditional business models appear increasingly unable to cope with the new digital ecosystem and the challenges brought by innovation across multiple dimensions, so traditional frameworks of competitive analysis looks in need of reshaping, if not of a more radical change. The synapses framework of analysis is built on five key pillars: advance data/information management, applied analytics and machine learning/AI, a new way of doing business in a richer, more value adding, multi-stakeholders way (dubbed “interconnecting by junctions”), new solutions and use cases that create truly incremental value for the overall economic system and, finally, trust—e.g. the importance of being credible and with a good reputation in an upcoming age of digital uncertainties, cyber risks and warfare, loss of privacy and of individual conscience and many others. This is particularly true for the financial services, an industry built on the pinnacle of the intangible—as money (already digital) gets unregulated, with new services offered by unknown digital dotcom.

Keywords

Synapses • Data management • Applied analytics • Machine learning • Artificial intelligence

2.1 Synapses and Syndesis

Complex economic systems have often been compared to living organisms, in the way they behave and develop—through cycles of innovation, maturity and decadence, and for the way they tend to react to exogenous factors, as they potentially mine their chances of survival through the unavoidable periods of booms and busts

(from a financial or evolutionary perspectives, respectively). As a critical component of this economic system—living organism, we could then think of the global financial sector as a fairly complex nervous system, working as a structure that allows the diverse components of the larger economic organism—the muscles, the bones, the blood pulsing in the veins and the skin covering the outside—to work effectively and in full coordination with each other—allowing almost everything to become possible... from the simplest movement (like the waving of a hand to say hello) to the most complex ones (like performing a critical somersault).

More specifically, we could think of the financial system as ultimately pursuing a process of continuous evolution. With steps forward preventing the terminal events that could come from inside or from external shocks, and driving the continuous recombination of its genetic components then driving the evolution into stronger offsprings and species. A critical component, in this interpretation of the world of finance and banking, would be played by synapses—in general terms and with specific reference to a nervous system.

Synapses (also called “syndesis”) refers, more broadly to the pairing of two homologous chromosomes that occurs during meiosis. This pairing (“fastening together”, the original mean of the Greek word) allows the matching up of homologous pairs, prior to their segregation, and the possible chromosomal crossover between them. This crossing over, known also as genetic recombination, provides the important function of increasing the genetic variability within the offspring. Think about the variability of business and operating models—and the multiple constraints posed by regulations and technology, not to mention culture and behavior—politics, bureaucracy and syndication, now prevailing in banking and limiting its chances of changing successfully.

Against this back drop of internal and external constraints, and given the continuously changing and increasingly threatening ecosystem, a set of repeatedly recombinant synapses would have the general effect of allowing genes to move independently of each other through successive generations, allowing for the independent concentration of beneficial genes and the purging of the detrimental ones—an essential step for the successful meiosis, and for the evolution and survival of the species. Setting free the recombinant synapses, from illogical rules and IT legacies, doctrinal culture and prevailing behavior and bureaucracy, would rise the chances of evolution of the system, and of its main players’ (banks and other financial intermediaries) survival.

Synapses—arguing one step further in this biological digression—has an even more interesting specific definition when referred to the nervous system, as it works as a structure that transmits an electrical or chemical signal to another neuron—even if via non neurological contacts, or junctions. Synapses are essential to neural functions because via neurons they pass signals to individual target cells, driving them to perform their correct function in a logical, coordinated way—making the body wave or shake hands or perform a fairly critical somersault. Regulating the neurological transmission allows then to make the system work, performing its fundamental function and in a “smart” way—reducing to a minimum the neurons required to perform and making sure their (business and operating) model works in

the most effective and efficient way. What would then be the approach to rethink the global financial system as an interconnected synapses process? And what would be the critical elements to characterize the new role of the bank as the synapses main driver?

We will assume, as our funding hypothesis, that five critical components, or pillars, are now supporting and will be increasingly driving in the future the successful synapses that needs to happen in the global financial system to support the development of the overall living organism—the economic system as a whole, as it unfolds and perform at international and local level. We will then discuss how a number of new major regulatory events—among them the open data movement and related “requirements”—are further acting as a catalyst of the fast paced evolution process. And, finally, how a couple of well-known, leading global—regional banks—Goldman Sachs and BBVA, incumbent leaders on the investment banking/wholesale and retail/commercial sectors respectively—have initially reacted to the challenging forces now at play in the financial services industry, leveraging digital innovation to change their business strategies, apparently in a very successful way.

2.2 Five Senses: One

We can define these five critical components, or building blocks, as “senses” that help banks in predicting, understanding, navigating, contrasting and reacting to the new external ecosystem in which they are now increasingly competing—as it is progressively dominated by digital and other technological innovation. In our working hypothesis, these “five senses” include (as shown in Fig. 2.1): data and information advance management; intelligence by applied analytics, machine learning and artificial intelligence (AI) management; interconnectivity and junction management; new business solution design and management; trust and credibility management.

Data and information (as defined as some more structured combination of data, characterized by a particular arrangement or sequence of things), stand out as the first critical block, that needs to be designed, built and protected, with particular reference to the personal digital identity of clients, by the “synapses bank”. Data and information have always been at the center stage of banking, but new technological developments are suggesting now some kind of discontinuity in their role and importance.

New data capture and storage technologies are now making technically possible and economically feasible the accumulation of unprecedented quantities of data—derived from multiple sources (quantitative—structured—and qualitative and with an increasing role played by the social sites of the world wide web—unstructured) and managed in multiple ways—allowing more flexibility in the rules for data retrieval, combination and sequencing. The “internet of things”, e.g. the real time connectivity allowed by the digital devices that can now be easily installed on

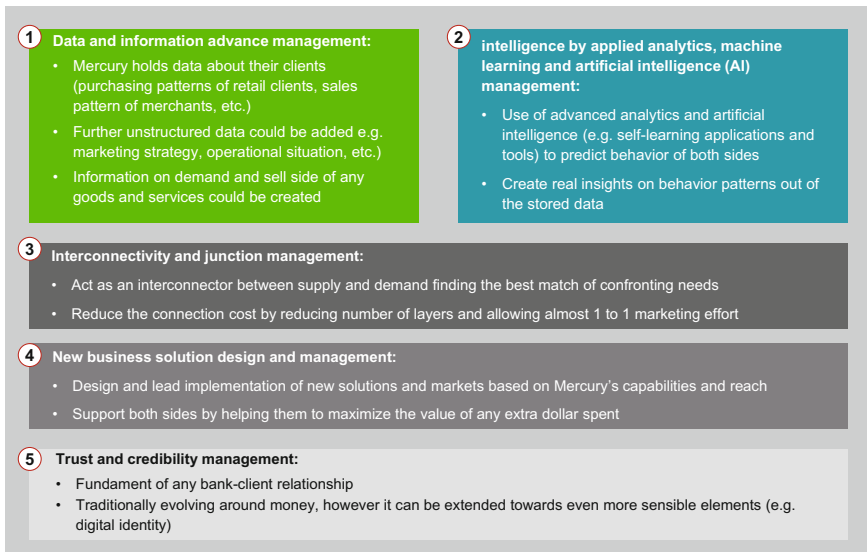


Fig. 2.1 Five senses to read and navigate the new banking digital ecosystem

almost everything—from a T-shirt to a car—is just going to compound the trillions of data further becoming available and produced on a continuous basis and in real time.

Not only that. As new regulations (the PSD2 on payments, and the MIFID on derivatives and other investment management products) come into play, banks and other financial intermediaries are forced to open up their own data to let the customer know how they operate, how much they are charging them, and for what service. Hence, new sources of meaningful data once jealously preserved by banks are now becoming available for customer and—given their approval—to other aggregator/price comparison players. In turn, this extended freedom of data access and the related shift in the bargaining power to favor the end customers, opens up to new competitive dynamics, and favors the entrance of new “shadow banking” (mostly digital) players.

2.3 Five Senses: Two

Quantity and quality of data may however turn out relatively unfruitful, if it is not matched by a parallel development of models, techniques and approaches to derive intelligence out of them—that is the ability to define multiple, logical and serviceable “cause—effect” relationships among those data and the information. The ultimate aim is therefore to use applied analytics, machine learning/AI and anything else that can produce recommendations that are useful enough for the business

strategy and scope of the “synapses bank”. It is intelligence with a clear aim in mind that allows the build-up of goodwill out of data and information.

More specifically, the recent sophistication and industrialization of machine learning and artificial intelligence (AI) tools is now making possible the “robotization” of the easiest bits of the reasoning process that produces intelligence out of raw data and sequenced information. As AI is threatening to revolutionize or displace large segments of the financial services job market, it is also offering a number of new functionalities and applications that can really turn the needle of the productivity attained out of the enormous amount of data and information now being captured, organized and stored. In a way, applied analytics and the use of AI systems are raising the yield on the new intangible capital of the financial system, e.g. the data/information capital—helping to overcome its relative scarcity and excessive abundance (in many instances, scarcity—of very relevant, immediately intelligible data/information, and abundance—of all kind of other “white noises”—coexist and only machine learning/AI can help make sense of the latter, whilst leveraging the former).

As of today, most of the data gathered by financial intermediaries have been stored without following basic golden rules (such as the full verification of completeness, existence, accuracy, valuation, ownership etc.) and in multiple legacy systems that make the consistency and easiness of any comprehensive extraction and elaboration very difficult to master, with high investments required for any new use case, with long time frames required to extract and elaborate data and with high chances of errors and mistakes along the way—with potential fines and liabilities deriving from the wrong use of data—given stricter confidentiality rules.

The use of middleware solutions, able to retrieve data from multiple legacy systems, doing elaborations based on flexible rules hosted in the middleware and then ensuring the reconciliation in 1–2 days on batch elaboration, has partially addressed these serious issue, but not ensured a full competitiveness of the incumbents, vis a vis the unstructured, multi-sources but unified flexible, agile data bases mastered by the new digital players—where queries drive the structure and elaboration ex post—a la Google, without requiring any pre-determined and rigid articulation “once and for all” of data and information.

It is also worth noting that frantic “data accumulation” excesses by global and local banks have lead in many cases to huge over-investments and high running operating costs not justified by any final use-case yield. And that the effort of digitizing historical data written on paper has proved long and costly, exposing the now-fully-digitalized data sets to the increasing cyber-risk, where data directly owned by the bank or on behalf of its customers could be destroyed or stolen—potentially threatening the confidentiality of the digital identity of clients and the very existence (risk of destruction) and ownership (risk of theft) of their money.

2.4 Five Senses: Three

Banking, at times, has been described as one of the easiest and most boring jobs in the world—assuming you had the money and power required to start with. As we discussed in our “*pars destruens*”, the well-known saying that banking is a “3-6-3” job—meaning, you buy money at 3%, sell it at 6%, and by 3 p.m. are at the golf course—is obviously long gone. But the overall tendency to rely on intermediation as “core business” of banking is still there, even if most of its competitive strength—related to the sometimes described “segmented oligopoly”—is mostly lost, and ready to be further disrupted by the digitization of markets and societies alike—breaking any further boundary of the potentially segmented addressable markets. In truth, calls to get back to the pure intermediation businesses have been high—after the more aggressive forays in the principal investment space brought hell to the sector. But, as it was implicit in our discussion in Chap. 1, intermediation lies at the heart of the traditional lending business and is actually generating—and is in turn supported by—the three “unbearable lightnesses” of the current business model of banking.

Firstly, intermediation happens when the bank gathers data from multiple retail sources seeking low risks/low returns opportunities, and extend loans to few, more risk taker corporates (the magic transformation is in theory ensured by the diversification and by the bank’s capital buffer—but we have argued that the magic tends not to hold in time of crisis). Secondly, intermediation happens when lower duration funds are employed to finance longer durations uses (again, with a magic transformation happening by virtue of the ALM—asset liability management capabilities of the bank—and of the usual bank equity buffer—but we have argued that ALM time lapses tend to become impossible to refinance when the market is illiquid and risk appetite collapses).

Finally, intermediation happens in a multiplied way when the bank does not hold loans to maturity, but sell them (either as true sale, or just as mere deleverage that is not truly de-risking its balance sheet) via securitizations—effectively extending its intermediation from retail clients to corporates (traditional business), to wholesale investors (the buyers of the securitization notes) to retail again (if these investors are then putting part of this notes in the portfolios of mutual funds, pension funds or insurance companies).

In our vision of the “synapses bank”, mere intermediation should evolve and extend, becoming the ability to interconnect, via junctions, as in the neural function example, a larger number of stakeholders, and in smarter, more value adding ways—to allow the economic system to work, performing its fundamental functions in smarter ways, e.g. reducing the transaction frictions and the neurons required to do the job in the most effective and efficient way: in a way not just finding the minimal two counterparts required for any deal, but finding the multiple best ones—so as to maximize the total value created by the transaction, minimizing as well all associated costs and risks. This should in turn help the system become more stable and profitable, as the three unbearable lightnesses are reinforced by the new mix of

stakeholders put at play—with the synapses bank acting as intelligent match maker of different quantities of money available, time horizons and risk profiles, so as to produce an higher economic output (no matter how it is then shared).

2.5 Five Senses: Four

Building on the logical extension of this “junction management” ability, the “synapses bank” could then compete on the solution seeking, designing and delivery—e.g. not just limiting itself in interconnecting the best possible counterparts to a trade and in the smartest, most efficient/effective way, but also finding innovative use cases (or business solutions) that enable the development of new, valuable, economic possibilities. These in turn should allow and support the development of new, successful business models. In this way, the bank could capitalize on data and information to create intelligence that drive interconnection by selective junctions and support as well the development of innovative economic solutions or use cases. A simple example could help in clarifying the different dimensions of the four senses so far discussed.

As a start, a typical bank will own “structured” data on the purchasing history of its retail clients, and on the sales patterns of its merchants and of their suppliers. The bank could then start considering to add to them other unstructured data, such as the personal behavior and preferences of its retail clients, and the marketing strategy and operational situation of its merchants. It could create a powerful set of data and information on the demand and sell side of any specific kind of good and service (sense 1). On this basis, with the use of applied analytics and machine learning/AI, it could also start to predict the potential behavior of both sides of a trade to create real, insightful intelligence out of the data and information gathered and stored (sense 2).

Acting as a meta-intermediary (or via junctions, to use a better terminology) the synapses bank could then selectively interconnect the best counterparties to a deal: the trendy teen ager looking for a new cerulean pull-over and the merchant that is high on the stock of this, and the manufacturer that is just planning the colors to produce for the next, upcoming season (as in the “Devil wears Prada” Hollywood movie—and in the notorious discussion, between Merrill Streep and Anne Hathaway—on the power of fashion and designers). The junction will work better if it can use the minimum required number of neurons (e.g. allowing an almost 1 to 1 marketing effort, moving away from the typical bombardment of broad band marketing material and communication and without the multi layered middle-men sales structure), and seeking the best match, in real time, of confronting needs—to buy or sell and produce that cerulean pull-over (sense 3).

More importantly, the synapses bank could seek, design and lead the implementation of new “solutions” or “use cases” that could be developed on these basis: e.g. supporting its customers in optimizing the value they get from any extra dollar of spend (not just ensuring better deals as “value for money”, but also by having the

bank playing the buyer's advocate role, advising and helping the client in designing and fulfilling a targeted and aspirational life-style). Following this "solution seeking role", the bank could, for example, help merchants in organizing their marketing campaigns—both pre, and post sales—to achieve a better penetration of new clients, their fidelization and optimal satisfaction (we will discuss later how banks could help merchants in setting up and managing MFO and CLO—merchant funded offers/card linked offers—loyalty systems based on points earned and cash rebates driven by their purchases).

The banks could then end up supporting the manufacturers in planning and producing the goods demanded by its target customers and with the acceptable level of associated quality/price tag and creating a fully integrated supply chain. In both examples, the bank would end up not just doing better its old intermediation work (by creating and sustaining new ways of interconnections among multiple counterparts), but would also create new businesses (the MFO/CLO) and better ways to allocate and use the scarce resources in the economy, to the overall benefit of the system.

2.6 Five Senses: Five

It is easy to understand how far from all this the traditional banking model is, and how it is still mostly focused on reaping the benefits of the "low hanging fruits" coming from the mere intermediation (of money and of other financial products) in the retail/commercial side and from the broker—dealer business model on the wholesale/investment banking side. The "synapses" banks would go much further than that, trying to act as the enlightened match maker of multiple stakeholders active in markets and societies alike; and as the skillful designer of new, value adding solutions that would create incremental value in the system (and not just redistribute the existing one), potentially defining and supporting new lifestyles and behavioral core values.

Such a powerful and almost omniscient "synapses" would not act in a vacuum and would need to be built on the credibility and faith entrusted to it by millions of customers, ready to leave the inefficient and ineffective "safe known" for the unknown risks potentially introduced by the new offerings and players. Such credibility and trust in the banking sector appears however in bad shape, after the recent, multiple sectorial scandals that have been observed, reported and sometimes magnified by media and politicians alike.

It follows that a fifth final sense, or building block, is required to complete the overall picture and sustain the potential feasibility of the synapses bank—and of any emerging FinTech winner alike. Such a bank (or emerging FinTech) will in fact need to develop working on all four preceding pillars, but on the basis of the "trust capital"—the fundamental required foundation of any sustainable innovation and development to come.

Trust has been, we have already commented, the very basis on which the superbly intangible global financial system has been born and built through time. A bank's value is based on the word's value of the bankers, and on their reliability in keeping faith to it. Trust should then be recovered and amended from past mistakes, and then further developed and capitalized for the even more immaterial potential role played by a synapses based business model (whether played by transformed banks or by FinTech). Such a business model would in fact end up not just managing the already sensible "money" of people and companies, but also other even more sensible stuff like the "digital/personal identity" of customers, the intelligence that can be derived out of their social and economic subsystems and consumer and investor behaviors. The synapses bank could end up creating more and better value for the overall system, allowing for a more transparent, competitive and socially acceptable sharing of the richness and well-being that should become available out of it. But it can ask for such a vast and holistic mandate if it is widely trusted by markets and societies alike.

Let's then stop for the moment in the discussion of our suggested theoretical framework (the "pentagon") to assess the digital transformation that will disrupt banking and the global financial system, and let's briefly consider a further potential tipping point towards the creation of "synapses" based winning business models: the "open data" movement and the implications it opens up in terms of competitive strategies.

2.7 Data, Going Open

Banking, at times, has been described as one of the easiest (and most boring) job in the world—assuming you have the full control and ownership of the data that can allow you to perform an all too easy intermediation game. Banks know, or should know, most of the financial health, issues, worries and ambitions of their customers, and can act accordingly, linking the counterparties that are long on funds but short on ideas with the ones that are long on dreams and energy, but short on cash, and for a spread or a fee (or both).

The control and ownership of customers data has allowed banks to build through their history a significant negotiating power and to build a quasi-segmented oligopoly structure of their market, fending off the competitive attacks of new players and capitalizing on the information they already got to cross and up-sell their customers, or influence their consumption and investment patterns across other value chains.

Their control of customer data has also allowed them to increase the stickiness of their customers, because of the mess and the time lost that you need to go through once you decide to change bank, and to reduce the overall transparency of their pricing: money, as a commodity, should be fairly easy to compare, but the complexity of the products and services offered, along with the limited availability of customers data on their usage of financial services, has helped in preserving the

fogginess around the bank's competitive proposition. A major regulatory breakthrough, an almost quasi-philosophical movement, is now potentially mining the basis of this fundamental competitive advantage¹ providing more badly needed transparency to this industry.

According to this breakthrough, regulators are demanding that banks provide customers with detailed transaction data in the belief that better-informed consumers will make better decisions and drive greater competition. To facilitate the availability of such detailed data and information, the European Union's new Payment Services Directive 2 (PSD2) will soon require banks to share transaction-level data with third parties. The PSD2 and the standardization of banking API (Application Programming Interfaces) that helps to make use of open data will help in boosting customers' engagement by improving access and accelerating the development of third party apps that can analyze data and recommend best products and services.

In advance to the EU, regulators in the United Kingdom have started applying considerable scrutiny to the market for personal accounts—reflecting concerns that banking may lack competition and real break-through innovation, thus delivering, as a result, poor value to customers. By order of the Competition and Market Authority (CMA), these API may soon become the market standard, even in advance of the PSD2 implementation, and help anticipating some of the discontinuities expected across international markets.

Ideally, on the positive side, a combination of app developers, price comparison web sites and banks' new use cases (where banks can also try to play the customer's advocate role, or pre-empt the independent price comparison web sites by launching their own comparison methodology, to be "selectively" communicated to current and target clients) can afford banks to take their selective bets on this new breakthrough. Eventually, the open data disruption will allow consumers to use historical account data files to compare accounts and the cost of any other financial products and services—and answer few fundamental questions about the competitiveness of what they get from the incumbent traditional banks. Financial technological innovation around tailored accounts could then help banks in boosting engagement by providing insightful analysis that promotes improved outcomes, potentially driving further cross and up selling and more tailored solutions. But FinTech challengers could as well prove that their value proposition is simply much better, for the peace of mind of old, dying incumbents. In fact, on the negative side, this "open data" regulatory change and the associated "open data" apps and digital players that should be mushrooming on the world wide web, is promising to be disruptive for the financial services industry—with money becoming more of the fully comparable commodity it really is and banks loosing most of their negotiating power born out of the control and ownership of data, and of the related limited transparency and comparability available in the sector.

¹Current account comparison, David Branch, AlixPartners, July 2016.

A major challenge still lies ahead for a successful deployment of the open data initiative, as such account data have to be rich enough to enable a valid comparison—whether received in a downloadable file or transmitted via API. And they must allow for an easy comparison—by no means assured, when data inputs are affected by a range of choices that must be made to reconstruct accounts under different terms and conditions. Unless the banking industry can agree on common standards in relation to those choices, customers will likely keep getting significantly different answers from different sources, thereby undermining their confidence in price comparison web sites and causing confusion as opposed to creating clarity and transparency.

Even if via a process of trials and errors, the industry will ultimately get it, driving a further acceleration towards the unbundling of the incumbent banks: they will be deconstructed in terms of what they are precisely offering and at what price, and they will be competitively challenged along their integrated value chains, at any single point where a better offering by a digital challenger could be more likely to hit and win customers. The open data will then facilitate the development of the “synapses” model—whether played by traditional banks digitally transformed or by new FinTech players—as this model actually starts from the full availability and optimal management of data and information, to derive intelligence, new ways of interconnecting customers and solutions and use cases that could be designed and implemented to deliver better value to the end customers—something that should be very high in the agenda of any players in the financial space. But even traditional banks could address these “value delivered to clients” concept and profit from it.

In fact, the “value delivered” to clients is clearly a complementary opposite (the ying of the yang) of the “customer’s value created for the bank” that needs to be measured and communicated to re-address their competitive relationships with clients: banks are not just there to financially gain from customers but also to deliver to them relevant and measurable financial value. In the aftermath of the global financial crisis and of the following banks’ bashing, this message has a number of positive communication and marketing fall outs. On one side, it would send a message to customers that there is value in banking for them after all, and that their bank is at the forefront of it: open, transparent and confident of its own proposition to build long term trust with its customers.

On the other side, it would also send a message to consumer associations and to the many local banking regulators/anti-trust authorities that the bank can become best practice in transparency and client management—setting a fair trade with customers. It would also send a message to incumbent and new digital/shadow players, that the bank is at the forefront of this and is proactively addressing the price comparison engines now available on the web, and setting a standard methodology, at its preferred terms.

Finally, the communication of the “value delivered”—by traditional banks to end customers—could also open up a powerful new way of engaging with their client base—therefore potentially leading to new ways of maximizing the traditional “customer value’s created for a bank”—reconciling the apparently unsolvable trade-off found in a client-bank relationship (“I gain, you lose”). In a more radical

application, the bank could be even willing to provide a fully comprehensive and transparent price comparison application, and to help then its customer in sourcing the best products and services as if he/she were acting in an open architecture setting, as it already happens in most of the asset management industry.

Even this “client’s advocate” role, that helps him/her in navigating in an open architecture world looks quite consistent with the “synapses” bank approach, where the bank drives the meiosis and the synapses, interconnecting different parts of the system, but without actually assuming any direct, captive driven, principal position—neither as the manufacturer of the products and services being sold, nor as the underwriter and holder of the risk being underwritten.

As data owned by banks open up, by virtue of by rule of Law, a number of third party applications will naturally surge—with their imagination and ingenuity limited only by the devices that can host apps and by the data available to feed their creations, ready to analyze almost everything: from the amounts, types, locations, and times of client’s spending; to the cost of banking products (e.g., current accounts, mutual funds, payments etc.) across the wider market; to the user-entered data regarding budget keeping and spending limits.

Banks customers will then have an unconstrained view of their real-time financial positions across their various bank accounts, credit cards, and mortgages or consumer finance products. And they will be able to use innovative functionality to understand, visualize, and therefore adjust their spending or saving patterns in ways never previously available: from the increased availability of price comparison, where the transparency of different prices and condition could change the traditional inertia of customers in switching across accounts and products; to the reduction of overdrafts, where most of these are generated by poor information and planning across the multiple current accounts and saving pots used by clients; to the increased usage of robo-advice, able to suggest real time, at the tap of an app, how to best manage your our own assets and liabilities—the universe of potential applications looks infinite, with wide reaching consequences.

Some of the work banks have so far done has involved their reconstruction of account histories under different terms and conditions to also see, for example, what would have happened to the customers’ accounts had they been held by another bank (or by a new FinTech). Some are also venturing in building their price comparison models, but for their internal use, or for their “selective” commercial use (calling on the clients only when their pricing offer is better than the ones of the competitors). But the potential applications of this “open data” discontinuity are really going to extend much beyond that on a potentially transformative setting.

In fact, as data will get open, and fully comparable, so the financial services industry will need to be.



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