

Examples of research areas provided by SEB

1. The Ownership Economy

Across different industries, new ways of steering business and economies are evolving; the unbundling of ownership and usership of physical products. Historically and presently, ownership and usership are most often held by the same entity, however emerging technologies (*such as cloud- and edge computing, smart sensors, cryptography and artificial intelligence*) are enabling usership-models without the need of owning the product itself. This implies a business model change; from a one-time sales model, to a subscription model based on multiple parameters such as time, velocity, energy and pressure. Manufacturers are starting to explore the positive impact this fundamental shift entails, where the incentive of maximized production volumes and turnover transforms to a new incentive of maximized life-span and durability of products. This will be good for the manufacturer as revenues will be more recurring and stable, good for the flexibility of the customers, and it's good for the environment as recycling becomes a more important factor, fully incorporated into the manufacturing business model.

There are examples of manufacturers already engaged in different explorations, selling usage instead of products: Electrolux sells autonomous Vacuum cleaning-as-a-Service, Kaeser Compressors sells Air-as-a-Service, Briggs & Stratton sells Landscaping-as-a-Service and Philips sells Lights-as-a-Service.

Banks are trustworthy and capable partners in financing capital investments for both businesses and private individuals. But, for this massive shift and new subscription models to work, it requires more sophisticated financial models than in the past. For example, the need for evaluating the quality of material will arise, enabling the constant flow of material no matter the owner or user. Another aspect is the actual separation of ownership and usership, enabling third parties to own a piece of hardware and earn revenue when it's utilized by the user. Furthermore, products will be more autonomous and will hence be able to perform tasks themselves. This makes the case for products becoming micro-companies bearing credit risks, instead of traditional credit risk for organizations.

Ultimately, physical products owned by third parties will need highly sophisticated solutions. There are several dimensions to take into considerations for financial products targeting the new ownership model, spanning from how to produce products, how to own and monetize products, and finally how to re-manufacture products. New financial solutions are at the core of these challenges, solutions that seamlessly connect manufacturers, product users, investors, credit evaluators, and recyclers.

For this research area, there is data available from different exploration studies, conducted in collaboration with global manufacturers. Additionally, there are a number of qualitative use cases to study.

The key question relates to the evolution of new ownership models and how financial institutions may adapt their services and solutions to fit in this ground-breaking transformation.

Support SEB: Christopher Lyrhem, Strategy and Digital Analyst, Transformation Office

2. Real Time Payments

Services in a business transaction will to an increasing extent be exchanged simultaneously, meaning that the transfer of funds (payment) is initiated and settled immediately at the time of the actual service delivery – i.e. in real time. Up until only recently only transactions settled through a physical payment (with cash) was executed simultaneously with the goods/services being provided for. As soon as the payment was performed with for example a card there was delay between the delivery of the goods/services and the funds being settled through an account in a for example a bank. In the recent years the launch of a Swish payments has dramatically changed the payment landscape between private individuals, but also being extended to the corporate business environment. Also the settlement cycle for financial transactions (i.e. foreign exchange and securities transactions) are moving towards simultaneous delivery. Historically, banks and other financial institutions have typically generated substantial income as a consequence of acting as intermediary in these payment flows.

In order to take full advantage of real time payments, banks need to modernize their processing systems to handle a 24/7/365 world, and at the same time invent new business models based on increased transaction volumes and new efficiencies across the payments value chain.

Ultimately this will change traditional payment flows and the full impact of adopting real-time payments will only become clear with time as corporates, start-ups, and policymakers deploy innovative services on top of the modern payments infrastructure.

Real-time payments can enable future innovative products and services, which use the data generated by digital payments. Real-time payments will release money locked up in the financial system and boost competition. As financial institutions open up to include more partnerships and more transactions, consumers will benefit from gaining access to a wider selection of financial service providers, while governments will benefit from the ability to distribute benefits and collect taxes more quickly and accurately.

The real-time payment infrastructure will also add greater weight to the concept of open banking and application programming interface (API)-powered data sharing capabilities, which can not only enable banks to accelerate product deployment with services that meet customers' real-time needs, but also allow financial institution to aggregate and wield customer data in real time for their own internal processes. For corporate treasurers, one of the biggest benefits of real time payment capabilities provided by the bank, is in the availability of data.

As mentioned above, business transactions have been settled first and then, after a certain delay, been followed by a settlement of funds. Throughout this process, from when the agreement has been signed until the payment has been received, banks have played an important role both as payment intermediaries and risk mitigators. Today, banks do not only help to initiate and receive corporate payments as well as keeping records of historical transactions but do also offer temporary financing options with the invoice as collateral as well as takes over payment failure risk from the seller until the agreed service has been paid for. In a real-time economy where "accounts" potentially can be held by other actors than banks, the banks' role in the economy and society will change.

This move to real-time and open payment flows holds many key implications for each participant in the payments ecosystem, opening up new opportunities as well as challenges for future financial providers.

The question that can be raised is how, and if banks and other financial institutions will change their business models to accommodate for the real time payment processing/ecosystem?

Support SEB: Robert Pehrson, Head of Business Development, Transaction Services

3. ESG Metrics in Credit Analysis

A growing awareness among consumers, stakeholders, regulators, employees, and competitors is prompting an increasing number of banks to become more proactive in terms of sustainable banking, particularly concerning product development and financing sustainability projects directly.

Traditional credit risk analysis is based on the ability to service debt and the models are built on historic outcomes. However, sustainability related factors are influencing business models, consumer preferences and regulatory actions at different time horizons, sectors and geographies. As a consequence, traditional bank models for credit analysis need to be adjusted to cater to new sustainability related factors and other time horizons. The critical question of how to incorporate sustainability in credit risk management needs to be solved.

The recently launched EU Taxonomy is a starting point for categorizing sustainability-related risk in different sectors and industries. Sustainability risk is defined as the likelihood and significance of a loan's default due to environmental and/or socioeconomic factors derived from the loan's terms and, therefore, compromising the borrower's ability to repay the loan. Financial intermediaries need risk management tools to evaluate underlying or emerging risks stemming from their business activities related to sustainability. For instance, in the case of financial institutions, a borrower's environmental risk can become the bank's financial risk. Hence, the financial sector's accountability is not to be limited to the financial reporting of risks but should also account for environmental and social risks, which encapsulate trade-offs in terms of value under the scope of sustainable development.

At a macro level, the use of fossil fuels need to decrease, while investments in new low carbon technologies or untested infrastructure will require massive investments. What type of financing solutions will be optimal from a macro and micro economic perspective and what is the role of banks in that financing? This requires research on optimal allocation of risk in society during times of high risk, breakthrough technologies and evolving standards. What is the role of Government guarantees, blended finance, PPP, risk capital etc.? Are there differences in across sectors or geographies and what effects does current debt situations have on society's ability to optimize financing? At an organizational level, decision making is changing as a result of sustainability considerations, building on normative values in the organization, regulatory requirements and business decisions on expectations of how others (investors, clients, etc.) would react. Decision making processes in banks in particular are evolving as a result of sustainability considerations.

There is a need for credit score systems including sustainability risks, as it could be used as criteria to improve financial institutions' lending policies. Secondly, the data and insights gained in sustainability score systems can be used to advice customers, to transparently report the credit portfolio and to develop new innovative offerings. Thirdly, there is an increasing external demand for transparent reporting of the sustainability risk embedded in the credit portfolio. The integration of sustainability metrics in the credit analysis and the credit worthiness evaluation of borrowers will be a critical success factor for banks moving forward.

A wider scope of sustainability, beyond climate impact, is yet to be defined with proper metrics and available data in climate risk is non-conform and differs across industries and geographies. The current lack of disclosure of ESG data by many corporations create asymmetric information. Climate risk also happens across value chains, where a system approach is necessary.

The critical challenge is the questions of how to develop new credit score systems with relevant sustainability risk taken into account.

Support SEB: Karl-Oskar Olming, Chief Sustainability Strategist

4. Algorithmic Trading

In **algorithmic trading** one assumes that future events are the same in “character” as historical observations, which to a large extent also is the case. However, the situations when this assumption no longer holds can cause large problems which poses the following questions:

Unknown changes: How can one identify that a regime shift has taken place in the market? Or, better yet – how can one identify that a regime shift is to take place?

Known changes: At macro economical events (releasing GDP, CPI, unemployment numbers, rate decisions etc.) the “usual” statistical models might not hold as each event is, in some sense, unique. Are there alternative methods to be able to draw conclusions on the outcome to be able to predict the market’s reaction (in both direction and size)?

There exists anecdotal evidence that order books can provide early indications of non-functioning markets (“Order book imbalance”), but no established models are currently available to support this indication.

SEB plays a major player in the foreign exchange market, no least in the Nordic currencies. This brings that other actors have a lot to gain from understanding and trying to predict what SEB are to do next, something that can be achieved by observing our prices. When SEB distributes its prices to clients it happens that information leaks out to the general market, which in turn brings unwanted consequences. Thus, there is a great interest in trying to quantify this leakage for a specific distribution channel. This problem is topical in the light of the continuing fragmentation of the trading landscape from a few primary markets to today myriad of trading venues, making the volumes less persistent (“Liquidity Mirage”) and smaller in size.

To support the above analysis market data is available consisting of all order book updates in buy and sell prices with the corresponding volumes for the majority of FX trading venues, including prices distributed by SEB. To note is that the amount of data is very high, about 1000 updates per second, which puts demand on the methods used while at the same time enables good insight to the market dynamics.

The question that can be raised is how, and if there are any ways to determine if information data leakages could be identified in the available market data at the trading venues.

Support SEB: Simon Österberg, Chief Quantitative Trader, FX