

AI and factoring - an upcoming revolution?



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At a time of accelerated technology development, many areas of finance are radically changing. Receivables finance is no exception – ease of information transmission and basic automation tools have led to a rapid development of areas such as supply chain finance (SCF), (an age-old concept also known as reverse factoring or confirming, redesigned as a mainstream banking product), and various receivables platforms that are attempting to commoditise confirmed invoices. Traditional factoring, however, has been quite resistant to change: whilst newer operating platforms make the factoring process easier and more efficient, it is still heavily driven by human expertise and decision-making.

The reason is that factoring as a product is inherently complex because of the interplay of multiple risks, such as buyer credit risk, supplier risk, performance risk, operational risk (which results in dilutions), and fraud risks. The lack of deep knowledge of these inter-related risks and the misunderstanding of their complexity has led to many unsuccessful attempts where different platforms/ventures were set up trying to create shortcuts using technology rather than to comprehensively automate the entire process.

Most of the structures developed for highly automated forms of receivables finance (such as SCF and SCF-like structures used in various platforms) bypass this complexity by altering the relationship between the buyer and the supplier and by relying on the buyer confirmation (normally communicated

via purpose-built systems and having specific legal terms such as limiting offset rights, etc.). This allows for the separation of credit risk from a complex credit/performance risk mixture and (with the right structure and systems in place) the creation of either a mainstream banking product (SCF) or a product that might be sold to relatively unsophisticated investors through various platforms.

These solutions, however, present a number of challenges as they require integration with buyers' systems and may cause significant payment delays due to long and inefficient invoice approval processes. Traditional factoring's advantages are that the availability of funding can be much quicker (possibly as soon as an invoice is issued) and that it typically does not alter/complicate the process for the buyer (such as through the introduction of separate confirmation processes, legal agreements, etc.) in many instances. It does, however, come with extra risks and inefficiencies, and heavily relies on manual processes. Reliance on the factor's knowledge and expertise remains the critical limitation.

Artificial Intelligence (AI) has already changed many industries, from cancer diagnostics to driving. This has been spurred on by larger volume and better quality data, greater computing power, and readily available programming frameworks supporting sophisticated algorithms.

The introduction of advanced AI-based systems will have significant organisational and technological impacts on the factoring ecosystem, and especially on factoring organisations themselves. At the organisational level, a system's ability to recommend and/or make decisions on their own will greatly reduce the level of human involvement. Systems based on various machine learning algorithms can learn how to make decisions in specific business domains by being trained to interpret data about past decisions and patterns in data and/or by monitoring the decisions currently being made (as well as monitoring currently produced data), thus mimicking the expertise of human decision makers. (AI-based systems can often outperform their human counterparts).

This development may lead to the complete elimination of human decision makers in simple/routine cases or, with AI-based systems acting as advisors, routine decisions could be handed over to junior staff while senior, experienced factoring staff could be used for handling complex situations, for audits, etc. The resulting productivity gain would allow factoring companies to handle a significantly larger client volume and reduce operating costs.

There has been an increasing number of (often, unsubstantiated) claims of AI as a cure-all remedy. It is, therefore, extremely important for a solution provider to remain focused and set clear, credible, specific, and achievable outcomes. We propose that the use of computer algorithms

and predictive models in factoring and SCF has great potential to deliver value in three key areas:

First, high-precision, timely risk assessment will lead to a significant reduction in the cost of risk, especially in situations where risk assessment is too conservative due to the inability to accurately account for all possible risk factors.

Second, the use of decision automated algorithms will support timely, data-driven, and evidence-based decisions that take into consideration a variety of threats and opportunities and are optimised for maximum possible cumulative value.

Finally, the ability to introduce powerful predictive solutions without the need to heavily modify existing processes and the relationships among supply chain elements will minimise disruption and improve the acceptance of these new methods, compared to existing "solution-centric" tools that require significant process modification.

The common theme for these three areas where AI adds value is the ability to extract critical insights from high-volume high-velocity structured and unstructured data from multiple relevant sources, and then integrate the resulting set of analyses and information.

A major trend in those industries where factoring has been or could be used is the significantly higher degree of integration between the buyer and supplier. While this change is not driven by financing, but rather by other operational considerations, it opens up a tremendous opportunity for the factoring industry. Sophisticated procurement and A/P systems, better IT systems for logistics providers, and different types of portals can provide massive amounts of data, showing multiple elements of performance risks (e.g., the status of the goods, disputes, approvals, etc.). Standard procurement practices (such as triple matching) can easily be automated (even in the absence of e-invoicing) by using natural language processing and image processing with optical character recognition. This can be modelled and analysed even if the buyers have not automated these processes yet.

For a factoring company, this means that the various risks can be analysed in a more data-driven way by utilising both structured data (such as invoice or payment information) as well as unstructured data (such as email and other types of communication) across different systems. Given the improved and expanded continuous data collection, increased automation, and advanced analytics, decisions and analyses can now be made not on a human scale, but on a machine scale – faster, more frequently, and potentially with more consistency and precision.

The approach described above should foster insights into:

- **Dilutions.** Unlike statistical analyses of invoice/payment/credit note data, utilising various AI algorithms across multiple systems and data sources (the seller's ERP, procurement systems/portals, logistics data, service logs, etc.), AI-based technology supports the analysis of root causes and the making of more accurate real-time analyses of expected dilutions. This should allow more flexible pricing, including finding optimal trade-offs between the timing of funding and the pricing of the product.
- **Diagnostics of suppliers' problems.** Seeing invoice-related problems (such as increased product disputes) is often a sign of serious supplier problems. Advanced analytics of this information could be a significant value-added service that a factoring provider can give to its clients (particularly, small and mid-size firms that probably lack resources and expertise to do it themselves), thereby increasing its perceived value to those clients as well as reminding them of the cost of switching to another factor. At the same time, this type of analytics would help a factoring provider monitor the credit risk of suppliers themselves.

Predicting and addressing dilution and the supplier's performance can be approached from two angles: (i) regular patterns that represent the supplier's typical invoicing and discounting practices, buying patterns, and invoice disputes and resolutions and (ii) anomalies, such as unexpected undesirable events or rapid changes in regular patterns. Regular invoicing patterns can be mined from a supplier's and buyer's AR/AP and CRM data using unsupervised learning algorithms, such as cluster analysis, association rules, and time series analysis. Anomalies and critical events can be predicted using time-to-event modelling techniques (e.g., survival analysis) or probabilistic methods, such as the Hidden Markov model.

- **Buyer credit risk.** Supplier information about its buyers (that includes invoice/payment information, disputes data, CRM data, etc.) may often provide valuable and real-time insight into the buyers' financial health, far in excess of the buyers' financials and significant overdue reports available to credit agencies and/or credit insurers. This may be particularly important in the industries where a factoring company is dealing with multiple or major suppliers to a particular buyer. Using AI technology would provide, in many cases, a better insight into the buyer's credit risk. This may not only include payment patterns, but also buying patterns, the product mix, and various secondary indicators of events leading to potential credit problems long before they can be directly observed in financials.
- **Credit risk/dilution interplay.** The boundary between credit and performance risk is often unclear. For instance,

a distressed buyer is likely to use any kind of mechanism to delay payments, which may include spurious disputes. Cleaning up and analysing the data to understand if a dispute increase is related to supplier issues (such as quality), genuine process change (e.g., a more stringent buyer process) or is just masking the buyer's financial deterioration should be critical in providing early warnings. The presence of distinct predictive models for credit risk and supplier's performance risk allows one to better understand the causes and factors of each individual risk type. The combined model will be capable of detecting the cases where one risk is posed as another by a buyer or a seller (for example, an increase of spurious disputes to mask liquidity issues).

- **Fraud risk.** Fraud risk is probably one of the most important issues in factoring, and there are periodic "horror stories" relating to it. AI technology is very successful in combating fraud risk in many industries and could be efficiently used within the factoring environment. One possible area of supplier fraud risk assessment can include invoice anomaly detection based on natural language processing and document clustering algorithms, and the detection of duplicated invoices and invoices submitted to multiple funders. The overall ability to access multiple systems for the seller (such as accounting, manufacturing, and logistics) and enabling anomaly detection alerts also makes the process more transparent and thus more fraud-resistant.
- **Audits.** With the factoring provider being plugged into the supplier's and possibly some of the buyers' systems, periodic audits could be supplemented (and in some cases even replaced) with ongoing monitoring. A data visualisation dashboard in combination with an alert system based on integrated multiple-source data will not only allow continual monitoring of standard compliance metrics but also will be able to notify a decision maker when a potential violation is about to occur.

Implementing the capabilities set out above to support the activities of factoring organisations requires the development of sociotechnical systems that focus on (i) the design of advanced AI-based solutions, (ii) their interoperability with many enterprise systems (ERP, CRM, etc.), communication systems (e.g., email, messaging), etc. for data exchange, and (iii) their integration into existing enterprise business processes. Thus, when designing and configuring these AI-based systems, we need to consider not just the technical, but also organisational and other issues. For example, we have multiple stakeholders (factors, their clients and debtors, and more) with many conflicting objectives and needs, varying levels of trust in automation in general and in AI technologies in particular, and different legal and compliance requirements (e.g., due to operating in different jurisdictions).

These differences may result in, for instance, varying needs for explainability of AI-based systems' recommendations as well as the different ways AI-based systems would operate – purely as advisors to human decision makers or taking over those decisions from humans. Therefore, any solution needs to be highly customisable to take account of the above differences and, moreover, it must be evolvable as these requirements may change frequently. Techniques from business analysis (requirements engineering), product line engineering, etc. can be used to meet the challenges above and to ensure both technical and organisational fit.

CONCLUSION

The development of AI technology, as well as significantly expanded data flows within supply chains present a great opportunity for factoring companies. Historically, financial institutions have been unable to deal with complex risks, and therefore most finance products have been based on simplifying the risk type – examples include letters of credit where contractual relationships were replaced by formal examination under UCP standards, “traditional” supply chain finance where performance risk was eliminated through confirmation and legal framework, etc. By contrast, the factoring industry has traditionally dealt with “real world” risk combinations. New technology will enable the industry to use data and structured processes to better finance such risks. Using advanced AI tools would not only allow factoring companies to better analyse and price the risk, but to become true partners to their clients, developing a deep understanding of their business and in many instances becoming a source of valuable advice to the clients.