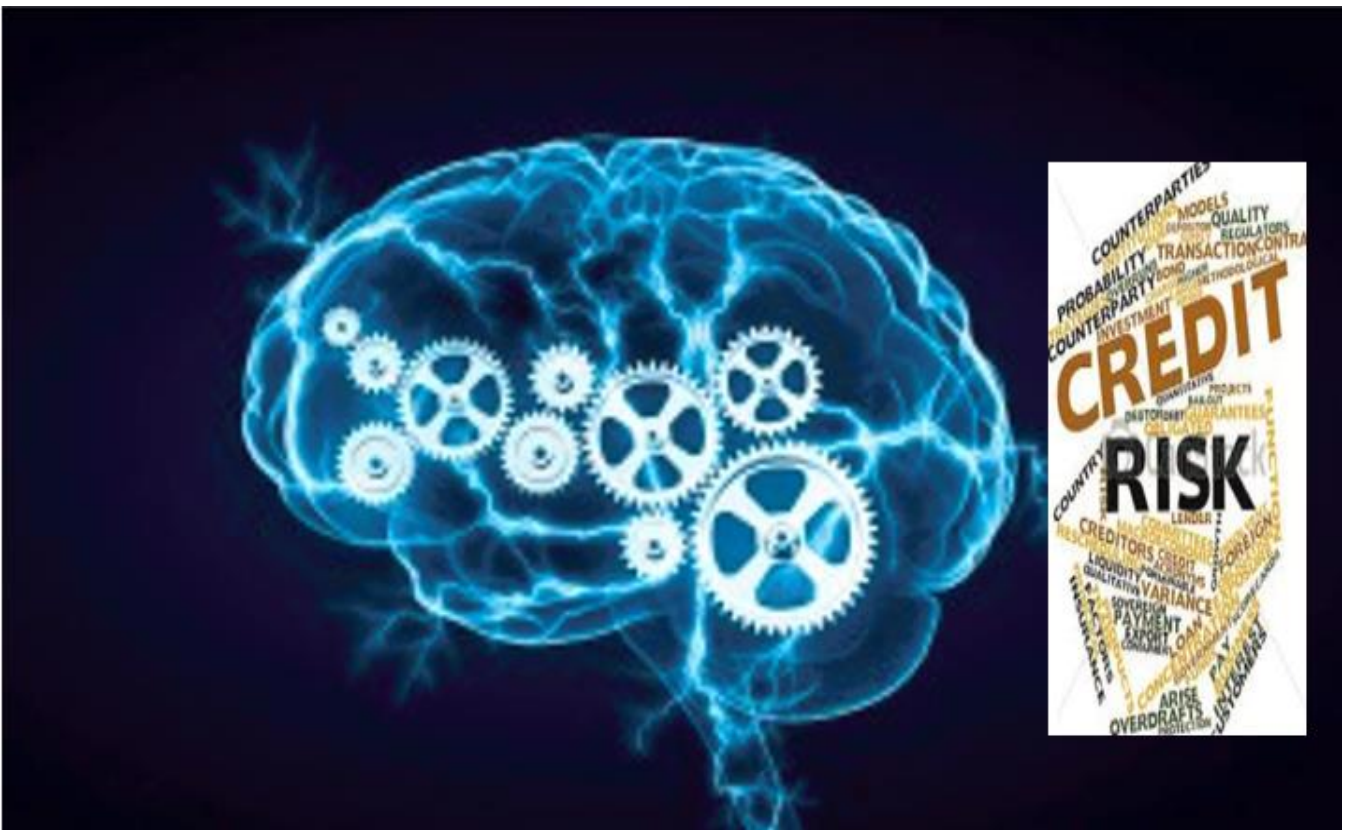


Reimagining Credit Risk in the Digital Age



- Manoj Reddy & Ajay Katara

Background and Business Context

Credit risk management or CRM as it is popularly called, has constantly evolved through time, more so after the 2008 financial crisis. Also factors such as increasing regulatory complexity, newer credit instruments, provisioning norms and increased competition are pushing Banks to digitally reimagine the credit risk function.

CRM function has evolved from being a transactional function where the traditional methods of CRM primarily revolved on traditional and conventional methods of assessing a customer's credit worthiness through reliance on ratings from a single bureau, policy defined underwriting methods, and simpler structured credit models with heavy reliance on Human judgment supported by manually intensive research and analysis.

Evolution of Regulations like Basel and the crisis of 2008 resulted in considerable developments in CRM space which resulted changes in forms of

- Emergence of an integrated Credit Risk Management cutting across Lines of Businesses
- Usage of multi bureau ratings,
- Establishment of Credit Risk policies & framework,
- Automations in the underwriting process
- Improved MIS reporting - Reporting has evolved into multi-dimensional form (slicing dicing) from its traditional form and is fairly interactive now.
- Capital Calculations too has evolved from Traditional Economic capital to

With Digital Technologies ushering a new ERA of innovations and advanced technology adoptions there is an opportunity to redefine the way Banks have managed their Credit Risk and explore the possibilities of a Digitizing some of the Credit Risk processes to bring in greater speed, diversity & customer centricity in Credit Risk Management and move them on to a strategic path from their current state.

Current Focus areas for Credit Risk

Though good progress is made in the CRM function over the years, however there are many processes within the Credit Risk value chain where considerable benefits can be derived from the



adoption of digital technologies. Some of the current focus areas in the Credit risk are as below

Credit Risk Analysis – Credit Risk Analysis during Credit approvals and periodic credit reviews do absorb a tremendous amount of organization time and efforts and there is an active interest in the Industry to optimize this space to make it more efficient.

Credit Modelling and forecasting – Modelling and forecasting function is gaining more and more prominence due to regulations like CCAR (Stress testing) & IFRS 9.

Credit Monitoring – Proactive risk management continues to be a key focus area for the banks as identifying risks early in the value chain is not only cost efficient but also strategically important for from the perspective of regulatory expectations.

Credit Risk Analytics and Insights – Analytics and Insights have evolved from simple reports and dashboard to a more intuitive form .The need for predictive analytics and gaining deeper insights in to data is becoming more and more relevant for effective decision making.

Current Challenges with Credit Risk Management

Inspite of Credit Risk being one of the oldest and the most fundamental form of Risk for the Banks,



it is still some distance away from being Managed in the most efficient and effective manner due to a few inherent limitations in which the Business processes and corresponding technologies have evolved over the years.

- ✚ **No Significant dip in the Distressed Debt Portfolios** - Even with advancements in Statistical modeling techniques and overwhelming number of regulations focused on Credit Risk and Loan losses, the Industry is yet to show significant improvement in the Credit Quality.

- ✚ **Heavy Reliance on Structured Internal & Credit Bureau Data** – Banks have traditionally been heavily reliant on using the internal relational datasets and Credit Bureau data which is one dimensional and limits the comprehensive all-round view which is needed to ascertain Credit Risk of Customers

- ✚ **Credit Risk underwriting & Credit Review processes are Manually Intensive**– Credit Risk underwriting & Credit review processes are largely manual which not only makes the turnaround time for credit approvals longer, it also makes the process more expensive and prone to errors.

- ✚ **Early Warning Signals are largely foundational** – The Early warning Identification is largely an outcome of downward shifts in Credit Ratings & Credit Score which in the current Banking scenario may not identify the potential bad loans early enough which can subsequently be more expensive for Banks by way of higher charge offs and provisioning of additional capital.

- ✚ **Existing Data Infrastructure may not be Scalable** – Existing Credit Risk Infrastructure and Data platforms are under pressure from the needed for diversity of the datasets, to historical data needs and the frequency at which data is needed.

- ✚ **Accuracy of Credit Risk Predictive Models** – The Industry is still grappling with accuracies in the Credit Risk predictive models. Most of the models in the Industry are built based on expertise of the SMEs are not optimized too frequently leading to a scenario of lower accuracies in their predictions of Credit Risk outcomes.

- ✚ **Data Quality impeding ability to Analyze** – Due to disparate Data sources and lack of strong data controls and Data quality, the Credit Risk Analysts are spending greater time on Data gather and Data cleansing and very little time on Data Analysis and deriving Insights.

How do the Digital Levers Help

The new era of Digital revolution has propelled a number of banking functions from run of the mill business processes to being more customer centric, efficient and cost effective. The Digital levers have ushered in new possibilities across the Banking spectrum and have a tremendous potential for adoption in the Banking Risk management domain as well. Machine learning (ML), Natural Language processing (NLP), Robotics process automation (RPA) and Blockchain are among the most prominent Digital levers that are in the fore front of this Digital revolution

Machine Learning (ML) – At a Broad level Machine learning is used for classification and regression based functions. Within the Credit Risk domain it could potentially be leveraged for predicting loan defaults based on historical patterns and also to build estimation models for PD (Probability of Default), LGD (Loss Given Default) and CCFs (Credit Conversion Factor). Additionally they could be used to infer the patterns associated with historical approvals and denials in both Limit breach and credit underwriting process and recommend a decision to the Credit Risk Analyst. The major benefit of leveraging ML algorithms in the above credit risk functions is that they are able to uncover unknown correlations among variables and also their accuracy is only going to improve with additional data feed and training which goes into them.

Natural Language Processing (NLP) – The ability to understand Natural language is what has differentiated us from the machine for ages now. However in the last few years with advancements in technology and NLP techniques we have a scenario where the machine are almost able to understand our instructions given in natural business language and almost act human like. Infact, the industry is a place where common spoken language is fairly well understood by the stems and if we are able to build a deep domain specific ontology, the system is able to understand the Business Context as well. So virtually in the Credit Risk world, all the documents that had to be scanned and searched for Underwriting, Credit review and Covenant monitoring process can now be done by building parsers which can do this extractions much faster and more consistently. In addition to data extractions from unstructured sources NLPs also have a great applicability in the virtual agent space and we can now provide instructions in simple business knowledge without the need for complex queries to retrieve information and insights for our Ad-hoc queries.

Robotics Process Automation (RPA) – Robotics Process Automation is an exciting new technology which aims at bringing in greater efficiencies, cost savings and consistencies in the way Business processes are carried out. It differs from traditional automation in the sense that it can enable variety of automation in one single platform from web crawling to Object Character Recognition to data creations on spreadsheets and database. The Credit Risk functions which are good candidates for an RPA adoption are senior management Internal Risk reporting and dashboard which are largely manual in most of the Banks even today, Credit Risk Loan approvals and Limit Breach approvals for low value and low risk cases.

Below is a table which summarizes some of the Key Use cases for the Digital Adoption within the Credit Risk spectrum. They have been categorized as high medium and low based on a broader Banking Risk Management Industry view.

Credit Risk Business Functions	DIGITAL LEVERS		
	Machine Learning	RPA	NLP
Early Warning Signals	<ul style="list-style-type: none"> Models that could be trained to differentiate and grade the various degrees of severity of the Signals 	<ul style="list-style-type: none"> Could work in conjunction with NLP solutions to trigger workflows for appropriate Credit Action for EWS 	<ul style="list-style-type: none"> Adverse media screening to pick up any early Credit Risk Signals
Credit Risk Ratings & Approvals	<ul style="list-style-type: none"> Recommend the approval or denial of credit based on Risk data variables based on Historical learnings. 	<ul style="list-style-type: none"> Auto adjudication of loans with highest Risk ratings & low exposure value. 	<ul style="list-style-type: none"> Parsing through 10Q & 10K documents Adverse Media screening for assigning Risk Ratings
Credit Risk Parameters (PD, LGD, CCF)	<ul style="list-style-type: none"> Predicting Loan Defaults (Classification) Estimating the PD, LGD & CCF percentages 	<ul style="list-style-type: none"> Could be used for the Data gather process and run based lined models for the PD, LGD & CCF Models 	<ul style="list-style-type: none"> It is very structured data intensive process. Currently low on adoption.
Credit Risk Review	<ul style="list-style-type: none"> Classify loans for enhanced credit review based on historical learnings. 	<ul style="list-style-type: none"> Approve cases where there has been no significant changes. 	<ul style="list-style-type: none"> Parsing through documents submitted for Covenant monitoring for Identifying any elevated Credit Risk Profile
Limit & Exposure Management	<ul style="list-style-type: none"> Recommend Limit & Exposure Breach approvals based on Historical patterns of Approved and Denied cases. 	<ul style="list-style-type: none"> Screen for Breaches & resolve First level breaches 	<ul style="list-style-type: none"> Credit Officer could leverage NLP techniques to scan documents which support the Breach approval process
Risk Reporting	<ul style="list-style-type: none"> This is largely a downstream process. Currently low on Adoption 	<ul style="list-style-type: none"> Credit Risk MIS Reports which are manually compiled 	<ul style="list-style-type: none"> Intelligent Virtual assistants that can understand Natural language for Ad-hoc Insights to Business users.

Relevance & utility ■ High ■ Medium ■ Low

Conclusion

Banks globally are in varying stages of their Digital transformation journey powered by their migration into the Big Data Infrastructures and will eventually have the required technology and data infrastructure to explore some of the use cases mentioned here. There is an incredible amount of savings, efficiencies and competitive advantage that can be gained by adoption of the Digital levers. What is important to consider is that a gradual structured adoption through exploration might work better than a Big Bang approach. It might appear that a Digital adoption might not be a necessity today, but given the dynamic Risk environment and an hyper competitive Business environment it is indeed the time to re-image the Credit Risk now in the Digital Age.

About the Authors

Manoj Reddy

Manoj Reddy is the Head of BFS Risk & Compliance Practice for TCS North America with an experience of more than 15 years in the areas of financial services, IT, and business consulting. Reddy has lead several risk consulting and implementation engagements for financial firms globally. He has provided both Regulatory and Strategic Business solution to his customers over the last decade primarily in the area of CCAR, Basel, Liquidity Risk and Enterprise Risk management and is currently leading TCS efforts in North America with respect to providing cognitive solutions for Risk & Regulatory problems.

Ajay Katara

Ajay Katara is a Domain Consultant with the Risk Management practice of the Banking and Financial Services (BFS) business unit at Tata Consultancy Services (TCS). He currently leads the BFS Risk Practice's portfolio on Regulations and Robotics Process Automation. He has extensive experience in both Consulting & Solution design space cutting across CCAR Consulting, Basel II implementation and credit risk, and has worked with several financial enterprises across geographies. He has significantly contributed to the conceptualization of strategic offerings in the risk management space and has been instrumental in successfully driving various consulting engagements.