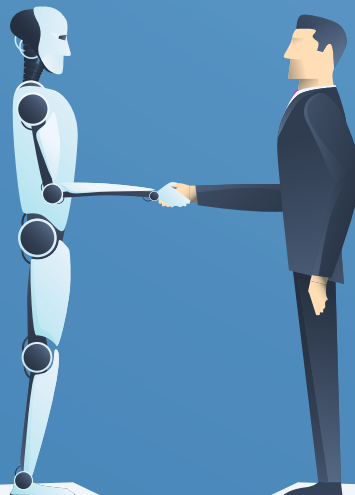




The Role of  
**Artificial Intelligence**  
in Managing Business Risk





## Introduction

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## Our experts

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Samiran is a Senior Advisor to Rubix Data Sciences Pvt. Ltd.

In a career spanning over 24 years, Samiran has held key roles at Microsoft, Dun & Bradstreet, IBM and TCS. Some of the senior leadership positions he has held recently are Chief Digital Advisor at Microsoft India and APAC Head of Technology for Dun & Bradstreet. Prior to that, during his 14 years at IBM, he did multiple roles across Consulting, Sales, Global Delivery, Solutioning, Research and Product Development. He took a one year sabbatical from IBM to work at the National Institute for Smart Government on several e-governance projects including the Aadhaar project.



**Mr. Samiran Ghosh**

Samiran is on the MIT Technology Review global panel. He is also a part of the Forbes Technology Council, which is an invitation-only community for World-Class CIOs, CTOs and technology executives.

He has written for leading technology journals, is a guest lecturer at premier Indian and international universities and a TEDx Speaker. He also advises a few startups and has co-authored a book on Blockchain and one on Artificial Intelligence published by Wiley.



**Dr. Vishnu Ramachandran**

Co-Founder and Chief Technology & Product Officer of Rubix, Dr. Vishnu Ramachandran is a Ph.D from the Indian Institute of Technology (IIT).

He has worked for over 15 years in various roles spanning product development, project management and operations in the risk management and data analytics domains.

While at Dun & Bradstreet India, Vishnu played a key role in setting up SMERA Ratings Ltd (now Acuite Ratings & Research Ltd). He also helped establish Experian's business information vertical in India and its commercial credit bureau, besides driving other digital transformation initiatives.



## In Conversation with



**Mr. Kaushal Sampat**

A veteran of the information services industry, Kaushal Sampat is Founder of Rubix Data Sciences Pvt. Ltd.

With over 25 years of experience, Kaushal spent 18 years with Dun & Bradstreet India in various leadership roles including President & Managing Director from 2010 - 2017. He helped establish Acuite Ratings & Research Ltd. (formerly SMERA Ratings Limited), Dun & Bradstreet's joint venture with SIDBI, and has served on its Board.

He is a prolific speaker at industry events and has moderated discussions with several eminent political and business thought leaders.

Kaushal holds a MBA from Bowling Green State University, Ohio and is a member of the prestigious Young Presidents' Organization (YPO) and Entrepreneurs' Organization (EO). He is passionate about reading, geopolitics, art and travel.





# Could you give us the most commonly accepted definition for Artificial Intelligence? How are Artificial Intelligence and Machine Learning related?

This is a question that gets asked a lot. People tend to use both the terms Artificial Intelligence and Machine Learning but there is a difference between the two and we will try and state it as simply as possible:

- Artificial Intelligence (AI) is essentially the superset and Machine Learning is part of AI.
- AI is us trying to use technology to emulate human thinking; whether it be cognitive processes, speech, hearing, smell, motion etc and there is a whole lot of intelligence and analysis that is part of it.
- Machine Learning (ML), on the other hand, is really about using the capabilities of machines and technology to analyse data and give you results based on either algorithms or models that you have created or by the machine learning and running by itself and giving you the results. So ML is a small part of

what AI is. ML is really about the data, looking at the data, understanding it, and getting good results whereas AI is a much broader concept.

- To make it real, let's consider some examples. Amazon's Alexa, Apple's Siri and Google Assistant are all examples of AI because there are so many different elements working together, such as speech, unstructured questioning, search etc.
- On the other hand, a simple example of ML is the automatic friend recommendation feature on Facebook; based on your existing friends, the system automatically generates recommendations about persons who could be your friends. Another good example of ML is the Amazon recommendation engine; if you buy a product on Amazon, it shows you other products that you may want to buy related to the product first purchased.





## Is Artificial Intelligence in its current form 'real' or is it 'hype'? There is an expectation that AI will have a revolutionary impact on business, government and society and yet many people are still skeptical. Do you think that businesses will actually be able to commercially harness AI in the next decade? If yes, then in which areas?

- AI is a real technology and has been applied in a lot of places. But the jury is still out on whether it can be applied at scale.
- Leading management consultancies such as McKinsey and BCG and universities such as MIT have done studies to determine what it will take for AI to scale. They have a few interesting findings:
  - Companies that have deployed AI effectively and done well were already digitally savvy to begin with. They were well along the path of automating their systems, processes, supply chains and plants. Hence, they were already creating and generating good data that could be used by the AI systems that they implemented.
  - These companies also invested substantially in training their employees. Studies have shown that as much as 50% of the AI budget actually goes into training, at least in those companies that have deployed AI successfully.
  - The third important prerequisite is creating the right Culture. Employees need to feel comfortable that AI will coexist with them and not take their jobs.

All of these things play a role in the ultimate adoption of AI. Just putting AI into a company has never worked, and the chances of it failing are very high if you don't have the prerequisites in place. This is why most companies never get past executing a few proof of concept (POC) projects for AI, and they are unable to transition to an enterprise AI solution.



- There is no denying the fact that there is hype around AI. Every start-up or company that is trying to raise funds calls itself AI-enabled because doing so makes it more attractive to investors. In fact, even customers like to buy products that are fashionable!
- Having said that, there are companies that have been truly successful at implementing enterprise AI. Let's look at the World Economic Forum's Lighthouse Projects and study some of the manufacturing companies that have been super successful at this. You will observe that in these companies there is a much larger program running across the enterprise and AI becomes an enabling lever. AI is a powerful technology but it is not a silver bullet – it cannot be looked at in isolation if you want to implement it at scale.

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*In reality, it takes a lot of hard work to implement a successful AI program across the company. It takes training, digitization and putting it all together. The program needs to be well thought out and it needs to be seen through; you can't go in halfway and then come back.*

- Samiran

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# How can AI help in predicting, preventing, managing and mitigating Business Risk?

## Please share some examples where AI has been useful in managing Business Risk.

The utility of AI/ ML can be best understood by analyzing the three different phases of Risk Management:

- Risk Prediction
- Understanding In-Process Risk
- Post Facto Risk Analysis
- **Risk Prediction** is probably the most difficult; how do you foresee the risk arising from something that is going to happen in the future. This prediction is going to be premised on the historical information that you have and on changes in the environmental variables. For example, to predict the risk of high car insurance payouts you have to look at the profile of the drivers whom you are insuring. Actuaries in the US tell insurance companies that if they are insuring a bachelor who is driving a sports car, the risk of insurance payout is higher because people with this profile are more prone to have accidents. On the other hand, if the company is insuring a person who is married, has a family and drives a sedan, the risk profile of the driver is better and hence insurance payouts are projected to be lower. Therefore the insurance premium you offer the latter should be lower as compared with the former. Now add an Electrical Vehicle (EV) like Tesla to the mix. Does the Risk Profile of the driver change?

**AI enables Insurance Companies to make these risk predictions at scale on huge volumes of data which would be very difficult for human beings to do.** This helps Insurance Companies to fine tune their business and adjust their pricing based on the risks involved.

- Let's now look at In-Process Risks. The best way to understand this would be through the example of Credit Card companies and Payment Systems where fraud is an inherent in-process risk. Companies like Visa, Mastercard etc have extremely sophisticated systems that keep track of transactions, identify them as potentially fraudulent, flag and stop such transactions and alert card users. These Fraud Analytics systems are augmented by AI to be effective. Mastercard experiences 200 fraudulent attempts per minute! In 2018-19 Mastercard prevented US\$ 52 billion worth of fraudulent transactions in its network. When a company operates at such a massive scale, AI is a critical part of your anti-Fraud arsenal.
- Finally, let's move to **Post-facto Risk Analysis**. After the Risk event occurs, it is important to investigate it so as to analyze how and why it took place. AI algorithms and ML can help test the system and identify vulnerabilities that need to be plugged to prevent recurrences of similar risk incidents in the future.



**We can also examine some other areas of Risk Management where AI is playing a key role:**

- In today's world, Social Media is a very important element when you want to assess the **Credit Risk** of your customers and prospects. Every company typically leaves digital footprints on the web and on Social Media. Since Social Media is a vast area to mine and track, AI has an important role to play. Typically AI modules and algorithms can actually dig through large amounts of data on Social Media to find red flags about your customers, distributors, dealers or prospects.
- AI is also very useful in gauging **Customer Sentiment**. Many proactive companies use AI to assess Customer Sentiment by mining through vast amounts of customer feedback and complaint data. By doing Customer Sentiment Analysis on an ongoing basis using

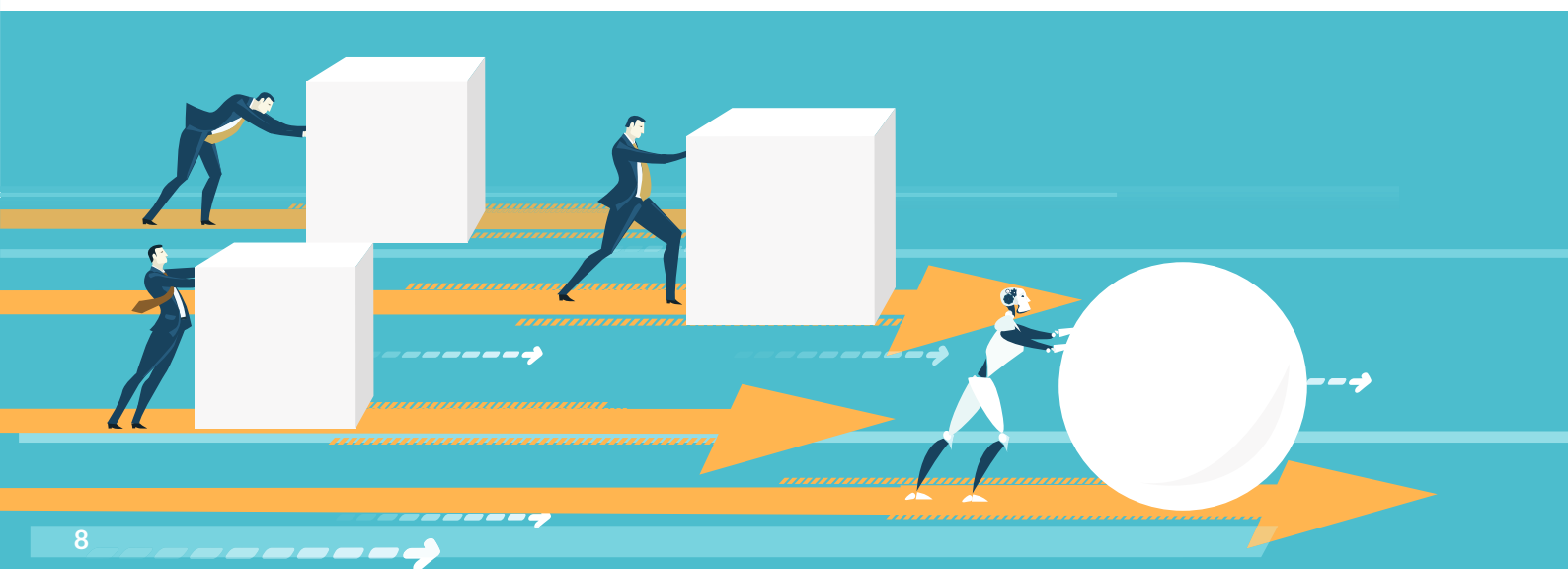
a dynamic feedback loop, such companies can be more proactive and responsive to customer needs. They are often able to detect and manage problems before they blow up.

- Another area of great importance is to protect companies against **Cyber Attacks**. Today we live in a world where we are constantly communicating digitally. We are being bombarded with electronic messages left, right and centre from around the world on all our devices. In this always-on, always-connected world, we are vulnerable to cyber attacks.

It takes a machine to beat a machine and detect cyber threats. In a lot of the technology tools or email solutions that we use, there are several strong AI layers that are able to detect intrusions, defend against them and allow users to block attackers and respond appropriately. AI has very significant uses in Cyber Security.

*“It takes a machine to beat a machine.”*  
- Samiran

*“AI enables companies to make these risk predictions at scale on huge volumes of data which would be very difficult for human beings to do.”*  
- Vishnu







## It is often stated by a lot of people that real world deployment of AI tools actually degrades the performance of AI. What has been your experience of working with AI in Credit Bureaus? How useful and accurate is AI when deployed in a real world environment?

- Credit Bureaus are excellent testbeds for developing AI systems because these systems typically require a lot of data. It is always better to develop AI systems on top of good quality data and Credit Bureaus are perfect for this because:
  - Credit Bureaus get data from almost the entire banking industry
  - The quantum of data available is very large
  - The data is representative of the broad cross section of borrowers and bank products. Hence, when you look at the data at a Credit Bureau level, there is no skew and this helps reduce bias to a great extent
- When the issue of performance degradation in AI systems is examined, one realizes that this is a typical problem impacting any modelling exercise. When we do a data modelling exercise or run an ML algorithm, the model is always developed on a certain set of data and is then tested on some sample data. A good model is one which behaves more or less equally on both sides i.e., on the development data as well on the test data. Over time, the performance of a model does get degraded; therefore, for AI to work well it is important that the system is continuously fed with real life data so as to prevent model degradation. This is why having a stable source of good quality data is important for any organization that is contemplating the implementation of AI systems.

Hence, AI works quite well in a Credit Bureau setting.

*Good AI Systems are dynamic in nature, never static.*

- Samiran

For example, if a Bank deploys a particular AI system, it is never a static solution. The data has to continuously flow through the pipeline to the AI system. The system, in turn, learns by itself and a lot of different patterns emerge. Hence, AI systems are dynamic in nature, never static.



## What are some of the key prerequisites that a Company or a Bank should have in place before it can deploy AI tools to manage risk?

Interestingly, a lot of the prerequisites are not technology related:

- The first and probably the most important prerequisite is the **Data**; the largest amount of time in any AI project is spent in fixing and cleaning data, finding the right data to analyze and arranging for a stable flow of data in the future. Unless the data piece is fixed, you cannot commence a robust AI program.
- **Talent** is equally critical. You have to have the right kind of talent on board in order to implement an AI solution. In case you are outsourcing a large part of the deployment, you still need an expert in your team to ensure that the solutions being proposed by the vendor have the desired impact and the ROI justifies the amount of investment.
- Developing the appropriate **Culture** is a prerequisite for a successful AI system implementation. Having employees who feel threatened by AI systems is a sure shot recipe for disaster.

- As stated earlier, **Training** is vital and 50% of AI budgets actually go into training, at least in those companies that have deployed AI successfully.
- Identify some **Quick Wins** to generate support for the AI project. Usually picking a project that helps drive Sales growth helps everyone rally around quickly.
- Plan for **Scale** when beginning the exercise otherwise the AI initiative will only become a series of little showcases.
- Ensure that you have story-tellers on your team who are able to **Communicate** about the AI projects and their findings to decision makers and end-users in simple terms. AI and ML projects are usually implemented by technical employees, whether statisticians or programmers. They need to ensure that AI does not become a 'black box' which business people cannot relate to and hence do not accept.

*The first and most important prerequisite for setting up an AI program is Data.*

*- Samiran*

*Communicating simply and effectively about AI systems and their results to business people is a fine art which organizations must master. Otherwise AI systems and projects will remain the domain of geeks and will not gain acceptance across the broader organization.*

*- Vishnu*



**Accenture conducted its Global Risk Management study in 2019 based on a survey of nearly 700 Risk Management executives in banking, insurance and capital markets globally. Of these, only 11% of the Risk Managers described themselves as fully capable of assessing the risk associated with adopting AI across the organization. Do you agree with the hypothesis that Risk Managers will become less relevant because AI systems are going to do their jobs?**

- Risk Managers should have no fear or apprehensions of AI based Risk Management Tools. No AI Tools, Algorithms or Risk Management Systems can be built without Risk Managers. Any AI based Risk Management System, whether Anti Money Laundering (AML), Fraud Protection etc will have to be built with inputs from Risk Managers.
- The key challenge is that Risk Managers will need to understand what the technology is capable of and then provide their inputs so that the AI based Risk Management system can be designed to do what humans are incapable of doing, both in terms of speed and scale. They need to be able to push the system to its limits.
- Decisions around the Risk appetite of the organization and Risk Management strategy will continue to be taken by humans. Risk Managers will still need to take the business calls and provide feedback to the AI systems on a continuous basis.



- The relationship between the Risk Manager and the AI based Risk Management System is similar to that between a coach and a world-class athlete. The Risk Manager plays the role of a coach and pushes the system consistently to do more and perform better and faster.
- The reality is that AI systems will, at some point, need to be deployed in a company as it scales and becomes global. There is no need to fear AI systems; instead recognize that they are required and learn how to work with them.

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When Microsoft introduced its MS Office suite, some roles became redundant but a whole host of job opportunities were created. Similarly, AI systems will create a new set of opportunities in the Risk domain since human decision making will continue to play a pivotal role in Risk Management.  
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- Vishnu





## Can you share any examples of successful AI or ML based system deployment in the area of Credit Management for companies other than banks?

- Three key use cases for AI based Credit Risk Models in companies are Trade Credit Default Prediction, Payment Delay Prediction and Fraud Prevention.
- Generally speaking, the data capture mechanism and infrastructure in companies lags behind that of banks and credit bureaus. Hence, the availability of data for constructing Credit Risk Models is typically lesser in companies than in banks.
- Consequently, companies develop ML models for Credit Risk Management based on the limited internal and external data to which they have access. These models typically rely on heuristics (expert judgement based rules) and the data available. The deployment of AI based Credit Models in companies is expected to grow as they generate and capture more data. For example, E-commerce platforms are far more data-rich than brick and mortar companies and can hence rapidly deploy scalable AI models for Credit Risk Management.
- Companies that have tried to use plug-and-play, off-the-shelf AI models that are not suitably modified to their data constraints have not seen much success.

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*E-commerce platforms are far more data-rich than brick and mortar companies and hence can rapidly deploy scalable AI models for Credit Risk Management. This becomes a source of competitive advantage in a world where credit risks are high and margins are under pressure*

- Vishnu

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## Fraud detection is an important use case for AI in the banking and financial sector. Please share some examples of how AI can be used for preventing bank frauds.

Fraud detection is one of the most common use cases for AI systems in Credit Bureaus and Banks. There are several ways in which AI systems can be used in this regard:

- If a person has submitted a particular type of Know-Your-Customer (KYC) document, the AI system matches it with the KYC document that the same person has submitted to other banks. If the document does not match, it is flagged as a potentially fake document through which the person is trying to perpetrate fraud.
- Credit Bureaus and Banks have identified certain 'fraud profiles' based on the fraud data that exists in their systems. When a new application or profile comes in, the AI system compares the incoming profile to the existing 'fraud profiles' to check for 'fraud similars'. If there is proximity or similarity, the AI system red flags the incoming profile as a potential fraud and mentions the degree of the match. This profile is then passed on to the Fraud Control & Prevention Unit for further due diligence.
- Similarly, if the AI system detects abnormal online transactions (For example, from another country), the bank immediately sends an alert to the customer stating that the nature of the transaction does not match the typical transaction type. It then requires the customer to self-authenticate and confirm the transaction again before it can be processed.
- Banks and financial institutions also deploy Generative Adversarial Networks (GANs) which are specialized neural networks for helping in Fraud Prevention and strengthening Information Security. Two GANs are usually pitted against each other to identify weaknesses within Fraud Risk Management and Anti Money Laundering (AML) surveillance systems. One GAN plays the role of the Challenger and the other is the Defender. If the Challenger wins, the Bank trains the Defender to protect it better the next time; if the Defender wins, then the Challenger is made even more complex to figure out different ways of beating the Bank's Defender. This is similar to ethical hacking, but is being done by machines now.

Banks and other high frequency trading platforms are using GANs to learn about how to prevent frauds, because they do not know where the next attack is going to come from. They are trying to figure out how to protect themselves by pitting AI models against each other.



**Very often you come across vendors marketing Risk Prediction Models that claim to be 90-95% accurate. Would you agree with the statement that when very high levels of accuracy are promised by AI based Risk Prediction models, it indicates that they are not likely to succeed in the real world? We know that if not carefully managed, an algorithm will go to extraordinary lengths in order to find patterns and data that are in line with the outcome that it is trying to predict – though these patterns may be completely nonsensical and appear to work only during model development. How do you resolve such problems while building a Risk Prediction Model?**

In Model building, the problem referred to above is called 'Overfitting'. In this situation, the Model understands the data so well that it could call it 100% accurate, but when the Model is deployed in real life it fails miserably. There are several ways of preventing 'Overfitting':

- Large data sets should be used both for development of the Model and its testing.
- Model developers generally remove a few variables intentionally so as to cause a slight deterioration in the performance of the system and to ensure that it does not over-learn the pattern.
- Other statistical techniques such as Ridge Regression are also used to moderate the performance of the Model being developed.
- Experienced Model developers truncate the number of 'epochs' so that the AI/ ML model does not 'over-learn'. In ML, an epoch is a term that indicates the number of cycles of the entire training dataset that the ML algorithm has completed. The number of epochs is the number of iterations that the model has completed on the whole training data set.





## There is an argument that AI based Risk Models are usually based on past data and hence cannot predict Black Swan events. Would you agree with this argument? If yes, why?

- As we know, a Black Swan event is an unpredictable event; one that is beyond what is normally expected of a situation. By their very definition, Black Swan events are extremely rare and have potentially severe consequences.
- A lot of people have called the current Covid pandemic a 'Black Swan Event.' However, considering the above definition, the Covid pandemic is not a Black Swan event. Nassim Nicholas Taleb who coined the term has stated this unequivocally because it was predicted that a pandemic such as Covid could occur. In fact, the 'Global Trends 2030' report published in **2012** by the National Intelligence Council in the US clearly states,

**“No one can predict which pathogen will be the next to start spreading to humans or when or where such a development will occur. An easily transmittable, novel, respiratory pathogen that kills or incapacitates more than 1% of its victims is among the most disruptive events possible. Such an outbreak could result in millions of people suffering and dying in every corner of the world in less than six months.”**

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*While AI based Risk Models may not be able to predict Black Swan events, companies that deploy such models based on the risk variables that they currently know about, usually are at an advantage in planning for adverse events. By planning for multiple adverse scenarios, they are able to develop tools and organizational systems that give them a little more control over potential outcomes when a negative event actually occurs.*

- Samiran

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## What skillsets should young Risk Managers acquire to stay ahead of the AI curve in the Risk Management domain? Any courses or focus areas that you would suggest to them?

- The first thing that young Risk Managers should do is to be excellent at their own job of identifying, managing and mitigating risk. It is your subject matter expertise that differentiates you and gives you value. Therefore, before going down the path of developing AI models and technology, you should master Risk Management completely. Once you understand your domain thoroughly, technology and AI can be applied to it. There are several courses available on Coursera, Udemy etc., most of them free, and these will certainly add value to you.
- In the Risk Management domain, there will always be two types of practitioners:
  - There are those Risk Managers who only want to use some of the AI tools without worrying about the technology behind them. For such people, the key skillsets are understanding the assumptions that go into the Model and interpreting its output. Another important skill for these Risk Managers is communicating the risks clearly and simply to the business team.
  - Other Risk Managers want to get under the hood of the car and understand the science behind building the AI/ML Risk Models. This is a multi-disciplinary domain covering mathematics, statistics, computing etc. There are several courses available on these topics both at the undergraduate and graduate level. Equally, a plethora of online certifications are on offer from institutions around the world.





Rubix Data Sciences Pvt. Ltd. helps you to take prudent credit risks, build a robust supply chain and monitor compliance for your business partners in India and around the world. Set up by highly experienced Risk Professionals who have worked extensively in the credit, legal and supply chain information domains, Rubix has been recognized as part of the 'Start-up India' scheme by the Department of Industrial Policy & Promotion (DIPP), Government of India, in 2018.

The Rubix platform and its suite of reports, products and services are based on its extensive database of structured and unstructured data aggregated from over 120 sources, customized predictive analytics and proprietary technology. Through its solutions, Rubix provides deep insights to Credit, Risk, Supply Chain and Compliance professionals, facilitating quicker and more effective decision-making.



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