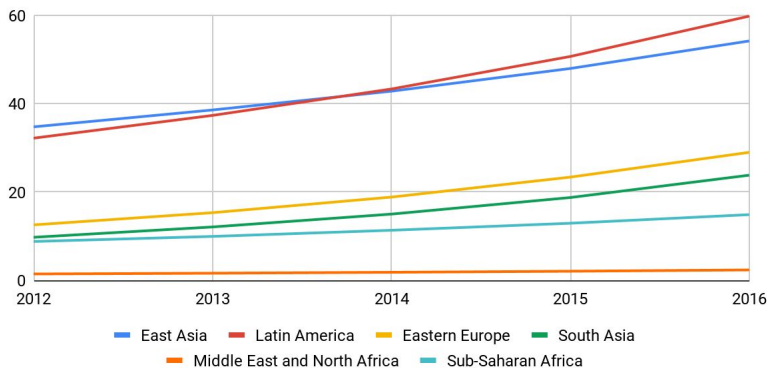


Technologies

1. Credit Scoring Algorithms, which predominantly use Data Analysis and Machine Learning. This includes: use of data generated via users' phones; use of small business transaction and accounting data; alternative sources analysis; behavioral and psychometric testing. Credit Scoring Algorithms are unique for companies providing loans and credits.
2. Personal Financial Management, which includes: proactive alerts and notifications; overdraft predictions; savings alerts or automation. Personal Financial Management makes use of the common directions of AI and ML development in the FinTech Industry and is not unique.

Global Microfinance Market by Geographical Segmentation 2012-2016 (US\$ billion)



A credit score is a quantitative representation meant to measure individuals' creditworthiness, used by banks for making decisions relating to credit applications. Traditionally, banks use logistic regression models to predict customer's likelihood of credit delinquency over the next several years. These models are intuitively attractive because the process of how they arrived at their answers and output is easily understandable and explainable. However, linear regression models are encumbered by the fact that they use linear analysis, which faces an uphill battle when the volume and diversity of data increases. They have a hard time dealing with large amounts of data. Machine learning has garnered great interest and enthusiasm over the past several years for its ability to deal with very large and diverse sets of data efficiently. Because they are not constrained by the linear methods common in traditional statistical analysis, they are able to model, classify and predict non-linear interactions between input variables, and could be used in the context of credit scoring to find hidden correlations in customer credit data. Some variants like unsupervised learning models can even discover new features previously uncategorized in customer populations.

However, machine learning has not received widespread adoption by retail credit institutions because they are black boxes, in the sense that the way in which they arrive at their answers is not easily understandable or explainable. Because regulators insist that lenders be able to explain their decisions, this is not optimal for traditional credit institutions.

14 Companies in Financial Inclusion Industry

Category: Loans

Name	Web Site	Description	Funding Amount	AI Type	Number of Customers	Number of Employees	Based in
Absa Bank	www.absa.co.za/	Absa provides banking and financial products and services to personal, commercial, and corporate customers primarily in South Africa.	n/a	Machine Learning	1300000	42 000	Cambodia
BankBazaar	www.bankbazaar.com/	BankBazaar.com is a neutral online marketplace that gives instant customized rate quotes on loans and insurance products.	103000000	Machine Learning	n/a	1000+	India
Bradesco	http://www.bradesco.com.br	Financial services company in Brazil.	n/a	Chatbot	11600000	108 794	Brazil
Branch International	www.branch.co/	Branch is a new way to access credit over a smartphone in emerging markets.	84674000	Machine Learning	n/a	252	United States
CompareAsiaGroup	www.compareasiagroup.com/	CompareAsiaGroup is a personal finance management platform committed to help people across Asia to save time and money.	96000000	Machine Learning	1000000	233	Hong Kong
Compara online	comparaonline.com.br	ComparaOnline is the leading price comparison site for financial & insurance services in Latin America	28050000	Machine Learning	n/a	45	Chile
CreditVidya	www.creditvidya.com/	CreditVidya offers alternate data based credit scores for underwriting first time borrowers using machine learning and big data analytics.	7000000	Machine Learning	n/a	101	India
Harvesting	www.harvesting.co/	Connecting finance with farmers.	n/a	Machine Learning, Computer Vision	n/a	n/a	United States

14 Companies in Financial Inclusion Industry

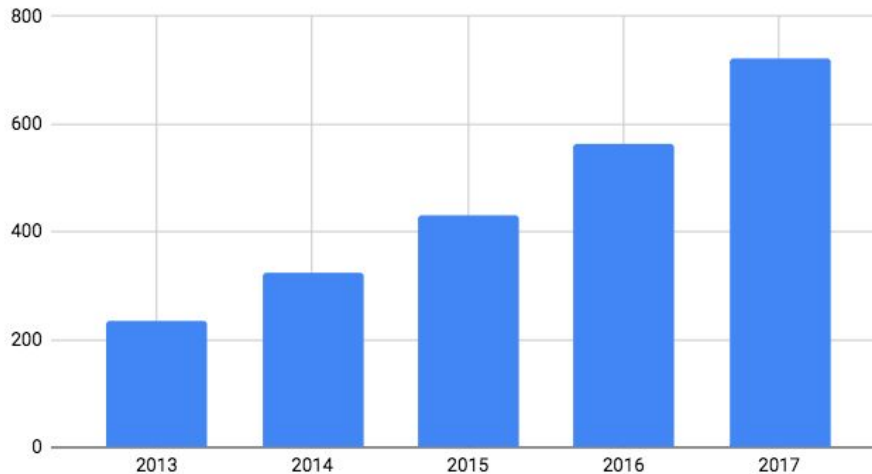
Category: Loans

Name	Web Site	Description	Funding Amount	AI Type	Number of Customers	Number of Employees	Based in
Kreditech Holding	www.kreditech.com/	Kreditech uses machine-learning technologies to provide access to better credit for the underbanked	503328000	Machine Learning	n/a	251-500	Germany
Lenddo	www.lenddo.com	Lenndo is a technology company that uses non-traditional data to provide credit scoring and verification.	6000000	Data Analysis, Computer vision	n/a	51-100	Hong Kong, Asia
Oakam	www.oakam.com/en	Oakam is a digital micro-lender for the UK's unbanked and underbanked consumers.	45000000	Machine Learning	n/a	109	United Kingdom
Paylatr	www.paylater.ng/	is a simple, entirely online lending platform that provides short-term loans in Nigeria to help cover unexpected expenses or urgent cash needs.	n/a	Machine Learning	420000	177	Nigeria
Shubham	www.shubham.co/	SHDFC Is an affordable housing lender headquartered in New Delhi targeting low-income, self-employed families in urban and semi-urban India.	99367000	ChatBot	800,000	n/a	India
Tala	tala.co	Tala is mobile technology and data science company that is revolutionizing financial services in emerging markets.	109200000	Machine Learning	n/a	722	United States
UangTeman	uangteman.com/	UangTeman.com is an online lending service that provides instant short-term microcredit to Indonesian consumers.	127300000	Machine Learning	1000000	250	Indonesia

Payments

AI is growing to play a pivotal role in mobile and peer-to-peer payments, which remains one of the largest FinTech applications globally, as well as by traditional banks to facilitate payments and transfers as well. A growing number of banks are using AI to secure client identities and to execute customer service inquiries via chatbots. Meanwhile, on the back end AI are increasingly used to automate processes and to detect problems preemptively through data analysis and machine learning. The most predominant use cases for AI in payments specifically include fraud detection, KYC and AML. A global economic crime survey conducted by PwC in 2016 estimates that one in three organizations experience economic crime. New ways to commit fraud and new ways to combat it co-evolve with the ongoing evolution of information technology. The use of data analysis to detect fraud is industry standard and falls into two main classes: statistical analysis and AI.

Global Mobile Payments Volumes (in Billion USD)



Subclasses of statistical analysis for fraud detection include: data preprocessing (error detection, validation and correction); models and probability distributions of business activities; user profile computation; time series analysis; clustering and classification to identify associations between variables; and matching algorithms to detect behavioural anomalies in transaction data.

Subclasses of AI for fraud detection include: data mining to classify, cluster and segment data, the use of expert systems to detect fraud by encoding human expertise in the form of rule-sets, pattern recognition to detect behavioural anomalies in an unsupervised manner, machine learning to detect unseen associations and hidden features indicative of fraud, and neural networks trained to detect suspicious transaction data.

10 Companies in Financial Inclusion Industry

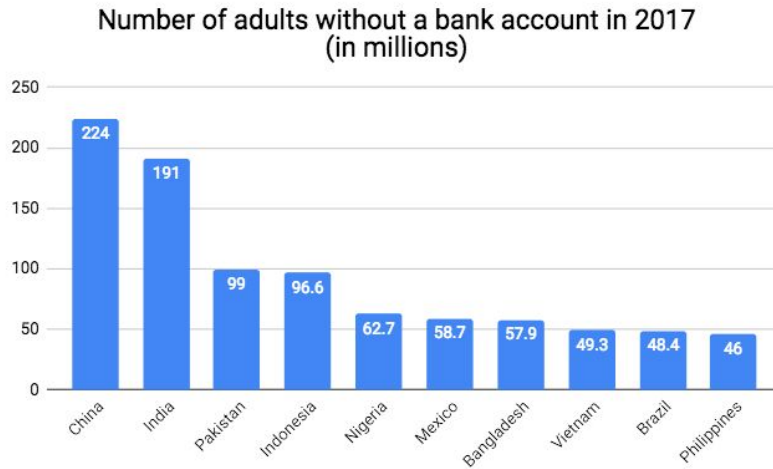
Category: Payments

Name	Web Site	Description	Funding Amount	AI Type	Number of Customers	Number of Employees	Based in
BanQu	www.banquapp.com/	BanQu seeks to provide financial inclusion for the un/underbanked of the world using blockchain technology	2600000	ChatBot, Bio-identification, Blockchain	n/a	12	United States
Baobab	www.baobab.bz/	Baobab is a digital finance company focusing on financial inclusion in Africa and China.	86247000	Bio-identification	100000	128 branches and 3000 staff	France
Billon Group	www.billongroup.com	Billon Group is a tech company that uses blockchain to create next-gen solutions that reimagine the flow of regulated money and data.	12048000	Blockchain	n/a	91	United Kingdom
CCAvenue	www.ccavenue.com/	All the Avenues solutions – CCAvenue, ResAvenue, EventAvenue and HotelsAvenue are designed and created exclusively for Avenues using three	9000000	Data Analysis	n/a	231	India
Go-jek	www.go-jek.com/	Go-Jek specializes in ride-hailing, logistics, and digital payments.	205000000 0	Machine Learning	n/a	3,282	Indonesia
Juspay	juspay.in	Juspay is the simplest way to make online payments in India.	5800000	Data Analysis	n/a	122	India
M-Pesa	www.mpesa.in/	M-Pesa is a fast, secure and convenient way to transact on mobile brought to you by Vodafone.	n/a	ChatBot	23400000	n/a	India
matchmove	www.matchmove.com/	MatchMove Pay is Singapore's fastest growing financial technology company providing innovative enterprise payments solutions	30000000	Data Analysis	20000000	100	Singapore
Recarga Pay	recargapay.com.br	RecargaPay is the leading mobile payments platform & wallet of Brazil	28600000	Machine Learning	16000000	84	Brazil
remitty	www.remitly.com/us/en	Remitty is a mobile payments service that enables users to make person-to-person international money transfers from the United States.	197600000	ChatBot	n/a	454	United States
VeriTran	www.veritran.com/	VeriTran is a software solution provider for Secure Digital Banking and Mobile Payments solutions for the Financial Services industry.	n/a	Data Analysis	10000000	87	Argentina

Savings

Researchers have shown that machine learning can be effectively applied to analyze and classify risky spending behaviour.

Many of the same tools and techniques used to rank individuals' creditworthiness through a risk-based analysis of spending behaviour can also be applied in order to help clients save more effectively and identify patterns of spending that are detrimental to their own objectives in terms of effective monetary savings. A mounting effort by financial institutions to shift toward the adoption of digital banking platforms and from transactional platforms to engagement platforms is enabling clients to better manage their own finances.



Source: World Bank

Furthermore, digital banking platforms provide a foundation upon which more sophisticated, interactive and engaging personal financial management tools, like spending analysis charts, savings goals visualization and budget tools can be seamlessly integrated.

Now, advances in AI that have enabled a large majority of financial institutions to gain access to ML and other AI capabilities is creating an ecosystem poised for the introduction of AI-driven personal financial management systems.

One of the most prominent use-cases for AI in personal finance management is the use of chatbots and interactive assistance platforms, which is thought to increase client engagement.

A more involved use-case is the use of machine learning technology in order to analyze clients' spendings and savings patterns and to identify ways in which they could spend in order to save more effectively.

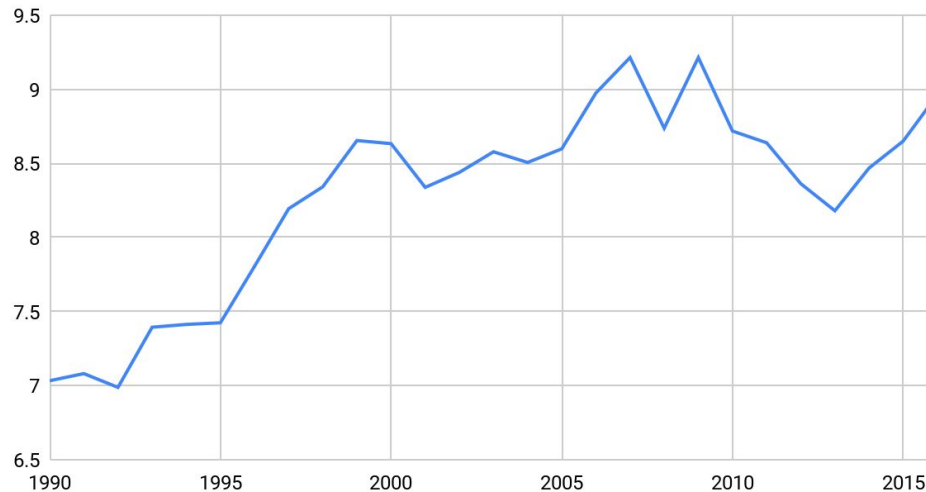
5 Companies in Financial Inclusion Industry Category: Savings

Name	Web Site	Description	Funding Amount	AI Type	Number of Customers	Number of Employees	Based in
Guiabolso	www.guiabolso.com.br/	GuiaBolso is Brazil's leading personal finance platform, with over 4M users of its #1 Finance app and consumer credit marketplace.	74000000	Machine Learning	n/a	182	Brazil
Kaleidofin	kaleidofin.com/	A fintech platform.	2800000	Machine Learning	600000000	16	India
Mambu	www.mambu.com/	Mambu is the leading SaaS banking engine powering innovative lending and deposits.	12650000	Data Analysis	n/a	143	Germany
Nubank	nubank.com.br/	Nubank provides financial services for Brazilian users.	496986000	Data Analysis	3000000	850	Brazil
Trulioo	www.trulioo.com/	Trulioo, an online identity verification company, enables trust and safety online by powering fraud and compliance systems worldwide.	21000000	Data Analysis, ChatBot	n/a	85	Canada

Insurance

There are very few insurance companies in developing countries that are using machine learning and AI in their activities. For the most part the use of these technologies by insurance companies is limited to developing predictive analytics algorithms for insurance risk by analyzing a large amount of data associated with individuals classified as high-risk historically, in order to tease out as-yet unnoticed correlations. While insights can be gleaned using techniques common in big data analytics, the use of machine learning (and deep learning in particular) can yield more impressive results because they have come to be recognized for their ability to neutralize the effect of statistical noise and outliers, and in their ability to develop highly accurate predictive models based on smaller amounts of data.

Insurance spending Total, % of GDP, 1990 – 2016



However, much as is the case with the use of machine learning techniques and technologies for credit score assessment, one of the largest barriers to this technology adoption by mainstream insurance companies is the black-box aspect of machine learning algorithms, and the fact that the specific way in which they arrive at their outputs is not clearly understandable and explainable.

Nonetheless, as the ability for machine learning to identify unseen associations between behaviour and to identify new features and characteristics impacting clients' insurability continues to grow and prove its capabilities, it is likely that the added benefits of machine learning will come to be recognized as net-useful enough to counterbalance those perceived issues and bottlenecks.

3 Companies in Financial Inclusion Industry Category: Insurance

Name	Web Site	Description	Funding Amount	AI Type	Number of Customers	Number of Employees	Based in
Arya.ai	arya.ai	Arya.ai is a Deep Learning platform offering multiple tools to build, manage and scale complex Deep Learning applications.	750000	Data Analysis, Machine Learning	n/a	11-50	India
Awamo	awamo.com	Mobile, biometric banking app for microfinance	2250000	Computer vision / bio-identification	n/a	28	Germany
Policybazaar	www.policybazaar.com/	Policybazaar is an insurance aggregator website that compares financial services from major insurance companies.	346600000	ChatBot	n/a	1860	India