

**CAPCO**

# Journal

THE CAPCO INSTITUTE JOURNAL OF FINANCIAL TRANSFORMATION

Operational

Seeing the Forest for the Trees  
– The Taming of Big Data

Sanjay Sidhwani

APEX 2016 AWARD WINNER

# FINANCIAL TECHNOLOGY

Download the full version of The Journal available at [CAPCO.COM/INSTITUTE](http://CAPCO.COM/INSTITUTE)

**#44**  
11.2016

# EMPOWERING THE [FINANCIAL] WORLD

Pushing the pace of Financial Technology, together we'll help our clients solve technology challenges for their business – whether it's capital markets in Mumbai or community banking in Macon.

We leverage knowledge and insights from our clients around the world:

**20,000**

clients in towns everywhere are becoming more efficient, modern and scalable.

**27 billion**

transactions processed help solve clients' challenges — big and small.

**\$9 trillion**

moved across the globe in a single year empowers our clients' communities to build storefronts, homes and careers.

**55,000**

hearts and minds have joined forces to bring you greater capabilities in even the smallest places.

Empowering the Financial World

FISGLOBAL.COM



# Journal

The Capco Institute Journal of Financial Transformation

Recipient of the Apex Award for Publication Excellence

## Editor

**Shahin Shojai**, Global Head, Capco Institute

## Advisory Board

**Christine Ciriani**, Partner, Capco

**Chris Geldard**, Partner, Capco

**Nick Jackson**, Partner, Capco

## Editorial Board

**Franklin Allen**, Nippon Life Professor of Finance, University of Pennsylvania

**Joe Anastasio**, Partner, Capco

**Philippe d'Arvisenet**, Adviser and former Group Chief Economist, BNP Paribas

**Rudi Bogni**, former Chief Executive Officer, UBS Private Banking

**Bruno Bonati**, Chairman of the Non-Executive Board, Zuger Kantonalbank

**Dan Breznitz**, Munk Chair of Innovation Studies, University of Toronto

**Urs Birchler**, Professor Emeritus of Banking, University of Zurich

**Géry Daeninck**, former CEO, Robeco

**Stephen C. Daffron**, CEO, Interactive Data

**Jean Dermine**, Professor of Banking and Finance, INSEAD

**Douglas W. Diamond**, Merton H. Miller Distinguished Service Professor of Finance, University of Chicago

**Elroy Dimson**, Emeritus Professor of Finance, London Business School

**Nicholas Economides**, Professor of Economics, New York University

**Michael Enthoven**, Board, NLF, Former Chief Executive Officer, NIBC Bank N.V.

**José Luis Escrivá**, Director, Independent Revenue Authority, Spain

**George Feiger**, Pro-Vice-Chancellor and Executive Dean, Aston Business School

**Gregorio de Felice**, Head of Research and Chief Economist, Intesa Sanpaolo

**Allen Ferrell**, Greenfield Professor of Securities Law, Harvard Law School

**Peter Gomber**, Full Professor, Chair of e-Finance, Goethe University Frankfurt

**Wilfried Hauck**, Chief Financial Officer, Hanse Merkur International GmbH

**Pierre Hillion**, de Picciotto Professor of Alternative Investments and Shell Professor of Finance, INSEAD

**Andrei A. Kirilenko**, Visiting Professor of Finance, Imperial College Business School

**Mitchel Lenson**, Non-Executive Director, Nationwide Building Society

**David T. Llewellyn**, Professor of Money and Banking, Loughborough University

**Donald A. Marchand**, Professor of Strategy and Information Management, IMD

**Colin Mayer**, Peter Moores Professor of Management Studies, Oxford University

**Pierpaolo Montana**, Chief Risk Officer, Mediobanca

**Steve Perry**, Chief Digital Officer, Visa Europe

**Derek Sach**, Head of Global Restructuring, The Royal Bank of Scotland

**Roy C. Smith**, Kenneth G. Langone Professor of Entrepreneurship and Finance, New York University

**John Taysom**, Visiting Professor of Computer Science, UCL

**D. Sykes Wilford**, W. Frank Hipp Distinguished Chair in Business, The Citadel

# WHAT ARE THE DRIVERS AND DISRUPTIONS THAT DETERMINE INNOVATION AND PROSPERITY?

CAN EVERY PROBLEM BE  
SOLVED WITH A QUESTION?  
YES, BUT NOT EVERY QUESTION  
HAS A SINGLE ANSWER.

The Munk School's Master of Global Affairs program is developing a new class of innovators and problem solvers tackling the world's most pressing challenges.

- > Tailor-made, inter-disciplinary curriculum delivering the best of both an academic and a professional degree.
- > Access to world-leading research in innovation, economic policy and global affairs.
- > International internships with top-tier institutions, agencies and companies that ensure students gain essential global experience.

**COME EXPLORE  
WITH US**

**BE A  
MASTER OF  
GLOBAL AFFAIRS**

[MUNKSCHOOL.UTORONTO.CA](http://MUNKSCHOOL.UTORONTO.CA)  
[MGA@UTORONTO.CA](mailto:MGA@UTORONTO.CA)

MUNK  
SCHOOL  
OF  
GLOBAL  
AFFAIRS



UNIVERSITY OF  
TORONTO



# Financial Technology

## Operational

- 8 **Opinion: Time is Risk: Shortening the U.S. Trade Settlement Cycle**  
John Abel
- 13 **Opinion: Where Do We Go From Here? Preparing for Shortened Settlement Cycles Beyond T+2**  
Steven Halliwell, Michael Martinen, Julia Simmons
- 17 **Opinion: Seeing the Forest for the Trees – The Taming of Big Data**  
Sanjay Sidhwani
- 20 **Development of Distributed Ledger Technology and a First Operational Risk Assessment**  
Udo Milkau, Frank Neumann, Jürgen Bott
- 31 **Digital Finance: At the Cusp of Revolutionizing Portfolio Optimization and Risk Assessment Systems**  
Blu Putnam, Graham McDannel, Veenit Shah
- 39 **Safety in Numbers: Toward a New Methodology for Quantifying Cyber Risk**  
Sidhartha Dash, Peyman Mestchian
- 45 **Potential and Limitations of Virtual Advice in Wealth Management**  
Teodoro D. Cocca
- 58 **Overview of Blockchain Platforms and Big Data**  
Guy R. Vishnia, Gareth W. Peters

## Transformational

- 67 **The Rise of the Interconnected Digital Bank**  
Ben Jessel
- 79 **The Emergence of Regtech 2.0: From Know Your Customer to Know Your Data**  
Douglas W. Arner, János Barberis, Ross P. Buckley
- 87 **U.S. Regulation of FinTech – Recent Developments and Challenges**  
C. Andrew Gerlach, Rebecca J. Simmons, Stephen H. Lam
- 97 **Strains of Digital Money**  
Ignacio Mas
- 111 **Banking 2025: The Bank of the Future**  
Rainer Lenz
- 122 **Banks Versus FinTech: At Last, it's Official**  
Sinziانا Bunea, Benjamin Kogan, David Stolin
- 132 **The Un-Level Playing Field for P2P Lending**  
Alistair Milne
- 141 **Blockchain in a Digital World**  
Sara Feenan, Thierry Rayna
- 151 **FinTech in Developing Countries: Charting New Customer Journeys**  
Ross P. Buckley, Sarah Webster

# Seeing the Forest for the Trees – The Taming of Big Data

**Sanjay Sidhwani** – SVP - Data Analytics, Synchrony Financial

The quandary of big data in recent years is similar to looking at a rainforest. There is so much of it, it is not an issue of seeing where and what it is, it is the fear of not seeing the forest for the trees. A rainforest has so many important ecosystems and tiny elements that may be hugely important, similar to big data. Many businesses have the challenge of seeing the thousands of types of data and identifying which elements of the data are important, and what to do about those elements.

At Synchrony Financial, we are a consumer finance company with a deep heritage in the retail sector. As such, we have a very large quantity of data, from several sources, which could include stock keeping unit (SKU) data on purchase transactions, marketing touchpoints, channel interactions, payment history, etc. Our data is not only credit card data normally gathered from an

issuer perspective, it is also data we gather to provide value to a retailer. As such, our data tools must be top notch – both scalable and flexible, in order to provide greater insights. And with the accumulation of data comes the responsibility of safeguarding the storage, access, and transfer of data, and ensuring the proper usage of key data elements. The security and protection of private customer data also needs to be a top priority.

In our experience, one strategy that is very helpful in identifying the important elements of the data available is data visualization. Data visualization tools can be crucial in identifying important factors, trends, and outliers in data. After these important factors are uncovered, the question becomes how to create programs that address the important items that can positively impact a business. This can be done

with agile methodology. We have found that programs that use agile methodology (created using the partnership of IT and analytics) can have a large impact on business success, as described in more detail below.

## **DATA VISUALIZATION – TRANSLATING DATA INTO ACTIONABLE INSIGHTS**

Data visualization can be a powerful tool to quickly observe trends and take action on the data observed. These tools make it easier for leaders across all disciplines to access key data without having to dig through thousands of data points and charts. It is more helpful to let the data tell a story through visual formats. These can include heat maps, infographics, and a combination

of pictures and graphs. Four types of tools are especially helpful:

- 1. Executive dashboards:** by translating data into a visual format, dashboards help users more clearly identify business insights, trends, and performance gaps, and to more easily share the results across the company. Once the dashboards are created, business leaders and analysts know what to look for and can easily interpret the data presented.
- 2. Pictures and graphs:** using pictures and graphs to portray data can sometimes be the differentiating factor in observing an insight that could otherwise go unnoticed. Paying attention to outliers and unique patterns can help highlight potential opportunities and areas of improvement.
- 3. Sensitivity modeling:** data visualization software can be used as an interactive tool for running sensitivity models on a particular variable. For instance, the impact of price changes on profitability, or the impact of weather changes on sales, can be assessed. Once these models are put into place, the risk of uncertainty can be reduced.
- 4. Heat maps:** another example of an effective way to display data is heat mapping. Individual values are represented in a tabular or graphical format in various colors to denote a range of performance from low to high. This visual representation allows users to hone in on where performance is strong, and where opportunities exist.

Data visualization tools are valuable to help organizations simplify large amounts of information into insights through a visual format. Letting the numbers tell the story often results in bringing insights to life and communicating them across the organization. And now that they see the data and understand its implications, the organization can impact change by using the agile process, as described below.

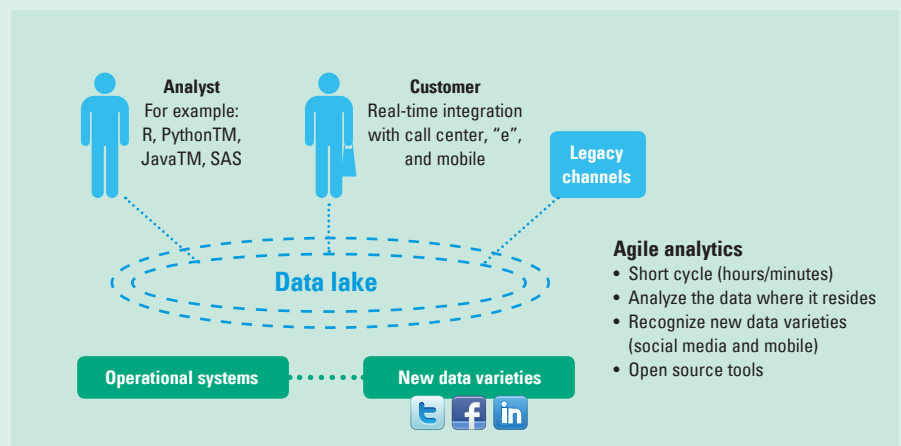
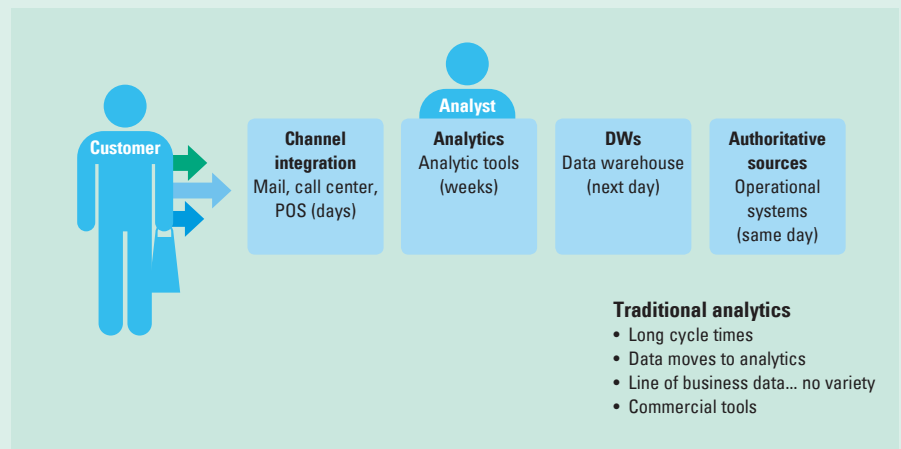
## THE AGILE PROCESS – USING THE PARTNERSHIP OF IT AND ANALYTICS TO IMPACT CHANGE

Creating a partnership between the analytics and IT teams is extremely important. Working together with a common vision and goal, the two departments can use the agile process to effectively produce workable solutions quickly and efficiently. By simplifying and speeding up the process of analyzing big data, companies are able to improve their marketing efforts and build better customer relationships.

Let us take a look at the traditional data model. When a customer engages with a business, whether to make a purchase, pay a bill, or make an inquiry, the interaction

and the resulting data are recorded in one of its operational systems. Traditionally, analytics processes have been separated from operational systems, because these processes demand considerable resources that can slow down the system and impact business. Consequently, businesses move data to a data warehouse platform so analysts can study the information without impacting the operational system. These commercial tools can be difficult to use and result in long cycle times.

The agile approach can solve these issues. With an agile process, the IT and analytics teams can work together toward a common business goal from the start. The analytics team works with IT to develop insights from big data and then use the data in a timely



manner – yielding improved customer personalization and more impactful marketing programs.

The agile process also allows for:

- 1. Minimization of data movement:** the goal of the process is to engage the customer at the moment of decision. To react with that kind of speed, you need a platform that minimizes the number of times you move the data. A data lake provides a scalable platform where data is ingested from the operational system very quickly, without moving to the analytics environment.
- 2. Availability of the tools:** open source tools are simpler and more affordable. Analysts run the data in real time and leverage tools in parallel to perform analysis.
- 3. Shorter cycle times:** performing analytics at scale requires a platform that is integrated with customer channels. This moves analytics closer to the customer, resulting in shorter cycle times and greater meaningful engagement.

Once an agile infrastructure is in place, there are essential steps for helping to harness the power of that data. First, make the implication of the data clear – not just to the analysts, but also to key stakeholders. A data platform can be used for both “push” and “pull” reporting on key business metrics so performance of your business can be tracked.

Data in today’s world is ubiquitous. Some is clear and definable – like a specific tree in a forest. Others are more unstructured and free flowing – the eco-system and co-relationships, for instance. In order to interpret the data and have an impact, data visualization can be used to see specific issues or trends, and the agile process can be used to provide the solutions and immediacy required to provide the solutions.



# FINANCIAL COMPUTING & ANALYTICS STUDENTSHIPS

## Four-Year Masters & PhD for Final Year Undergraduates and Masters Students

As leading banks and funds become more scientific, the demand for excellent PhD students in **computer science, mathematics, statistics, economics, finance** and **physics** is soaring.

In the first major collaboration between the financial services industry and academia, **University College London, London School of Economics, and Imperial College London** have established a national PhD training centre in Financial Computing & Analytics with £8m backing from the UK Government and support from twenty leading financial institutions. The Centre covers financial IT, computational finance, financial engineering and business analytics.

The PhD programme is four years with each student following a masters programme in the first year. During years two to four students work on applied research, with support from industry advisors. Financial computing and analytics encompasses a wide range of research areas including mathematical modeling in finance, computational finance, financial IT, quantitative risk management and financial engineering. PhD research areas include stochastic processes, quantitative risk models, financial econometrics, software engineering for financial applications, computational statistics and machine learning, network, high performance computing and statistical signal processing.

The PhD Centre can provide full or fees-only scholarships for UK/EU students, and will endeavour to assist non-UK students in obtaining financial support.



Imperial College  
London

## INDUSTRY PARTNERS

### Financial:

Barclays  
Bank of America  
Bank of England  
BNP Paribas  
Citi  
Credit Suisse  
Deutsche Bank  
HSBC  
LloydsTSB  
Merrill Lynch  
Morgan Stanley  
Nomura  
RBS  
Thomson Reuters  
UBS

### Analytics:

BUPA  
dunnhumby  
SAS  
Tesco

## MORE INFORMATION

**Prof. Philip Treleven**  
Centre Director  
[p.treleven@ucl.ac.uk](mailto:p.treleven@ucl.ac.uk)

**Yonita Carter**  
Centre Manager  
[y.carter@ucl.ac.uk](mailto:y.carter@ucl.ac.uk)

[financialcomputing.org](http://financialcomputing.org)

+44 20 7679 0359

Layout, production and coordination: Cypres – Daniel Brandt, Kris Van de Vijver and Pieter Vereertbrugghen

© 2016 The Capital Markets Company, N.V.

De Kleetlaan 6, B-1831 Machelen

All rights reserved. All product names, company names and registered trademarks in this document remain the property of their respective owners. The views expressed in The Journal of Financial Transformation are solely those of the authors. This journal may not be duplicated in any way without the express written consent of the publisher except in the form of brief excerpts or quotations for review purposes. Making copies of this journal or any portion thereof for any purpose other than your own is a violation of copyright law.

# Centre for Global Finance and Technology

The Centre for Global Finance and Technology at Imperial College Business School will serve as a hub for multidisciplinary research, business education and global outreach, bringing together leading academics to investigate the impact of technology on finance, business and society.

This interdisciplinary, quantitative research will then feed into new courses and executive education programmes at the Business School and help foster a new generation of fintech experts as well as re-educate existing talent in new financial technologies.

The Centre will also work on providing intellectual guidance to key policymakers and regulators.

“I look forward to the ground-breaking research we will undertake at this new centre, and the challenges and opportunities posed by this new area of research.”  
– Andrei Kirilenko, Director of the Centre for Global Finance and Technology

# **CAPCO**

**BANGALORE  
BRATISLAVA  
BRUSSELS  
CHICAGO  
DALLAS  
DÜSSELDORF  
EDINBURGH  
FRANKFURT  
GENEVA  
HONG KONG  
HOUSTON  
KUALA LUMPUR  
LONDON  
NEW YORK  
ORLANDO  
PARIS  
SINGAPORE  
TORONTO  
VIENNA  
ZÜRICH**