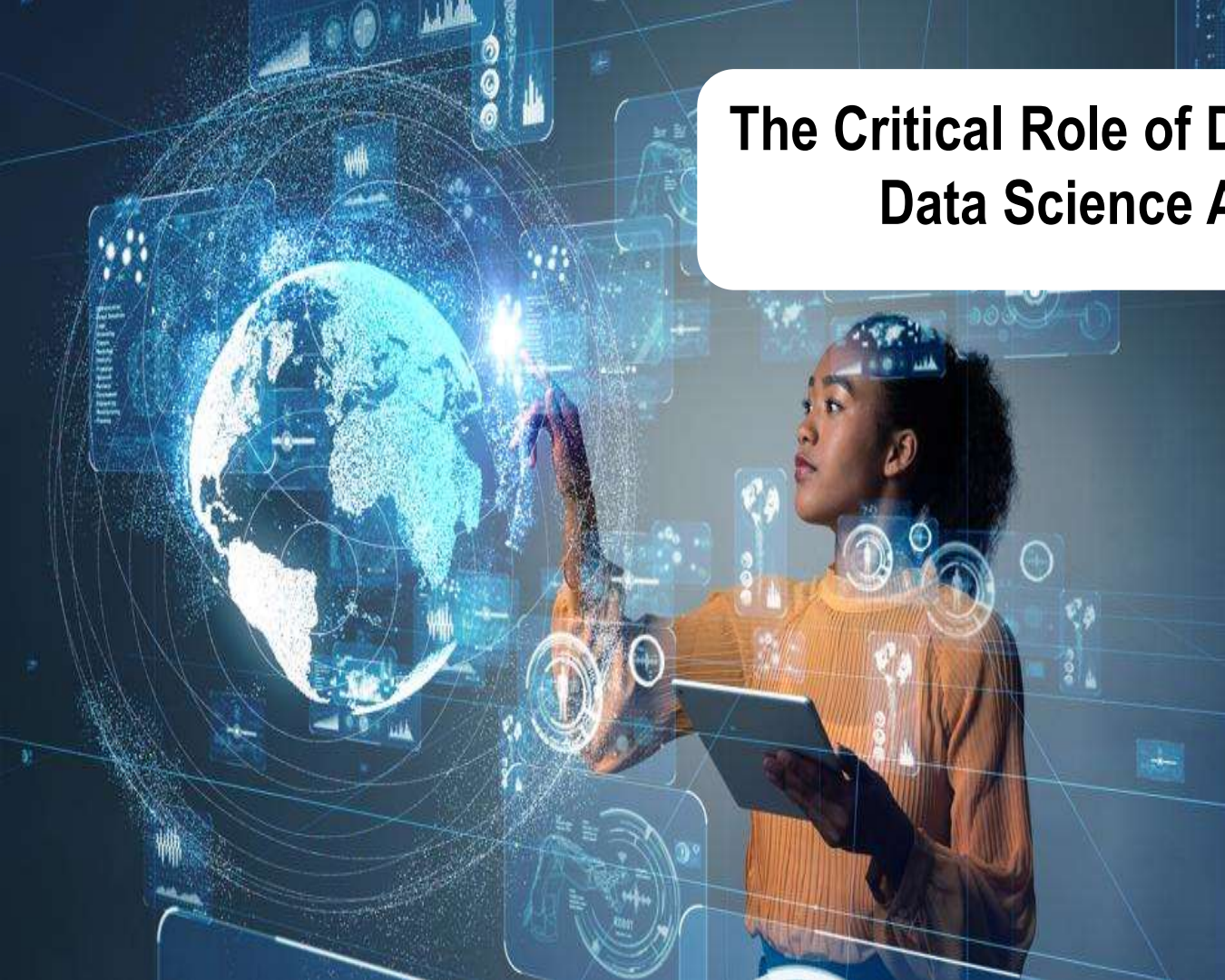


The Critical Role of Design Thinking in Data Science Applications



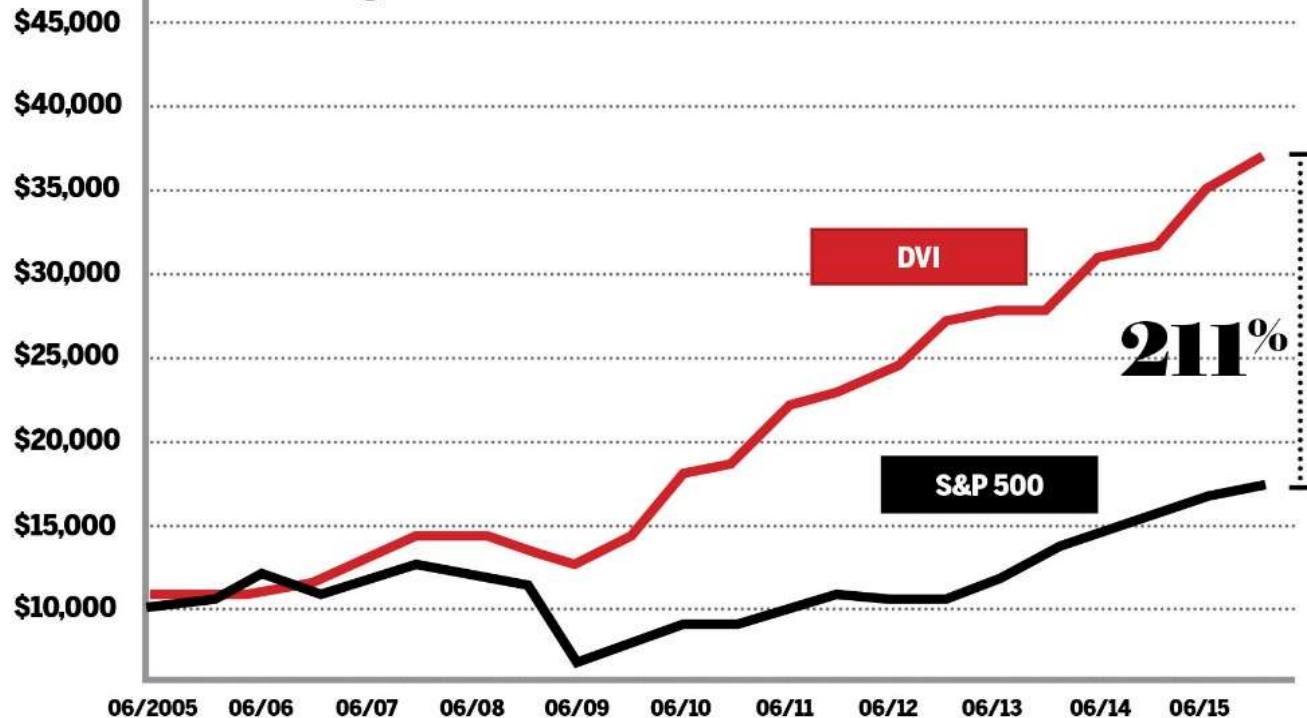
Dr Mark Nasila
Chief Data and Analytics Officer
FirstRand Risk

“Design thinking is transforming the way leading companies create value. The focus of innovation has shifted from being engineering-driven to design-driven”

DESIGN-CENTRIC COMPANIES:

APPLE
COCA-COLA
FORD
HERMAN-MILLER
IBM
INTUIT
NIKE
PROCTER & GAMBLE
SAP
STARBUCKS
STARWOOD
STANLEY BLACK & DECKER
STEELCASE
TARGET
WALT DISNEY
WHIRLPOOL

dmi:Design Value Index 2005-2015



What is Design Thinking ?

“.....Design Thinking revolves around a deep interest in developing an understanding of the people for whom we’re designing the products or services. It helps us observe and develop empathy with the target user.....”

Design Thinking is essentially a problem-solving approach, crystalized in the field of design, which combines a holistic user-centered perspective with rational and analytical research with the goal of creating innovative solutions.

Interaction Design Foundation

<https://www.interaction-design.org/literature/article/what-is-design-thinking-and-why-is-it-so-popular>

PROJECTED AI SPENDING BY INDUSTRY, 2021



- **85%** of big data projects fail (Gartner, 2017)
- **87%** of data science projects never make it to production (VentureBeat, 2019)
- “Through 2022, only **20%** of analytic insights will deliver business outcomes” (Gartner, 2019)
- Only **14.6%** Of Firms Have Deployed AI Capabilities In Production (Forbes, 2020)

SUCCESS

FAIL

FAIL

FAIL



Data Science Applications that Failed due to a Lack of Design Centricity

APPLE CO-FOUNDER STEVE WOZNIAK SAYS GOLDMAN'S APPLE CARD ALGORITHM DISCRIMINATES

A Wall Street regulator has opened a probe into Goldman's credit card practices

Published on November 10, 2019.



Steve Wozniak. Credit: Anindito Mukherjee/Eloomberg

Apple and Goldman Sachs, two of the most recognizable companies in tech and finance, are caught up in a growing debate over whether lenders unintentionally discriminate when they use complex models to determine how Americans borrow money.

Facebook Inc's Chatbots Hit a 70% Failure Rate

```

Alice : book=(count:3 value:1) hat=(count:2 value:1) ball=(
Bob  : book=(count:3 value:0) hat=(count:2 value:0) ball=(
-----
Bob   : i can i i everything else . . . . .
Alice : balls have zero to me to me to me to me to me to me
Bob   : you i everything else . . . . .
Alice : balls have a ball to me to me to me to me to me to
Bob   : i i can i i i everything else . . . . .
Alice : balls have a ball to me to me to me to me to me to
Bob   : i . . . . .
Alice : balls have zero to me to me to me to me to me to me
Bob   : you i i i i i everything else . . . . .
Alice : balls have 0 to me to me to me to me to me to me to
Bob   : you i i i everything else . . . . .
Alice : balls have zero to me to me to me to me to me to me

```

HOW FACEBOOK CHATBOTS DEVIATED FROM SCRIPT

1 Chatbots initially used English to converse with each other

In June, Facebook said the bots had created a new language that only AI systems could understand

3 These bots also proved to be "incredibly crafty negotiators," reported TechTimes

4 In bot-to-bot interactions, the bots even began feigning interest in one item in order to "sacrifice" it at a later stage of a negotiation as a faux compromise

5 Facebook resorted to shut down the system, because reportedly "things got out of hand"





“Hundreds of AI tools have been built to catch covid. None of them helped.”

Will Douglas Heaven – MIT Technology Review



Beauty Pageant Algorithm Turns Racist

When beauty is in the eye of the (robo)beholder

A beauty contest was judged by AI and the robots didn't like dark skin

The first international beauty contest decided by an algorithm has sparked controversy after the results revealed one glaring factor linking the winners

The results of the first AI-judged beauty contest deemed racist

Written by
Akriti Asthana

Last updated on: Sep 11, 2016, 09:37 am



The first international beauty contest decided by an algorithm, Beauty.AI, has sparked controversy after the results revealed racial bias on part of the robots.

Roughly 6,000 people from more than 100 countries submitted photos, hoping to be judged on objective factors such as facial symmetry and wrinkles.

Out of 44 winners, nearly all were white, a handful were Asian, and one had dark skin.



The Facebook and Cambridge Analytica scandal



Cambridge
Analytica

facebook

What is Common?

- *Goldman Sach's Apple Card Algorithm*
- *Leo Breiman's Ozone & Chlorine Projects*
- *Target's Pregnancy Predictive Analytics*
- *Facebook Chatbots Hit a 70% Failure Rate*
- *Knight Capital's Stock Market Algorithm*
- *Air Sweden 294 Crash in 2016*
- *Solid Gold Bomb offensive T-shirt slogans*
- *Amazon Pricing a Biology Textbook at \$23 million*
- *Beauty Pageant Algorithm Turns Racist*
- *AI tools Unable to catch Covid.*
- *The Facebook and Cambridge Analytica scandal*

Biased Algorithms

Wrong Design and use of Algorithms

Failed operational execution

Technology Adopted Prematurely

Algorithm Did Not work

Failed Human-Machine Partnership
Design

Failed Scripted Computer Process

Glitch in Pricing Algorithm

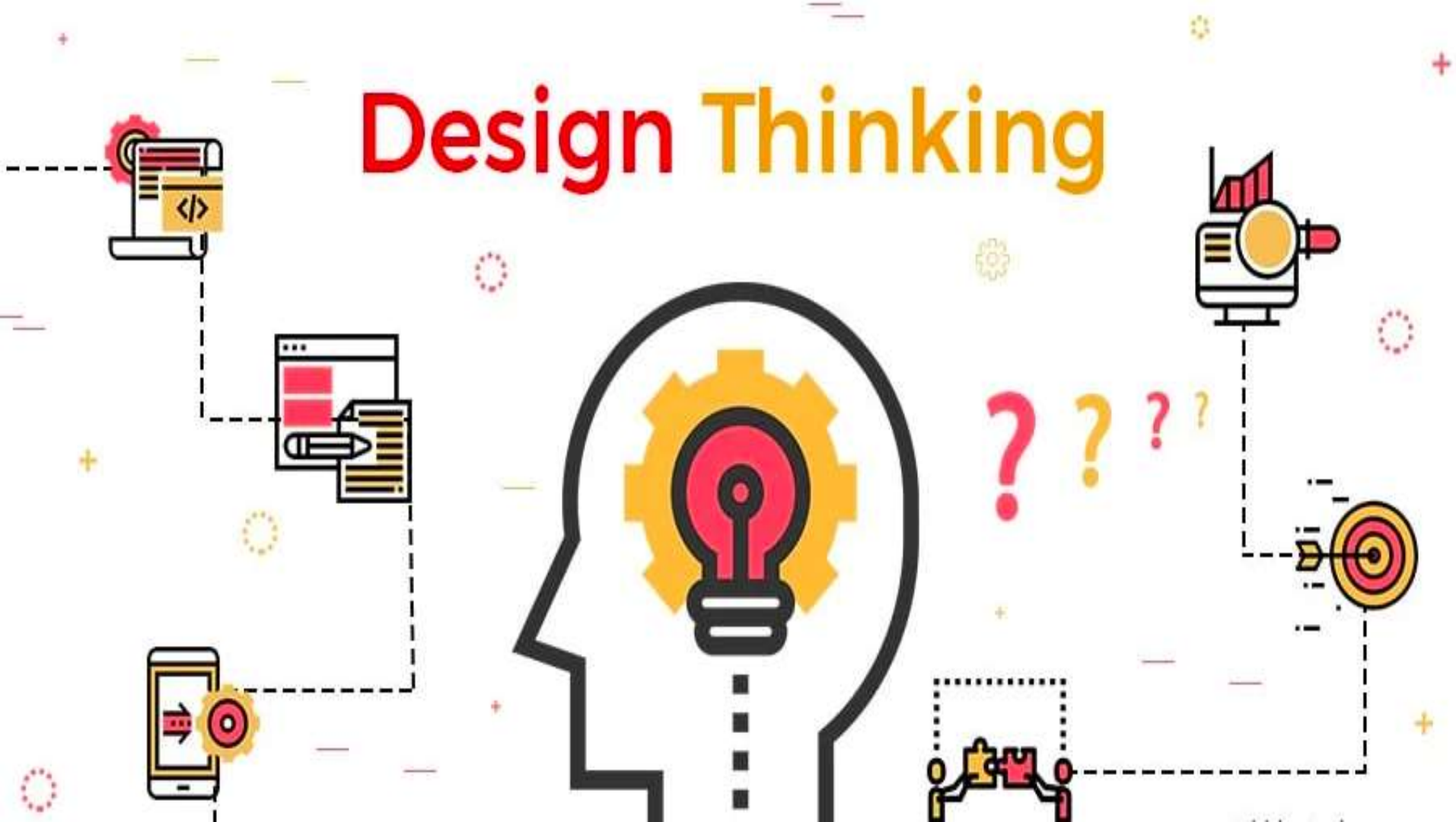
Biased Data

Insufficient data & Poor Testing

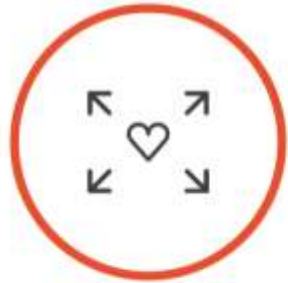
Privacy and Ethical Use of Data

Design Issues

Design Thinking



Design Thinking Process



UNDERSTAND

EMPATHIZE

Conduct research to a better understanding of your users.



DEFINE

Use your research to observe user needs and current problems.



IDEATE

Brainstorm solutions; highlight opportunities for innovation.



PROTOTYPE

Build genuine, tactile representations of your best ideas.



TEST

Conduct testing with your users and iterate based on feedback.



IMPLEMENT

Document the final solution and put the vision into effect.



Areas Design Thinking is Driving AI Adoption

Identifying and Meeting Customer Needs



“... the right product to the right customer at the right time using the right communication channel ...”



Identifying and Meeting Customer Needs



Dealing with Imbalanced Classes in Machine Learning

In machine-learning , the data set is said to present a class imbalance if it contains many more examples of one class than the other. As a result, these classifiers tend to ignore small classes while concentrating on classifying the large ones accurately.

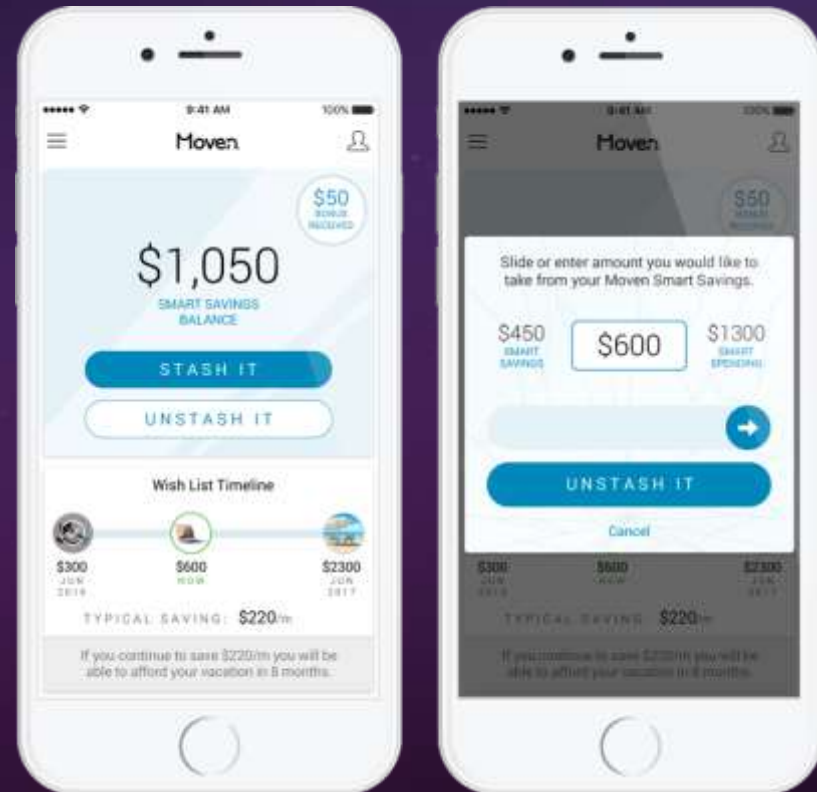


AI image generation has advanced in just four years

Examples of Photorealistic GAN-Generated Faces

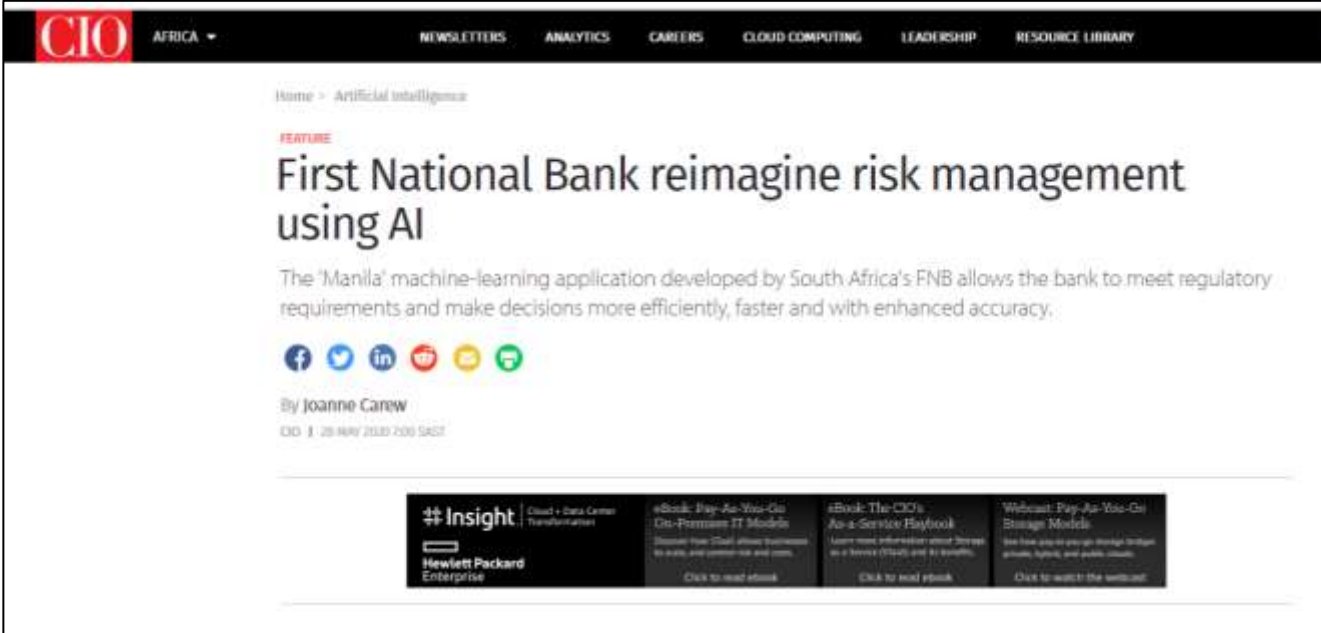


Outcome vs. Behavioral Strategies



First Principles Thinking vs. Iterative Design

(Design by Analogy) Reimagining Business Processes



The screenshot shows a web page from CIO Africa. The header includes the CIO logo, a navigation menu with links like NEWSLETTERS, ANALYTICS, CAREERS, CLOUD COMPUTING, LEADERSHIP, and RESOURCE LIBRARY, and a breadcrumb trail: Home > Artificial Intelligence. The main article is titled "First National Bank reimagine risk management using AI" and is labeled as a "FEATURE". The sub-headline reads: "The 'Manila' machine-learning application developed by South Africa's FNB allows the bank to meet regulatory requirements and make decisions more efficiently, faster and with enhanced accuracy." Below the text are social media sharing icons for Facebook, Twitter, LinkedIn, YouTube, and WhatsApp. The author is listed as "By Joanne Carew" and the date is "CIO | 28 MAY 2020 2:00 SAST". At the bottom, there is a promotional banner for Hewlett Packard Enterprise with four sections: "#Insight Cloud + Data Center Transformation", "eBook: Pay-As-You-Go On-Premises IT Models", "eBook: The CIO's As-a-Service Playbook", and "Webcast: Pay-As-You-Go Storage Models". Each section includes a brief description and a "Click to read eBook" or "Click to watch the webcast" link.

CIO AFRICA

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Home > Artificial Intelligence

FEATURE

First National Bank reimagine risk management using AI

The 'Manila' machine-learning application developed by South Africa's FNB allows the bank to meet regulatory requirements and make decisions more efficiently, faster and with enhanced accuracy.

By Joanne Carew

CIO | 28 MAY 2020 2:00 SAST

#Insight Cloud + Data Center Transformation
Hewlett Packard Enterprise

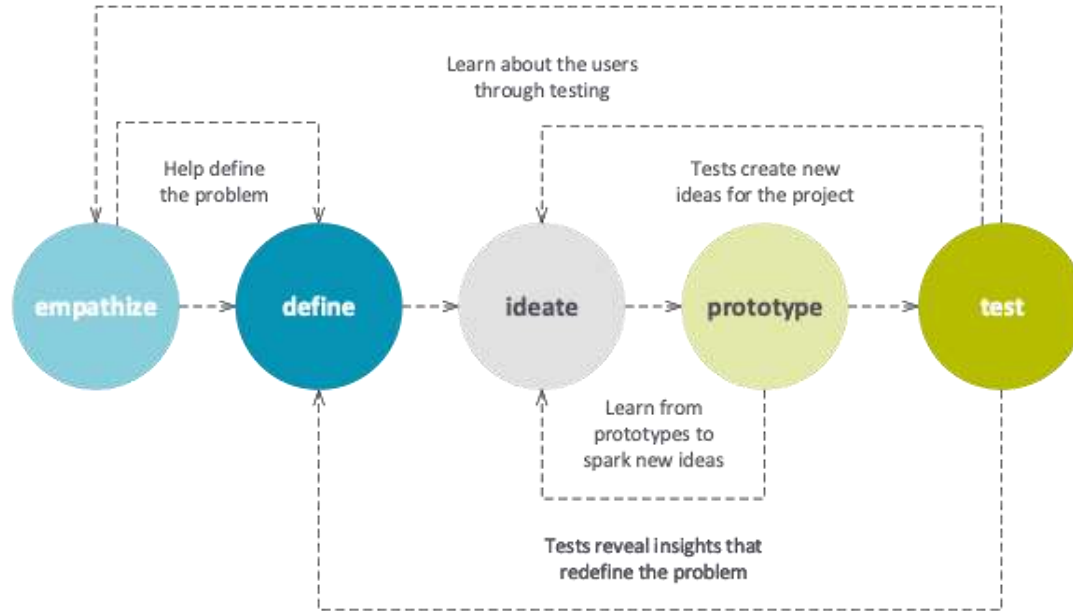
eBook: Pay-As-You-Go On-Premises IT Models
Discover how Cloud allows businesses to scale, and control risk and costs.
Click to read eBook

eBook: The CIO's As-a-Service Playbook
Learn more information about Storage as a Service (STaaS) and its benefits.
Click to read eBook

Webcast: Pay-As-You-Go Storage Models
See how pay-as-you-go storage brings greater, hybrid, and public clouds.
Click to watch the webcast



Design Thinking Process to Explore New Ideas



“Facebook forces Admiral to pull plan to price car insurance based on posts.”

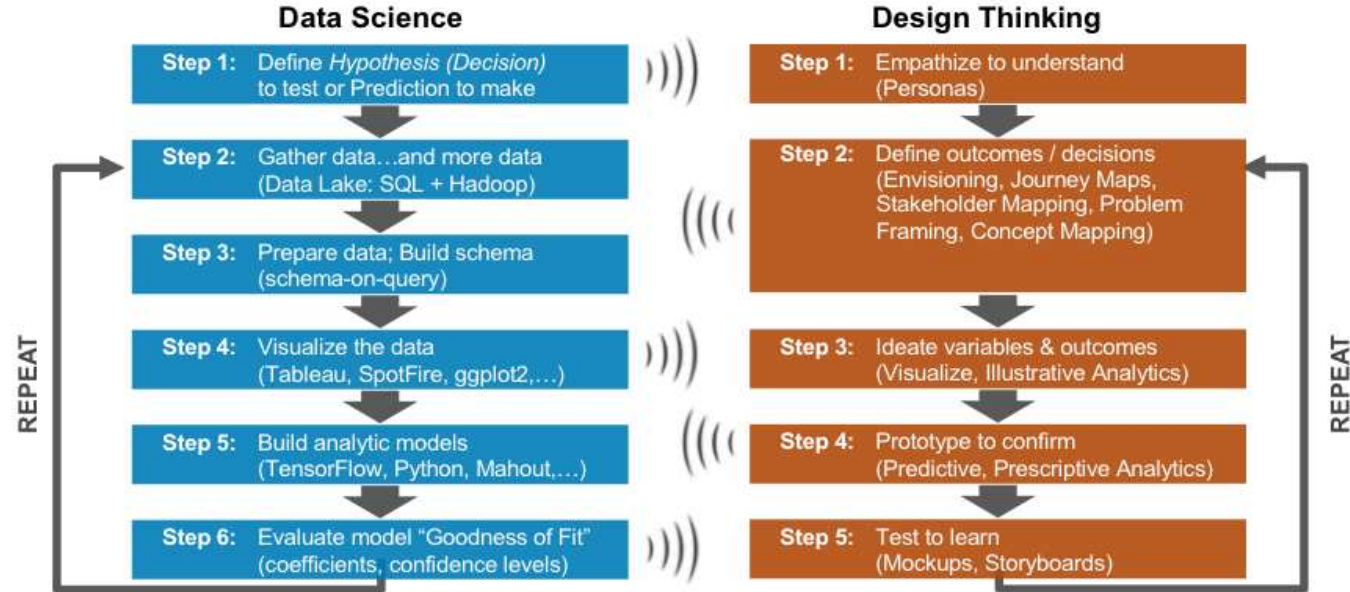


Insurer withdraws initiative with hours to go as privacy campaigners criticise 'intrusive' attempt to analyse users' data



Intersection of Design Thinking and Data Science

Design Thinking Humanizes Data Science



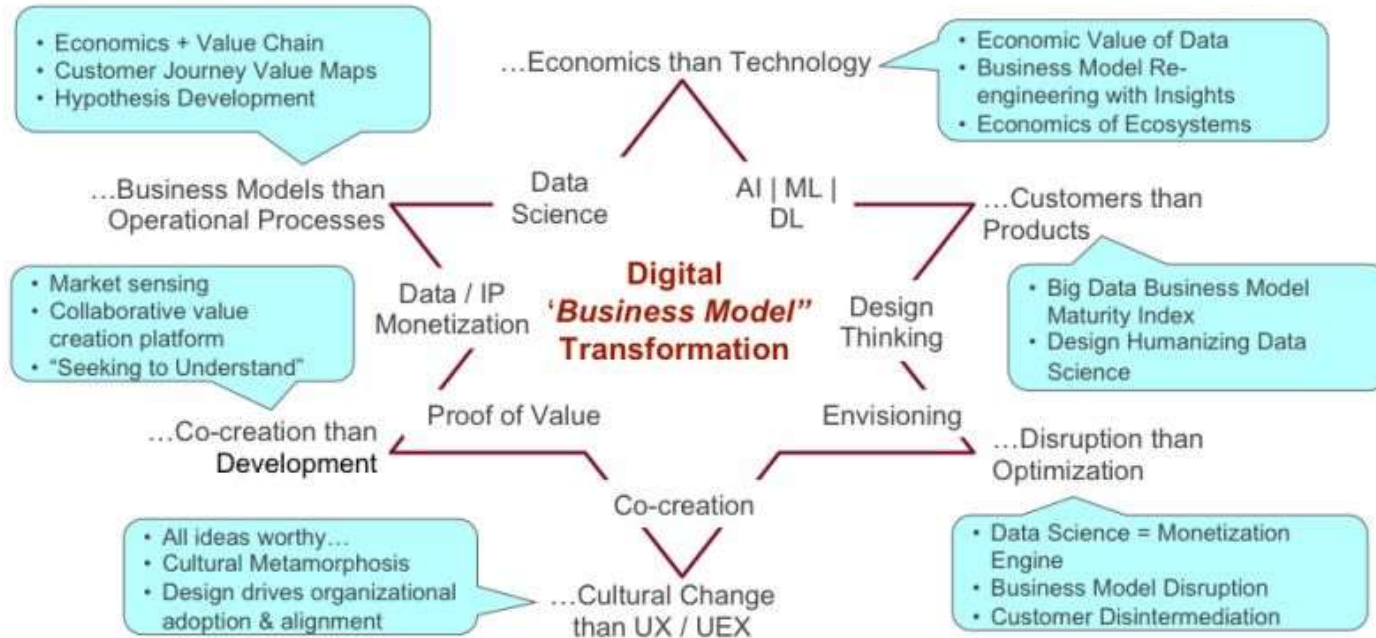
Source: "Scientific Method: Embrace the Art of Failure", University of San Francisco School of Management Big Data MBA

Source: Bill Schmarzo "Big Data MBA" Course Curriculum



Intersection of Design Thinking and Digital Transformation

Digital Transformation is more about...



Source: Bill Schmarzo "Big Data MBA" Course Curriculum



A satellite with two long solar panel arrays is shown in space. The Earth's horizon is visible on the left, and a wide pink band stretches across the background. The text "Thank You" is overlaid on the right side of the image.

**Thank
You**