Service Week 2017

UNIVERSITY OF CAMBRIDGE

Cambridge Service Alliance

Cambridge Service Alliance

Service Week 2017

Poster Booklet

The Cambridge Service Alliance is a unique global partnership between businesses and universities. It brings together the world's leading firms and academics, all of whom are devoted to delivering today the tools, education and insights needed for the complex service solutions of tomorrow.

Conference paper
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Blog

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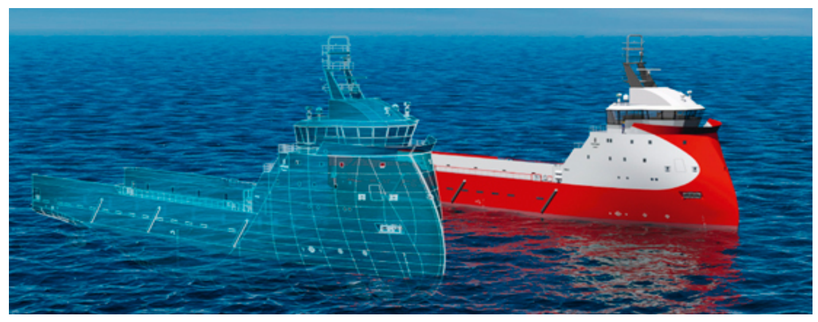
MAKING AND SUSTAINING THE SHIFT TO SERVICES

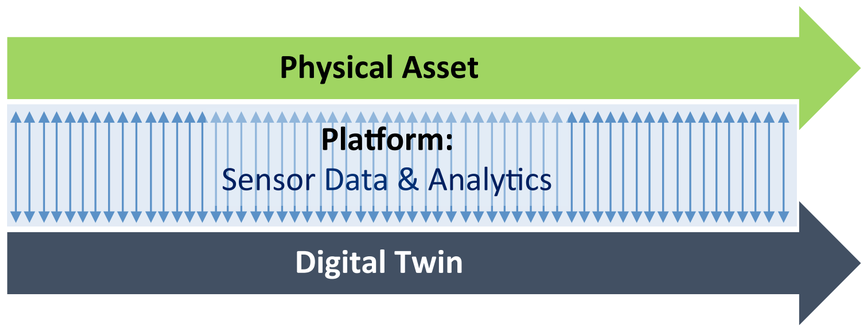
DIGITAL TWINS: What disruption does Digital Twins bring to Services?

Digital Twins (DTW)

Pairs physical and digital objects. They are:

- dynamic and interactive
- learning outcome
- drive business outcomes !!!





DTW provides complete digital models that can be used to operate, simulate, analyse and improve systems.

Adoption

Source: Schöllmann (2015). "Economic significance of in trade services: background to negotiations on in trade services agreement ". European Parliamentary Research Service. ISBN 978-92-823-6587-8

DTW enables more informed financial decisions

*"It is **Digital Twins** that we've built in the installed base and then it's the applications that matter… create digital services for our customers. Over **$5 billion** of orders only this year".*
Bloomberg Government Disclosure, FNDW 24th May 2017

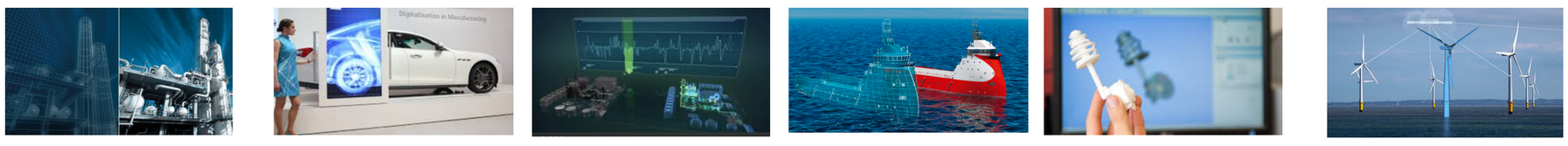
DTW - Digital Worker Capabilities

"it connects with field service technicians to dispatch and provides information for operations and maintenance. Workers submit the Operations & Maintenance (O&M) information back into the system, closing a full loop from problem identification to resolution".
ENP Newswire 13th June 2017

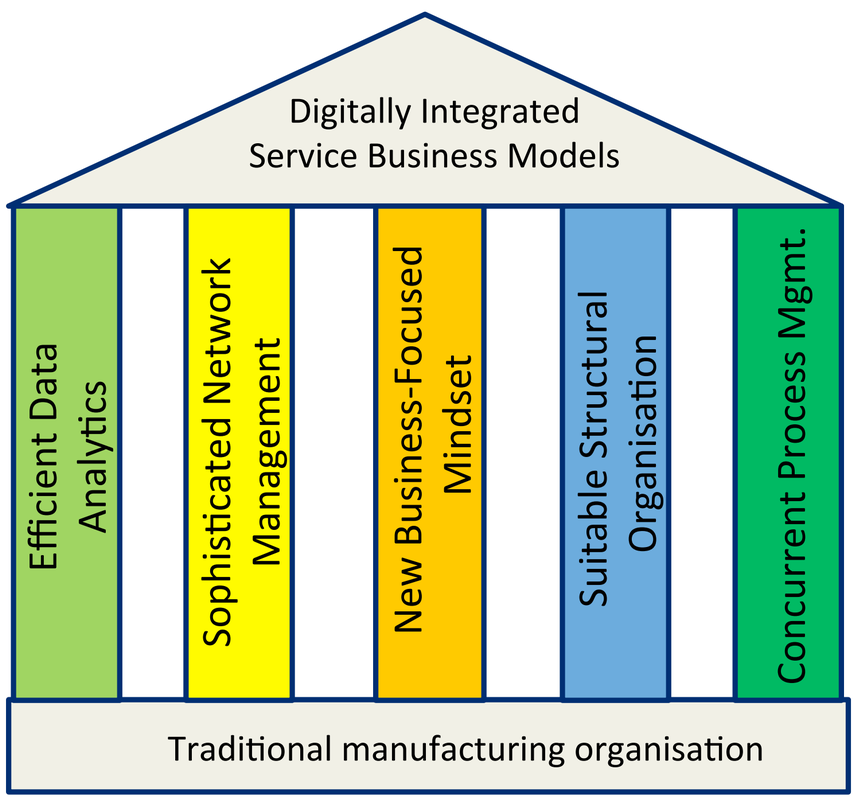
DTW enables more informed bidding at short and long term.

ENP Newswire 13th June 2017

DTW Implementations

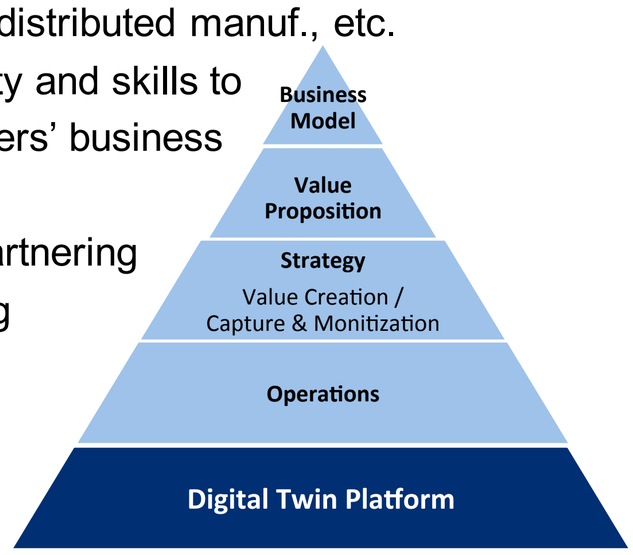


DTW Key Enablers



Findings

- Customer value proposition focused models
- New business and revenue models
- Tech. Integration and Connectivity: Blockchain, IoT, distributed manuf., etc.
- Business curiosity and skills to innovate customers' business models
- Collaboration, partnering and data sharing
- Fleet level maximisation



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DIGTIAL TRANSFORMATION

Blockchain: From Cryptocurrency to General Purpose Technology

Background

- Blockchain is a trendy topic.
- It is hard to explain.
- It has many definitions.

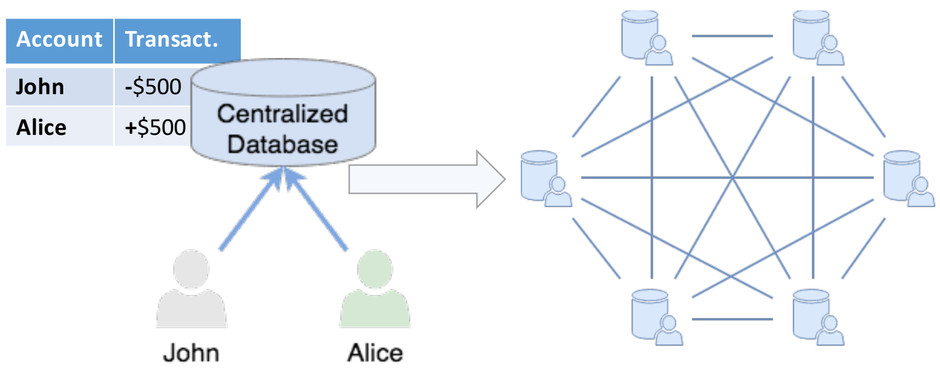
We consider it a **Decentralized Database** technology with the potential to revolutionize many industries.

Our research aims to answer these questions:

- What is the **essence** of Blockchain technology?
- Where are the potential **application areas**?
- Is Blockchain a **general purpose technology**?
- What are the implementation **challenges**?

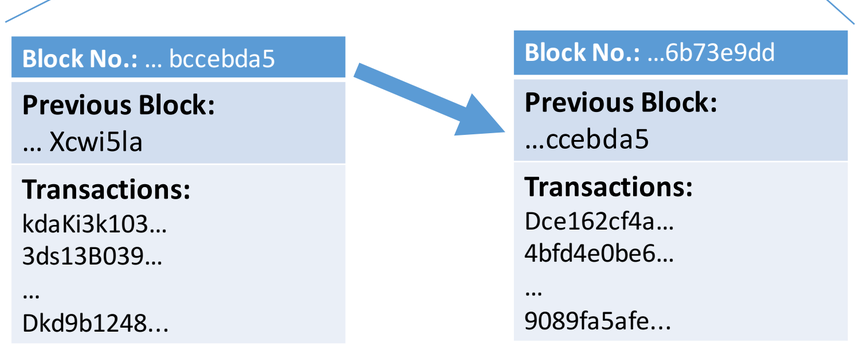
Origin: Bitcoin and Satoshi

- A peer to peer electronic cash system
- Proposed by Satoshi Nakamoto (2008)
- Alternative to a 3rd party database



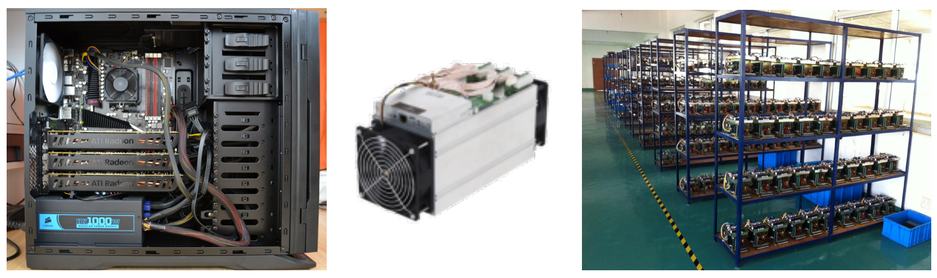
Blockchain the Backbone

- Transactions are stored into "**blocks**"
- Traceable since day 1 (03.01.2009) in a "**chain**"



Validation & Incentive Mechanism: Mining

- Valid record by consensus
- A "**puzzle**" needs to be solved before recording.
- Fraudster needs to **overpower 50%** of entire network of computers.
- Network maintained by rewarding puzzle solvers called "**miners**".



Evolution of "mining machines" dedicated to Blockchain "puzzle solving"

Key Blockchain Features

Core Usage Features

- **Resilience**: multiple data centres, redundancy
- **Security**: hacking a Blockchain is hard
- **Tractability**: all historical transactions are stored
- **Irreversibility:** records cannot be edited

Secondary Features:

key to financial applications such as Bitcoin

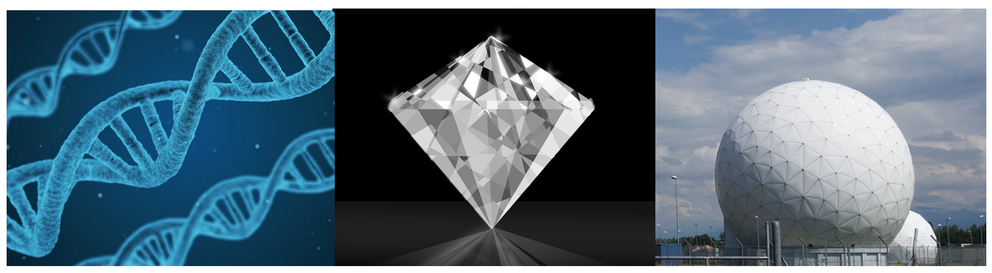
- No geographical constraint
- Possible: Semi-Anonymity

A General Purpose Technology?

- Case studies across multiple industries
- Experiments with both private and public chains
- Rare success cases beyond fin-tech

Sustainability | **Medical Care** | **Sharing Economy**

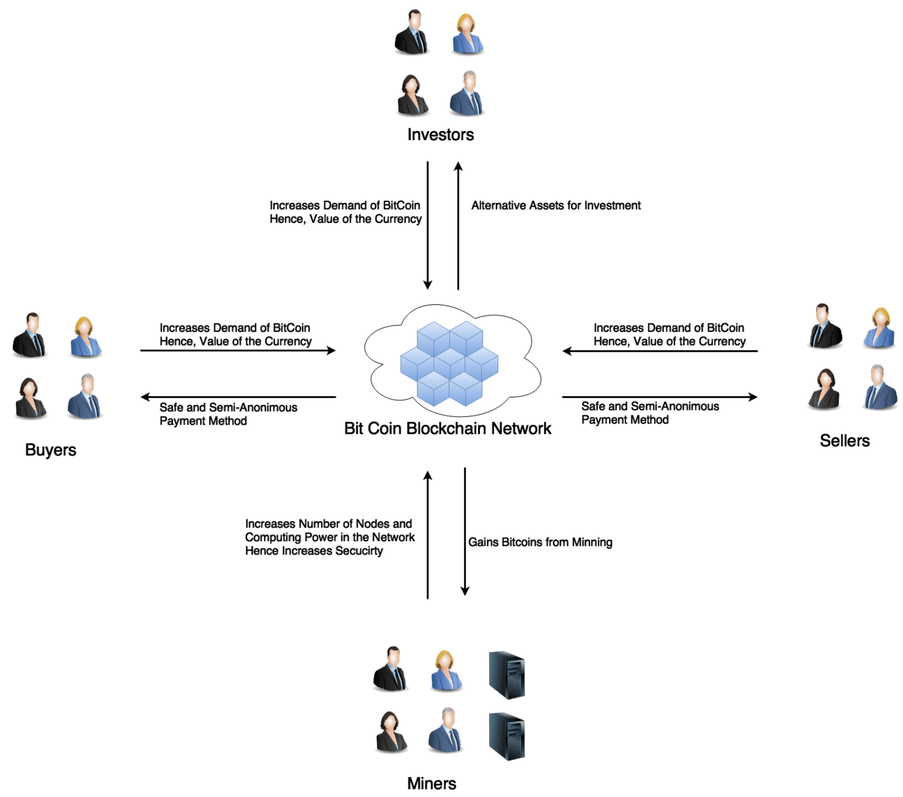
Scientific Research | **Supply Chain** | **Defense**



Implementation Challenges?

- Counterintuitive nature of Blockchain
- Fast evolving technology and multiple standards
- Interfaces are hard to properly manage
- Most importantly, lack of good incentive mechanisms for Blockchain ecosystems.

Bitcoin ecosystem: a self-rewarding design



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DIGITAL TRANSFORMATION

Digital Manufacturing Marketplace Platform

The prosperity of the sharing economy is changing the socio-economic system profoundly. Started in consumption markets with leading examples such as Uber and Airbnb, the concept is deploying in other industries. Meanwhile transformation towards decentralization and interconnection happen at different stages of the manufacturing value chain, which are embracing the sharing economy in different forms. Both the sharing economy and distributed manufacturing are enabled by the fast development of digital technologies, and a typical form is a digital marketplace platform.

This scoping study aims to explore the possibility of digital manufacturing marketplace platforms

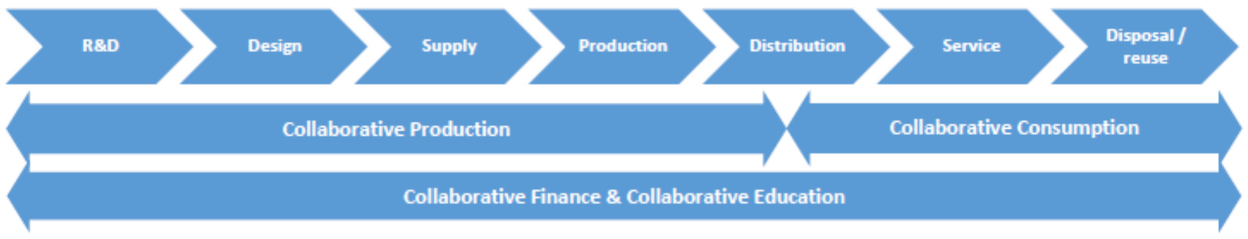

Figure 1 How manufacturing value chain embraces the sharing economy

There are four types of platforms: matching platform (e.g. Amazon), crowdsourcing platform (e.g. TaskRabbit), renting platform (e.g. Zipcar) and community platform (e.g. Linux). Within the matching platform type which is the most common, there are three sub-types – two-sided market (e.g. eBay), intermediary platform (e.g. Amazon) and Internet portal (e.g. ThomasNet).

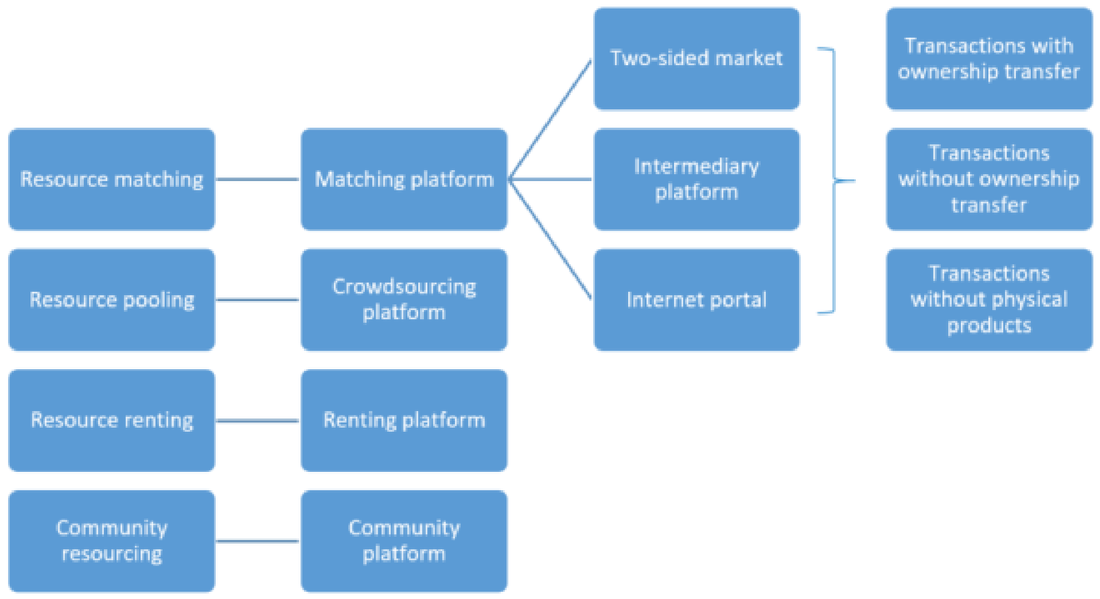

Figure 2 Typologies of digital manufacturing marketplace platforms

Thirty examples of digital manufacturing marketplace platforms as well as their platform types have been identified from the literature and from the database Factiva. Digital marketplace platform examples serving all stages of the manufacturing value chain have been identified. Some of them focus on particular manufacturing industries, while others service a wide range of manufacturing industries.

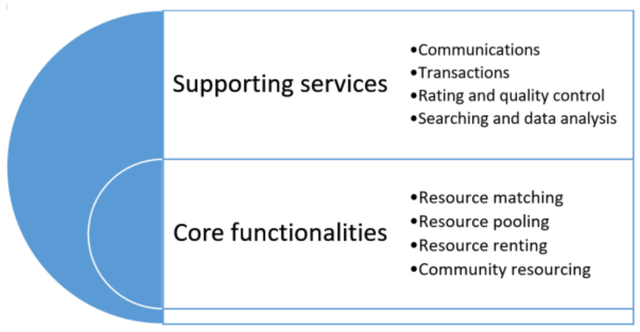

Figure 3 Functions of a digital manufacturing marketplace platform

The core functions of a digital manufacturing marketplace platform are resource matching, resource pooling, resource renting and community resourcing. Depending on the phases of transaction that the platform aims to support, certain supporting services should be incorporated. The most common supporting services include searching and data analysis, communications, transactions, and rating and quality control.

A process to evaluate feasibility is proposed. The potential barriers include complex supply chains and offerings, unbalance bargaining powers, trust issues, competition sensitivity, liability and accountability, obstinate current systems, readiness and affordability, and data security and ownership.

Enablers include technologies such as digital ID, demonstrators and successful cases, regulations, industry standards, and suitable platform design.

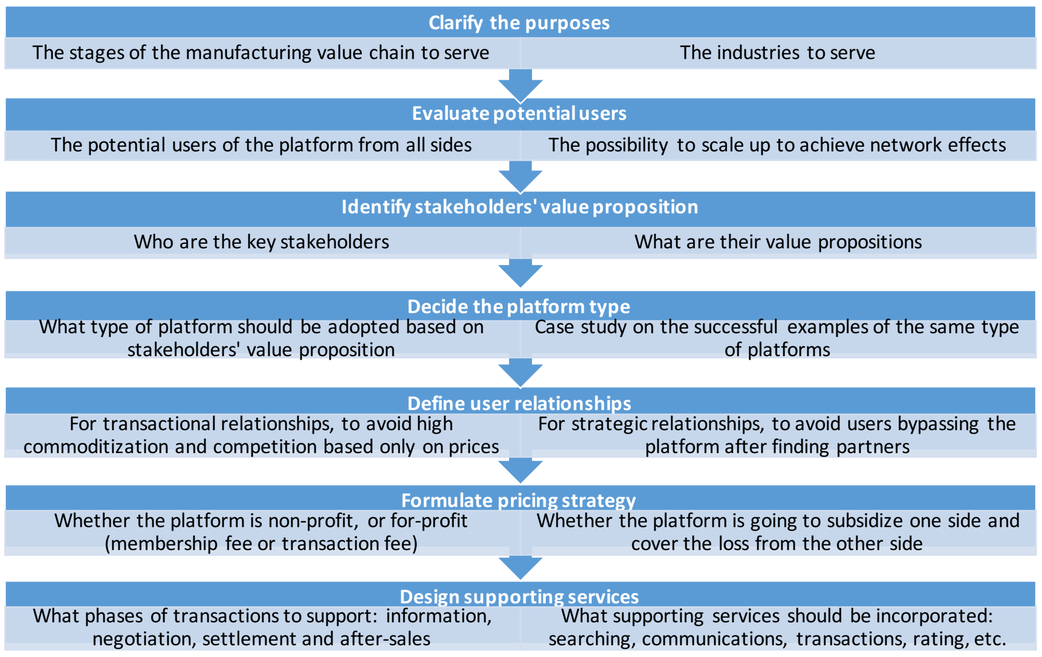

Figure 4 A proposed process to evaluate the feasibility of a digital manufacturing marketplace platform

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Digital Transformation

Developing a Process for Formulating a Digital Transformation Strategy

Background:

Digital transformation, which can be defined as the use of technology to radically improve the performance or reach of companies is becoming the focus of many firms across the globe. Companies in all industries are becoming more reliant on the use of digital technologies. Technologies such as analytics, mobility, social media, smart embedded devices and many more are changing the way companies interact with their customers, manage internal processes, deliver value propositions and ultimately explore new business models.

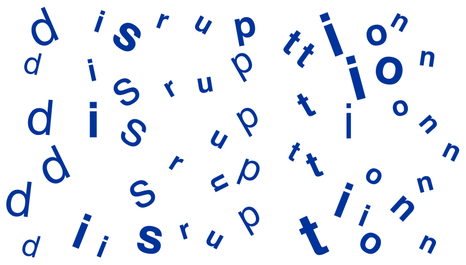
Problem:

A Missing Process for Strategy Formulation

Digital technologies have become a disruptive force, which can change the landscape of an industry very rapidly and cause companies to lose their competitive positioning. Given this challenge, managers are left with the question of how to successfully lead their companies through digital transformation.
A clear strategy process is needed.

Digital Technologies

The Effect: **disruption**



The Imperative: **transformation**

The Need: **strategy formulation process**

Research Question:

How can companies formulate a digital transformation strategy?

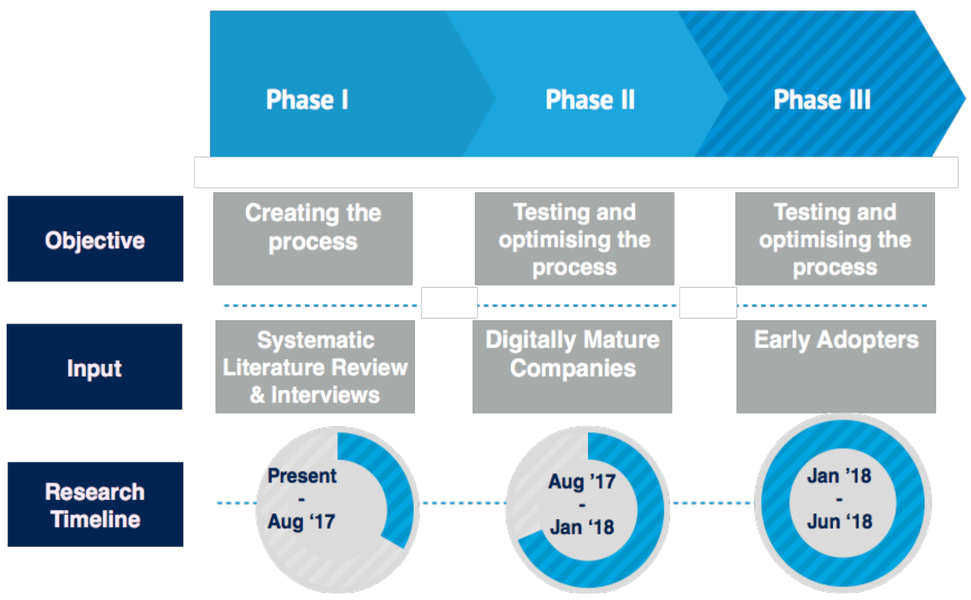
Research Contribution to Industry:

-Delivering ***a validated and tested strategy formulation process:***

- ***Developing*** the strategy formulation process ***with digitally mature companies***
- ***Testing*** the strategy formulation process ***with early adopters***

-Identifying the ***context*** and ***content*** of digital transformation

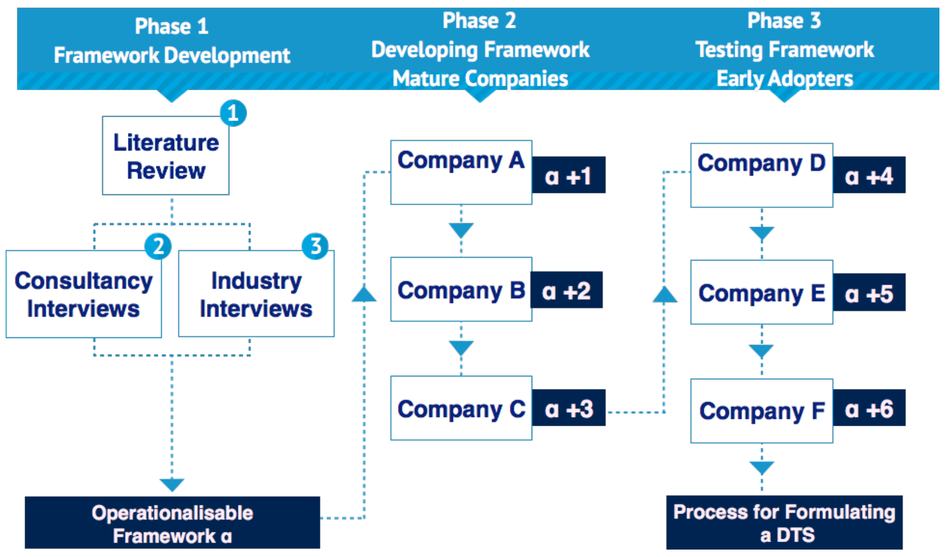
-Demonstrating the ***interactions*** between ***digital resources***, ***digital capabilities*** and other ***organizational capabilities*** for a sustainable competitive advantage



Research Approach:

Process Research

A methodology developed to defy the shortcomings of current strategy research. It is of particular relevance for this research, as it aims at developing processes to operationalise frameworks and provide managers with practical approaches.



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10 Myths about Co-creation

1. Co-creation should only include customers.
2. Co-creators should only be the usual target audience.

3. Co-creation is only appropriate for products.

Digitalisation has transformed books, music, maps, cameras and calendars into digital services. These are not just products but are a combination of both the digital artefacts themselves and the services that deliver them. Involving co-creators helps unlock the potential of digital services as well as products. For example, a company offering customisation of shoes through its online platform was able to receive authentic customer feedback about its pricing strategy through an offline co-creation approach. Not able to capture the customer's first impression online, the company used an open innovation space in order to co-create together with its customers. In this setting, co-creators pointed out that the company's pricing strategy is irritating: *"Shoes with laces should be more expensive than those without".* Although the production cost was not significantly different, the company decided to adjust prices in accordance with the feedback.

4. Co-creation is only suitable for large companies.

5. Co-creation is only fit for B2C.

Most B2B firms are disconnected from their end customer and hence may lack a clear understanding of their needs and wants. A company that has managed to overcome these challenges is Diehl Controls, a leading developer and manufacturer of display, control and drive systems. To familiarise future users early on with the possibilities offered by new products, Diehl Controls presented itself at the theme world 'SMARTer Living' in the Nuremberg-based innovation laboratory JOSEPHS®. Diehl used this innovative platform to address end customers directly. Enabling this direct interaction with end customers helps companies experiment more easily with new product offerings and make the final product as close to the customers' needs as possible.

6. Co-creation is only for beneficial for the private sector.
7. Co-creation is only relevant for the developed world.
8. Co-creation is a stand-alone tool.
9. Co-creation is a final test before launching a product.

10. Co-creation offers answers to questions a company asks.

Companies should expect the unexpected: creative and value adding ideas may come from stakeholders not only about a certain product or service, but also about other areas in the value chain such as product packaging, areas of application, sales channels and even raw materials used. For example, a company aiming to improve the shoe shopping experience with its innovative 3D foot scanner aimed to obtain information related to the market needs and privacy of data through co-creation with customers. Although, the company gained insights on these aspects, it also received feedback concerning the material of the 3D scanner foot plate. During their trials, customers noticed that the material of the foot plate shows if someone has sweaty feet which makes the measuring experience rather embarrassing. Consequently, the company changed the material of the foot plate. This highlights that co-creation can offer answers to questions but it can also deliver unexpected insights in areas companies initially did not consider.

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Full version available here: http://bit.ly/10CoCreationMyths

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Business Models

Through-Life Accountability: Managing Complex Services


NBA finals Game 6
Lakers defeat Celtics, 89-67. 1B

The Times
SHREVEPORTTIMES.COM
WEDNESDAY, JUNE 16, 2010
CADDO ■ BOSSIER ■ WEBSTER ■ DESOTO

Saving money
Properly store food to avoid waste. 1C

WEATHER
HIGH/94
LOW/74

THE QUICKREAD
A fast way to digest the news of the day

SPORTS
2 LSUS draftees sign contracts
■ Two-thirds of LSUS' record-setting draft class signed professional baseball contracts Tuesday. Left-handed pitchers Justin Ennis and Jeff Nadeau were part of a school-record three draft picks in the 2010 Major League Baseball First Year Player Draft. PAGE 2B

Miles: Lee could be NFL QB
■ Bo Jackson didn't do it. Neither did Deion Sanders, John Elway, Ricky Williams nor Brian Jordan. LSU head coach Les Miles says Zach Lee is capable of pulling off the incredible daily double. PAGE 1B

LOCAL/STATE
Bossier to vote on rate increase
■ It is costing about $20,000 a month for Bossier City to run emergency repair lines into its major sewer plant, a fact councilmen were eager to point out when they began the process Tuesday of raising city sewer rates. PAGE 3A

GULF COAST OIL SPILL

President Obama delivered his first televised address to the nation from the Oval Office of the White House in Washington on Tuesday. Obama said the nation will continue to fight the oil spill for "as long as it takes."

'We will make BP pay'
Obama accuses company of 'recklessness' in TV address

Gulf officials push to ease drilling ban

Budget OK'd for Caddo schools
■ Board includes $4.6M for block scheduling program.


DAILY NEWSPAPER OF THE YEAR
THE TIMES
Thursday June 15 2017 | thetimes.co.uk | No 72250
Only £1 to subscribers £1.60

Disaster in 15 minutes
● Dozens feared dead as inferno engulfs tower block
● Children thrown from windows to escape flames
● Residents had warned building was 'firetrap'

System Accidents

- Present several similarities
- Are the result of a combination of a number of smaller events
- Could have been prevented
- Have major consequences

Indicate

- Deficiencies in understanding and preventing accidents
- Safety education is not reaching the target audience
- More research and interactions between academia and industry is needed for advancing the safety agenda

Scope

This study aims to provide more insights for servitized manufacturers operating in complex service networks, where decisions may be taken by one party and actions carried out by another.

Data

Date	Interviewee	Interviewee	Interviewee	Incident Description
Q4-14	Senior Compliance Engineer	Supervisor	Operator	Large part of vehicle accidently moved during tests risking injuries to operators
	2 years in the organisation	3.5 years in the organisation	3.5 years in the organisation	
Q1-15	Team Leader	Junior Supervisor		During preparation of a vehicle a hydraulic pump was found not to have been fitted properly risking failure during its use
	3 years in the organisation	19 years in the organisation		
Q2-15	Maintenance Support			Undocumented maintenance works performed on a vehicle
	7 years in the organisation			
Q3-15	Data Integrity	Senior Supervisor	Operator	Towing arm fitted incorrectly and was damaged during towing of vehicle
	3 years in the organisation	6 years in the organisation	6 years in the organisation	

Preliminary Results: Barriers and Facilitators to Incident Reporting

Barriers

- Experience or time in organisation
- Fear of consequences
- Lack of confidence in the system
- Small Mistakes

Implications

IR training based on experience

- promote continuous improvement
- identify 'real' incident cause in a timely manner
- circulate and communicate recommended 'actions'
- small mistakes ➢ accidents
- promote IR even for small '*less important*' events

within the whole service network

Facilitators

- Experience or time in organisation
- Continuous improvement
- Training on IR
- Seriousness of incident

Full paper version available here:

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BUSINESS MODELS

Delivering Outcomes with Strategic Alliances

Servitized companies are increasingly providing outcome-based service contracts instead of output-based contracts, and they get rewarded when the experience for end customers and other stakeholders is improved. A further adaptation of these contract arrangements is to include multiple suppliers, forming an alliance / alliances of companies. This is set to be increasingly common, given the large, complex nature of contracts needing a wide range of expertise and depth of capability.

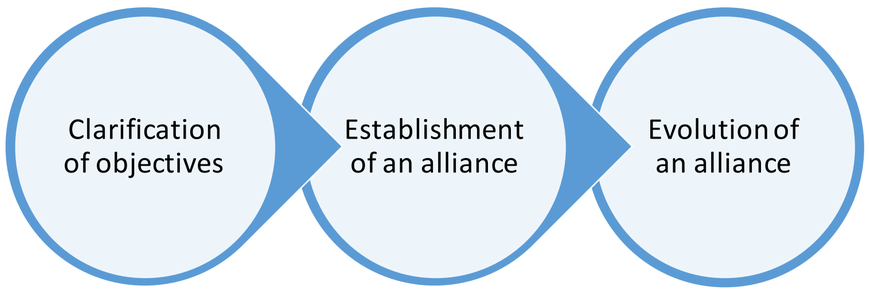

Figure 1 Key stages to establish an alliance to deliver outcomes

The formation of an alliance starts with engaging right partners and constructing a healthy alliance ecosystem. Together with chosen partners, governance structures and commercial agreements should be designed and agreed. The day-to-day operations should be designed carefully. The entire process should happen with the support of a proper alliance culture. The alliance ecosystem is not static. Adapting and adjusting the alliance partners, governance and commercial agreements to the evolving industry and the changes in specific contexts will ensure a continuous success.

Figure 2 Common objectives of establishing an alliance

Form culture

The main cultural challenge comes from the fact that multiple partners in an alliance have different organizational culture. Having right culture in an alliance means having right people, right behaviours and shared visions, with obstacles cleared and enablers enhanced.

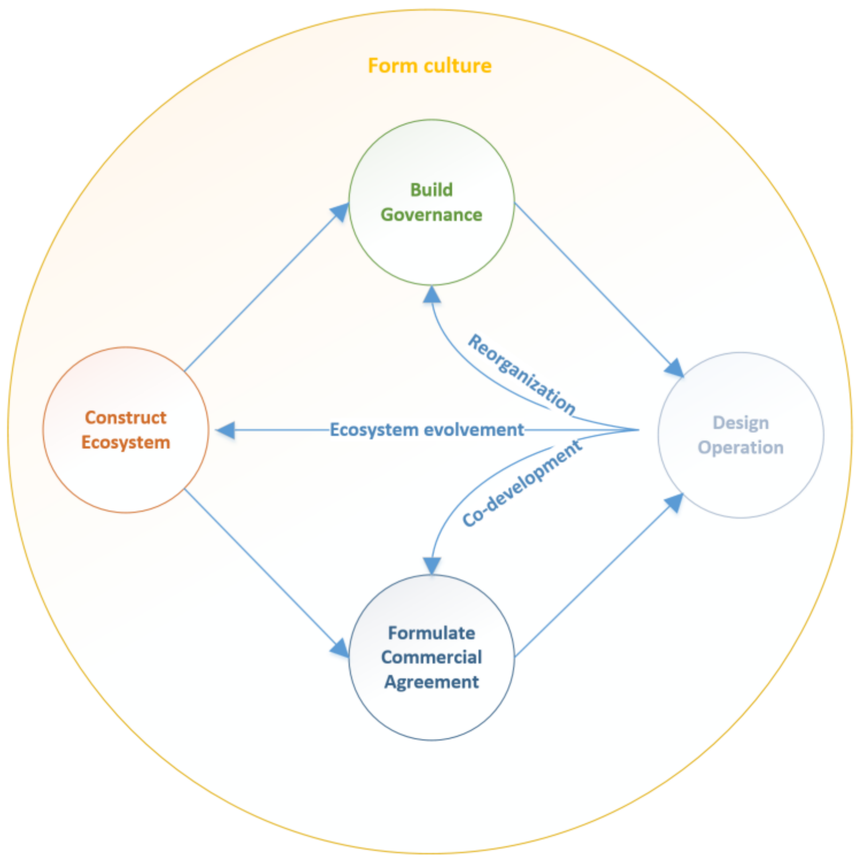

Figure 3 Key steps to design and establish an alliance

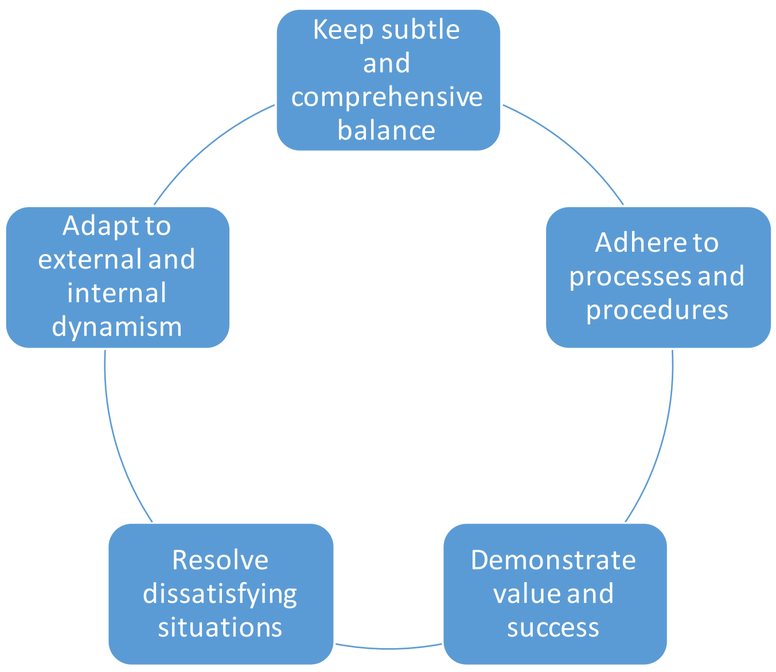

Figure 4 Actions to ensure the evolution of an alliance

To ensure the continuous evolution of an alliance, partners will need to keep subtle and comprehensive balance, adhere to process and procedure, demonstrate value and success, resolve dissatisfying situations, and adapt to external and internal dynamism.

Construct ecosystem

Dimensions to consider to construct an ecosystem of multi-partner alliance include partners' capability and diversity; behaviour and alignment; ecosystem's structures and scales, etc.

Build governance

Building blocks include organizational structure, leadership team, inter-relationships and decision-making rules.

Formulate agreements

Principles should be formulated first, followed by designing application rules and enabling mind-set shifts.

Design operation

Ensure a good start, design processes and stick to objectives.

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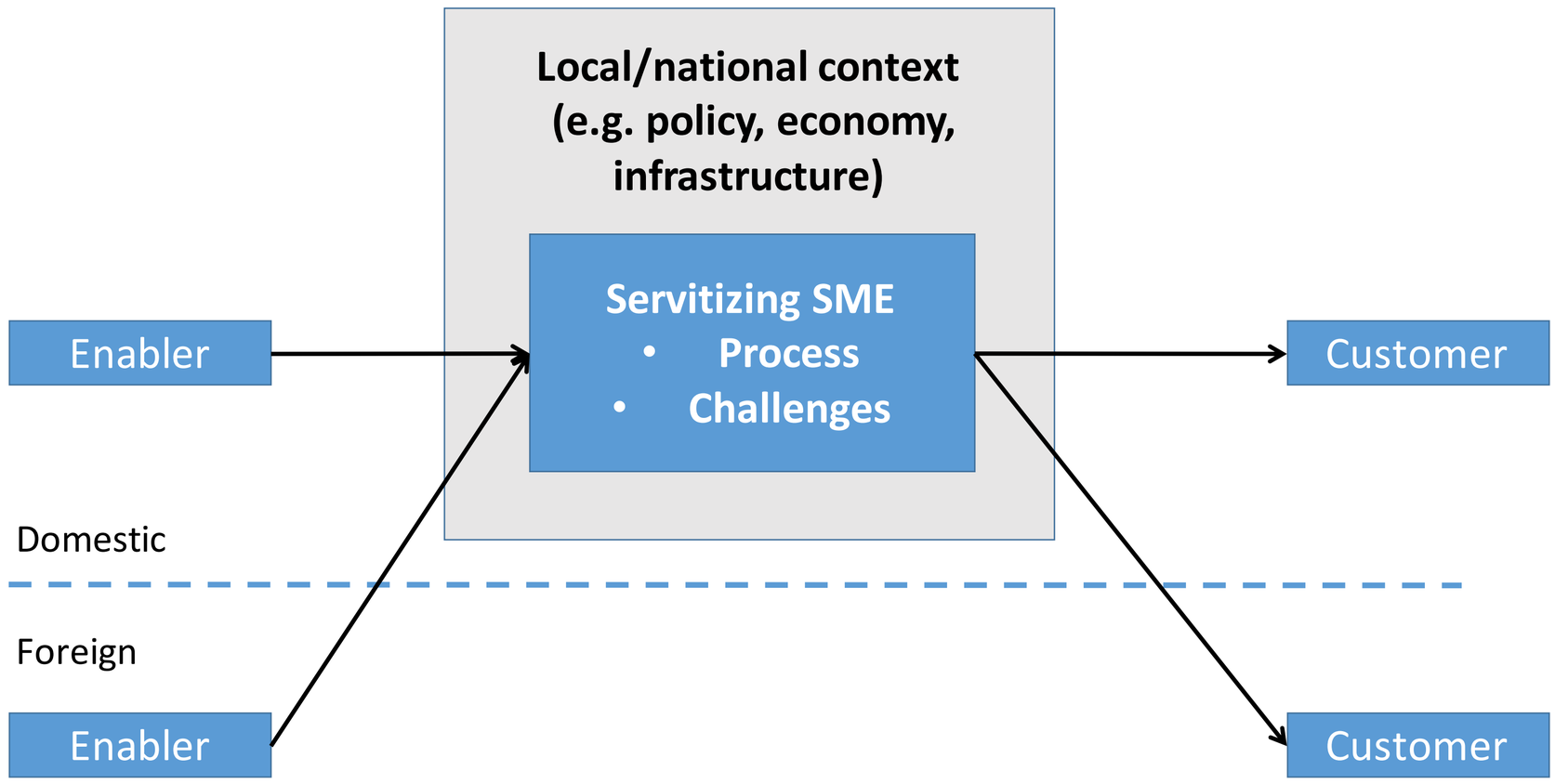
Executive Agency for SMEs - European Commission

Study on the potential of servitization and other forms of product-service provision for EU SMEs

The rationale and objectives of the study:

- Challenges of European SMEs, including global competition and complexity of value chains;
- The various types of servitization or product-service combinations;
- The wide range of industries in which product-service combinations are provided (or used);
- The role of ICT and digitalization in providing product-service combinations;
- The added value of taking a value chain perspective, e.g. providers of innovative business
- services that enable manufacturing firms to servitize and adapt business models.
- The importance of understanding the process (steps, drivers, barriers/challenges and success factors) via which individual SMEs and their value chains and industries move towards product-service combinations.

Value chain perspective of servitizing SMEs:



Summary of the study:

Analysis of the market of servitization	• Map the development of servitization • Quantify the size of the EU product-service market • Develop key performance indicators and metrics to monitor
Case studies of SME servitization	• Develop a methodology to identify sectors • Develop and validate case study methodology • Carry out at least five sectoral case studies
Analysis of the process of servitization and recommendations	• Describe the economic conditions for PS solutions • Develop an analytical framework • Provide recommendations to EASME

Conference paper
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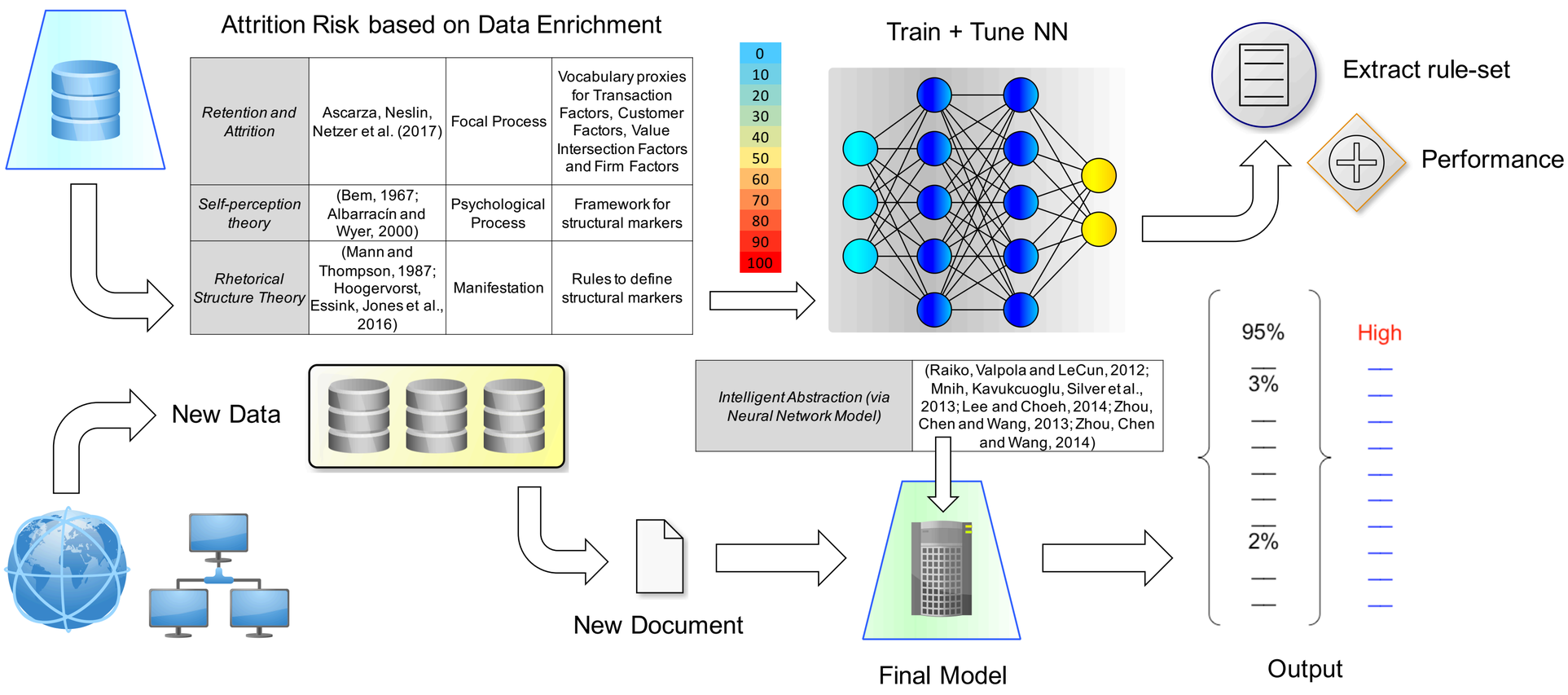
DATA AND ANALYTICS

Customer Attrition Prevention and CX Monitoring with Machine Learning

Research Projects Funded by the Marketing Science Institute

Study 1: Deep Keep: Customer Attrition Prevention with Artificial Intelligence

In this study, we leverage the intelligent abstraction capabilities of neural networks, but importantly, advance the training of such models with conceptually informed features and expert human knowledge. Specifically, we argue that in addition to identifying proxies for established attrition predictors (e.g. satisfaction, characteristics of transaction history), more work is needed to develop an understanding of how other clues indicative of customer attrition risk manifest in human communication.

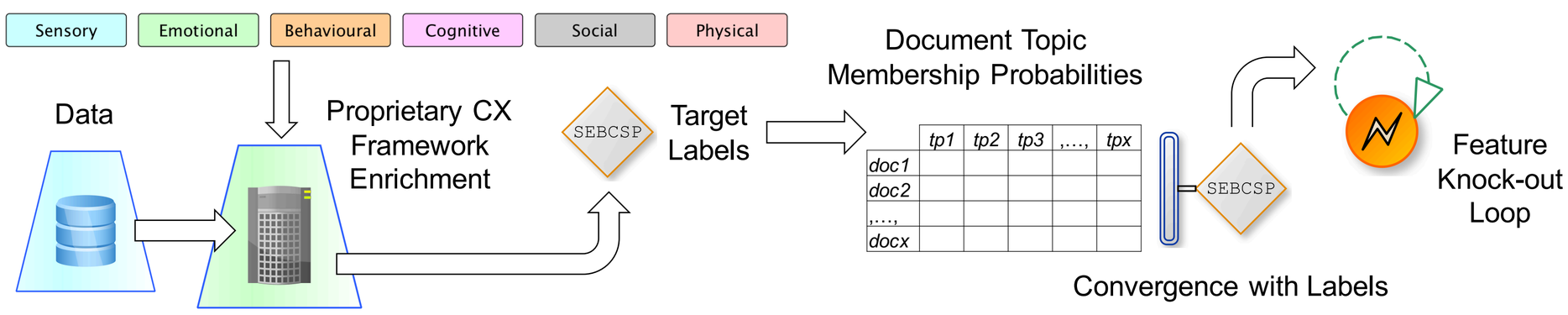


Deep Keep - Methodology

The neural network (NN) is trained on a large corpus of relevant customer feedback data. Each individual document is enriched to correspond with customer attrition / churn risk levels. The NN then self-selects features, and solves a supervised, multi-class classification problem as the basis of its training.

Study 2: CX Analytics: Data-driven Measurement System for Customer Experience and Emotional Complexity

In this study, we build a data driven measurement system to automatically assess the emergence of customer experience (CX) dimensions (sensory, emotional, behavioural, cognitive, social and physical) in online customer feedback and reviews. We also broaden perspectives on sentiment analysis (within the emotional dimension) by exploring the role of emotional complexity theory, a lens for analysing the way in which emotions manifest.



Deep Keep - Funded by the Marketing Science Institute (MSI) Grant Number: # 4000176

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CX Analytics - Funded by the Marketing Science Institute (MSI) Grant Number: #4000004

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DATA ANALYTICS

Intelligent Warranty: Towards mass-scale predictive maintenance

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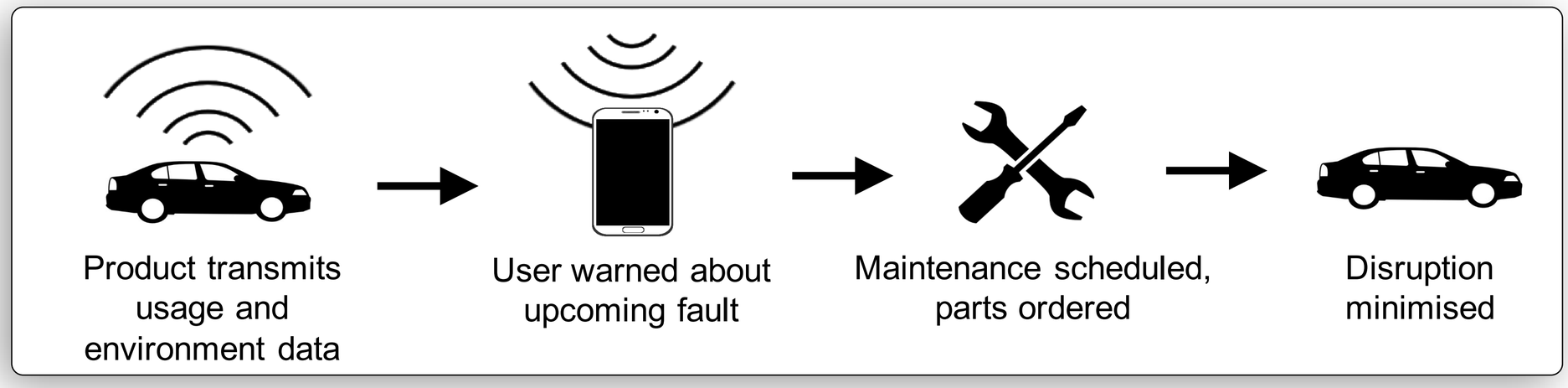
Introduction

- The Internet of Things era means connected products are becoming more prevalent.
- One use of this data is for real-time prognostic algorithms.

Main benefits

- Added customer value
- More accurate forecasts
- Prepare for maintenance activities

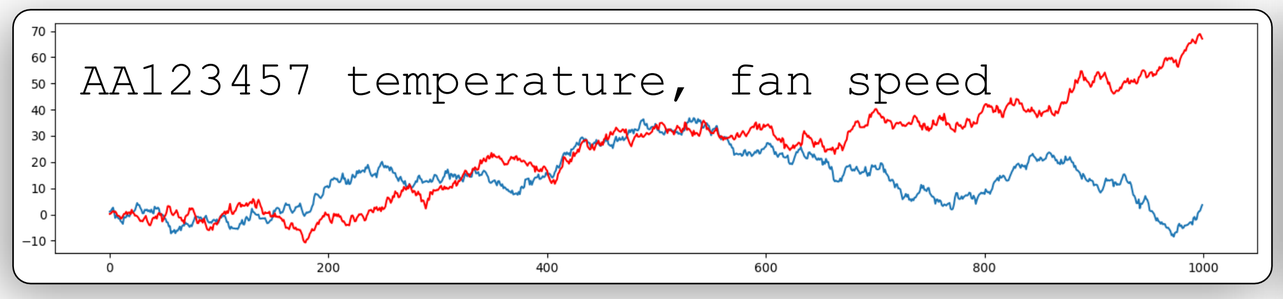


The data

Warranty database

Serial No.	Product	Build Area	Technician Comment	Part Failed	Failure Date	Cost
AA123457	Turbo range	UK	Customer complained about noise during operation. Fan was found to be faulty and was replaced.	Fan-13A	21.7.16	£520

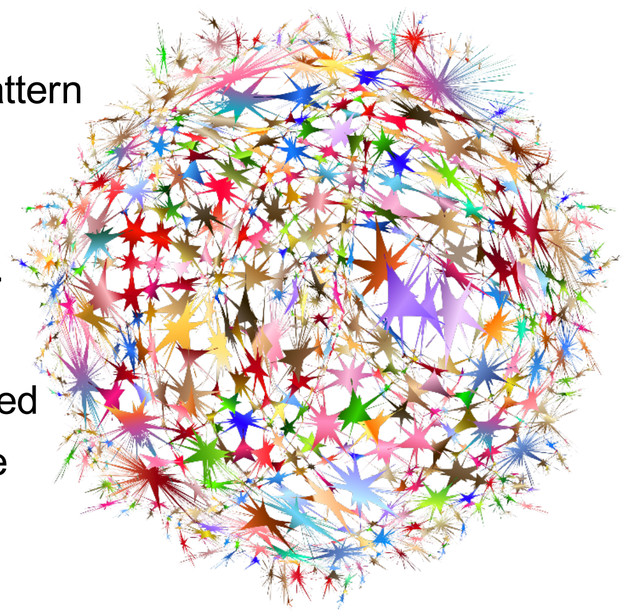
Product usage data

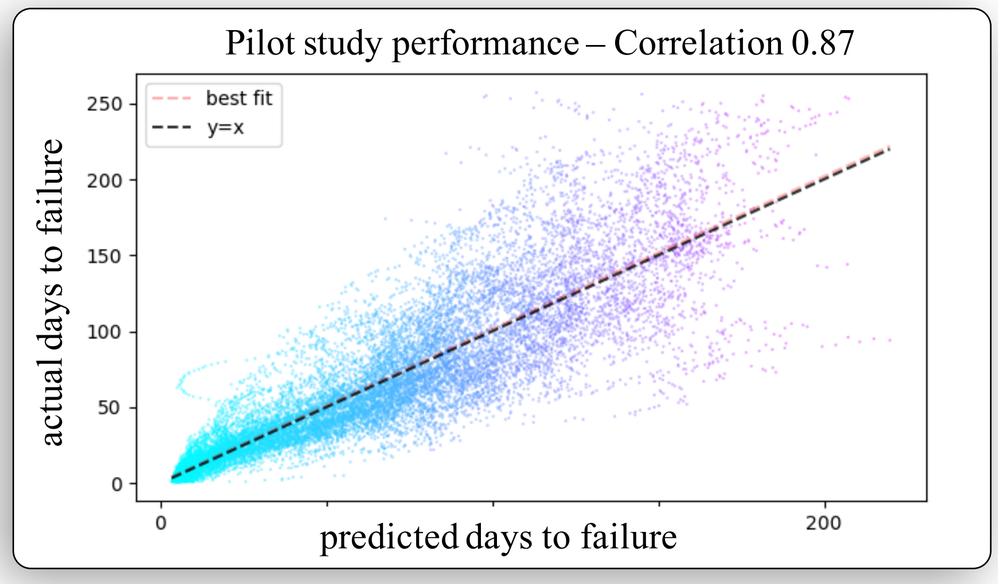


Failure Codes:
1:54 PM Fan failure
2:01 PM Engine overheat
3:15 PM Engine shutdown
3:21 PM Override on

Applying deep learning

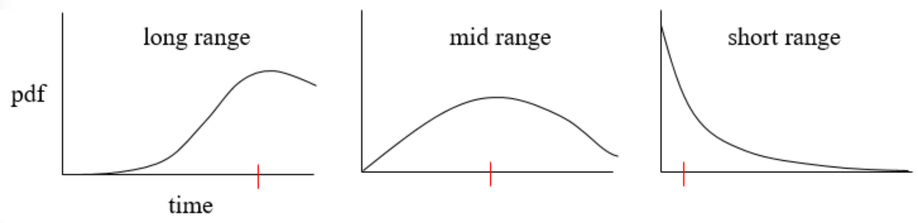
- Deep learning has proved the most successful technique at complex pattern recognition tasks.
- Requirements must be accommodated for use in prognostic settings: Handle censored data, output confidence intervals, collect many run-to-failure samples.
- This research investigates how machine learning theory can be advanced to incorporate these requirements, and the real-world applicability of the resulting models in applied case-studies.





One solution

- Have network output parameters of a Weibull distribution rather than a point estimate, minimising log-likelihood



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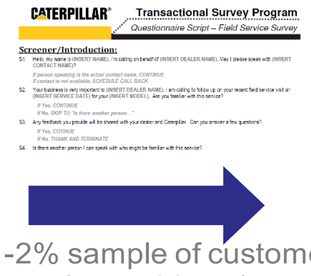
Customer experience analytics: Capturing and analysing CX data in real-time through the consumer journey

Existing system

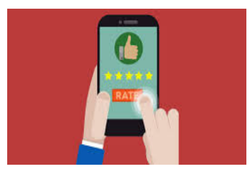


Up to 2 weeks

1-2% sample of customer (mostly are drivers) are surveyed

Up to 11 weeks

Proposed system

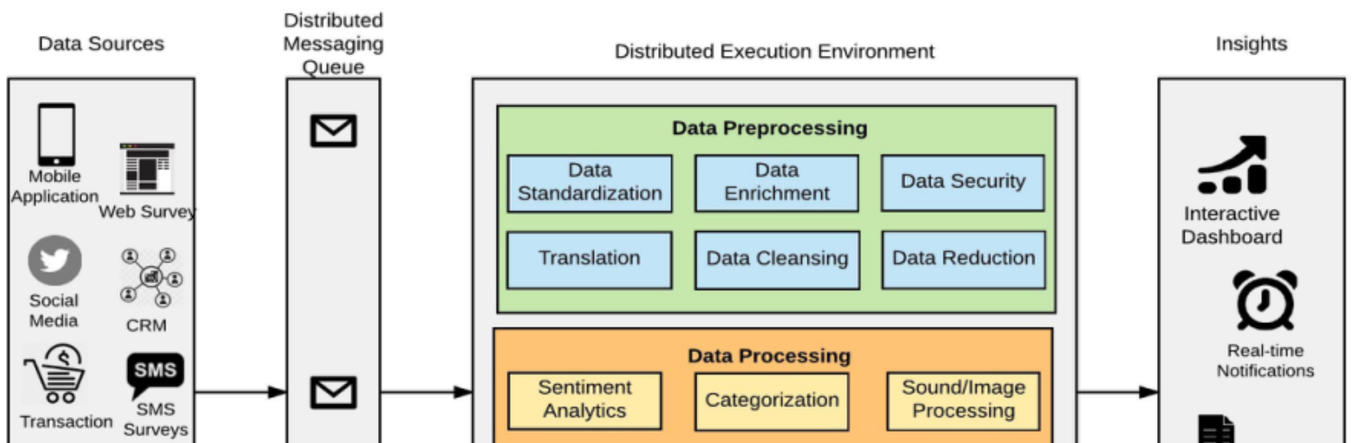


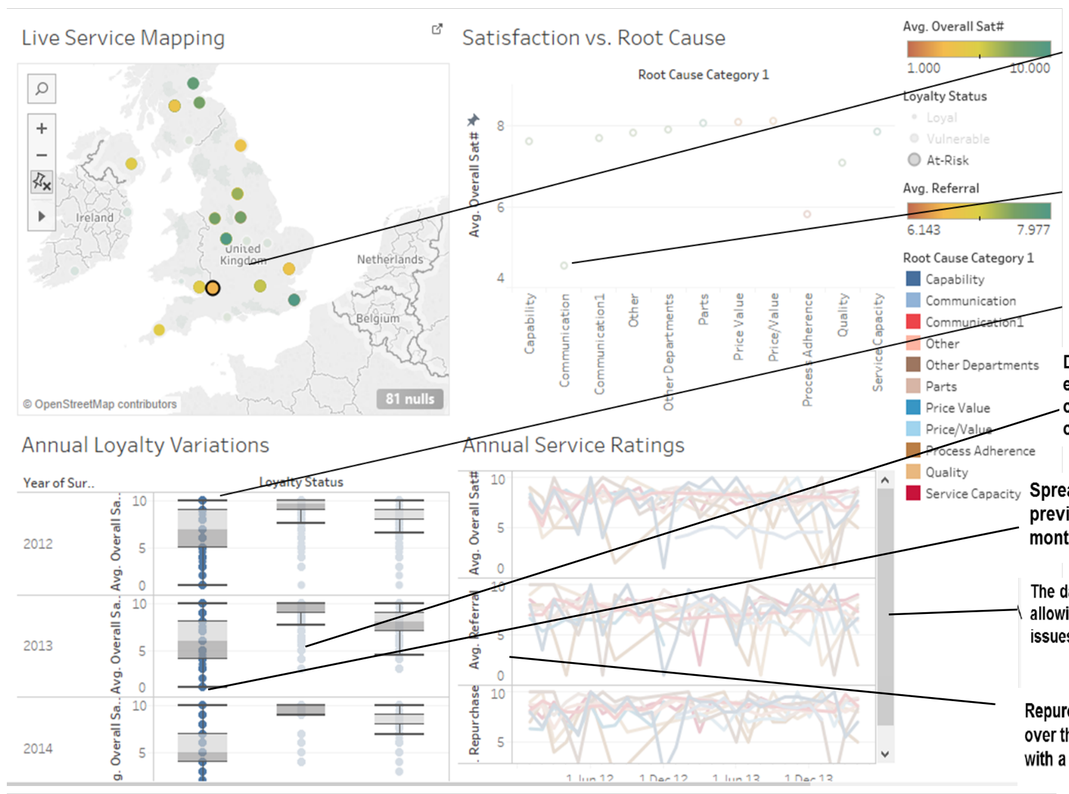
5 Minutes

Instantaneous

Instantaneous

Instantaneous





Increased number of low satisfaction scores can be seen across the map. A particularly low score has been selected near Cardiff

Communication has a far lower average satisfaction than other root causes

The loyalty status can easily be identified as At-risk

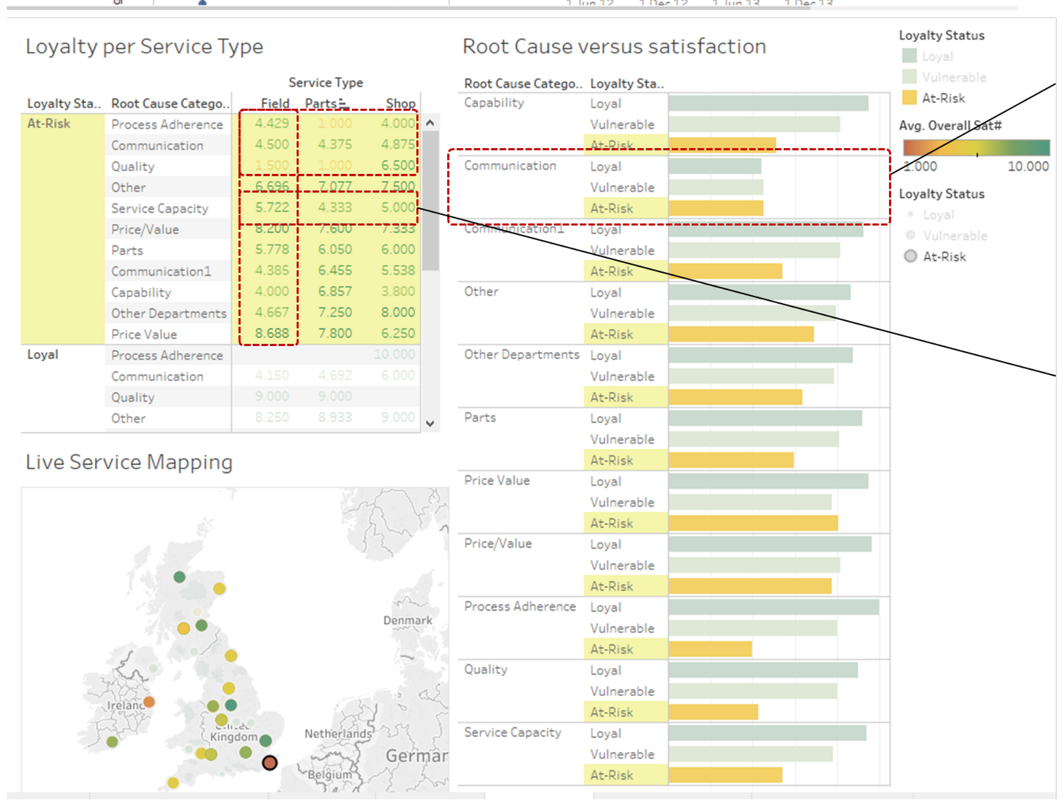
Data points far from the box-whisker extremeties can be used to identify customers who may be on the edge of changing loyalty status

Spread of scores can be compared to previous years, or filtered to see if certain months are more troublesome than others

The data can be split by root cause category, allowing Finning to pin-point the source of issues

Repurchase, referral, and overall satisfaction over the two years can be easily identified with a single click.

By selecting a point on the map, we can see what the root cause of the issue was, whether the customer is at risk or not, and the annual service ratings for that root cause category



Communication has a low score across the board, confirming the outputs from Dashboard I and Dashboard II

Areas of particular low scoring for the at-risk customers can be identified easily from the colour coded table:
Field services, Process Adherence, Communication, Quality, and Service Capacity

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Service Week 2017

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Service Week
2017

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