

Introducing University of Warwick, WMG and IIPSI

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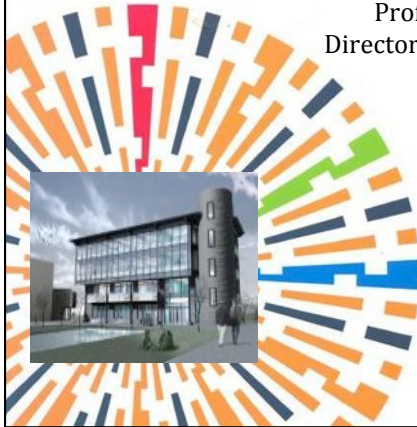
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www.warwick.ac.uk/go/sswmg

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THE UNIVERSITY OF
WARWICK



The University of Warwick

Facts and

- Established 1965
- League table positions
 - Times and Sunday Times (2012) - 8th
 - Guardian (2012 guide) - 6th
 - Independent (2012 guide) - 8th
 - RAE 2008 - 7th overall
 - QS* World University Ranking (2011) - 50th
 - We aimed to be in the top 50 by 2015
- International working
 - Formal working relationships with Boston University, Monash University, IIT Kharagpur, Jawaharlal Nehru University and Nanyang Technological University

Figures

- Undergraduates 12,979
- Postgraduates 10,441
- International students 6,411
- International students 27%
- Total staff 4,912
- Academic staff 687
- International staff 25%
- Turnover £419m
- Campus size 292 hectares
- Academic departments 28
- Research centres 48
- Overseas alumni 44,194

* Quacquarelli Symonds Ltd

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WMG
Innovative Solutions

WMG
Innovative Solutions

WMG Research and Development Centres



International
Manufacturing Centre



International Automotive
Research Centre



International Digital
Laboratory (IDL)



Engineering Management
Building

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Innovative Solutions

New Centres



International Institute for Product and Service Innovation (IIPSI)



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Academy for
Young Engineers
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Global Partners

International Digital Laboratory

Digital Manufacturing	Product Life-Cycle Management
	Robotics
	Experiential Engineering
	Product Evaluation Technologies
	Embedded Systems
Institute for e-Security	Simulation and Modelling
	Cloud Computing Security
	Privacy Enhancing Technologies
	Data Loss Monitoring
	Vulnerability Research
Institute of Digital Healthcare	Trust Management
	Health Informatics
	e-Health
	Neural Engineering
Digital Technologies	Biomedical Engineering
	Virtual Reality Medical Training
	Visualisation
	Digital Media
	e-Business

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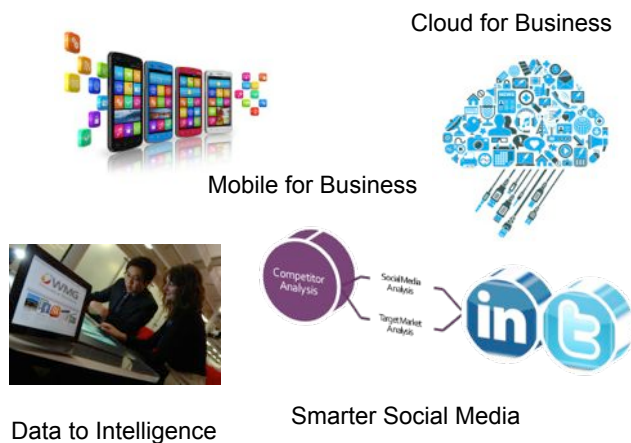
International Institute of Product & Service Innovation (IIPSI)



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Digital Application Innovation (tech demonstrators)



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Polymer Innovation (sample tech demonstrators)



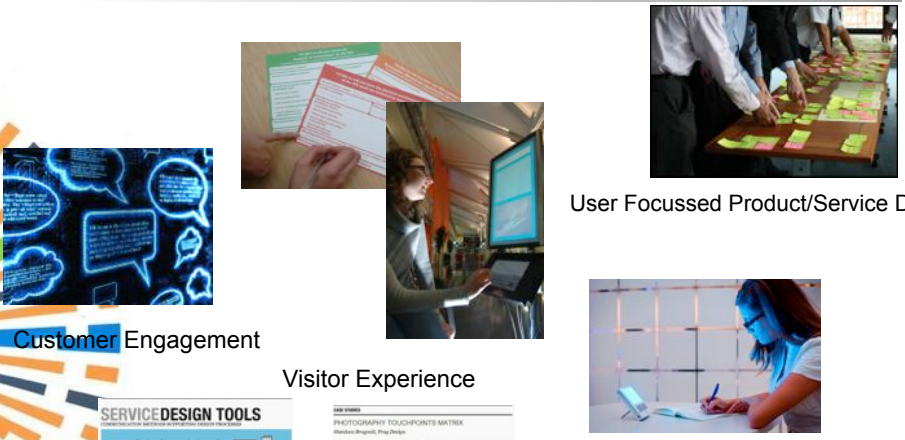
Adding Functionality to Plastic Parts

Low Volume Production

Polymer Recycling

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Experience-led Innovation (sample tech demonstrators)



Customer Engagement

Visitor Experience

User Focussed Product/Service Design

Energy Usage Behaviour

SERVICE DESIGN TOOLS
An open collection of communication tools used in digital processes that don't only create the website.
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PHOTOGRAPHY TOUCHPOINTS MATRIX
PHOTOGRAPHY - CONNECTING THE DOTS

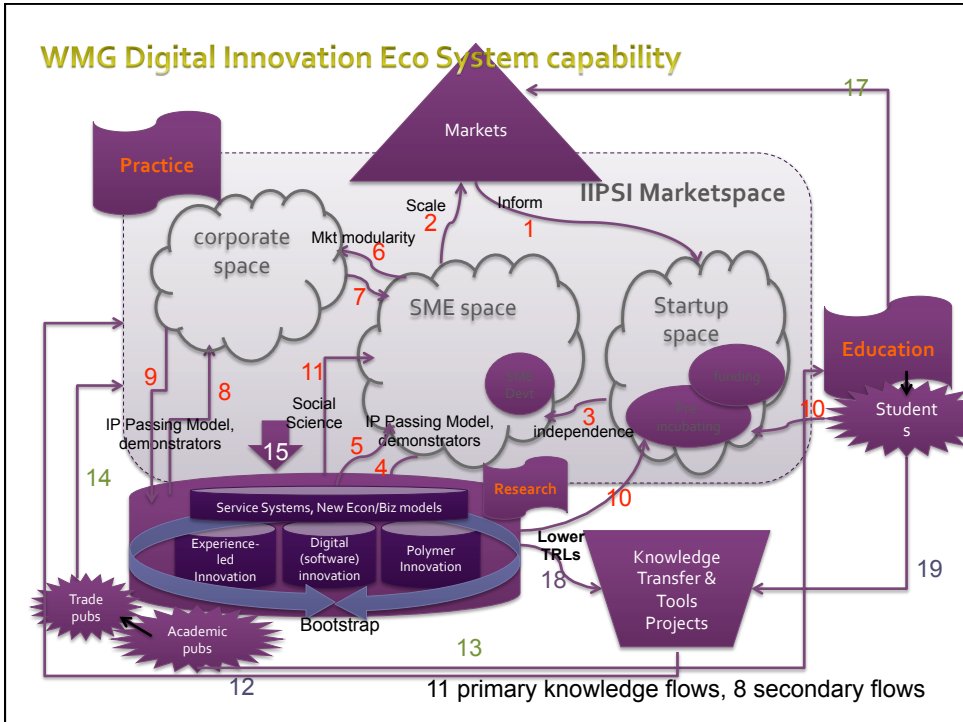
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IIPSI Service Systems & Business+ (bootstrapping tech innovation with service science & business models research and innovation)

- Technology disruptions cause challenges to existing business models (e.g. Kodak)
- Adaptability, transformation needed – both for their **business models** (the firm’s capability to serve the market) and their **economic models** (the way they derive their revenues and the market exchanges they participate in)
- Business+ research into value creating service systems, digitisation/virtualisation, service science, S-Dlogic (e.g. Bombardier, Rolls Royce, GSK); also into pricing/revenue models, methodology for new transactions & markets
- Transdisciplinary team of social science, technology, business & engineering
- 4 RCUK/EPSRC DE projects, NEMODE virtual collaboration host

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 **WVG**
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Impact

- created 12 new high tech start-up businesses,
- directly generated 70 new jobs,
- trained over 450 small business in a range of digital technologies over the last 4 years
- International publications, patents, tools etc.

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 **WVG DIGITAL**

Outcome-based Contracts as a New Business Model

Research Insights from Aerospace/
Defence contracts



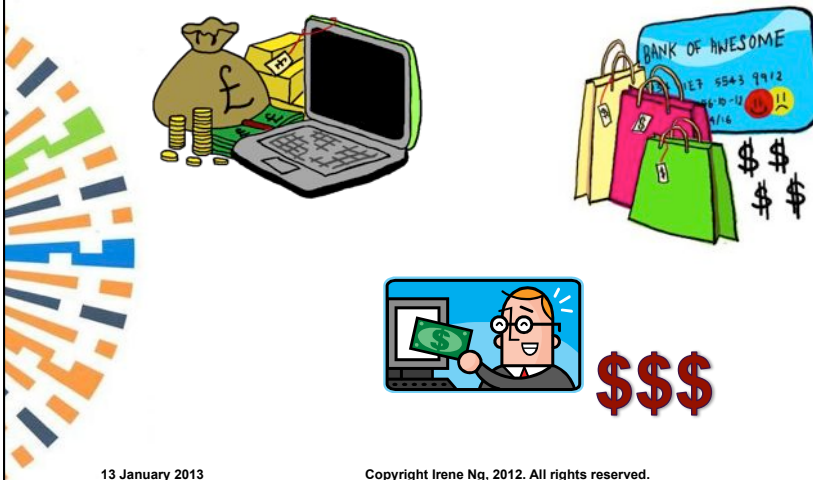
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Theoretical background



The 'science'

More than 200 years of Goods dominant logic: Value as WORTH



But it wasn't exchange that made us happy. It was experiencing what we bought that gave us the outcomes we wanted



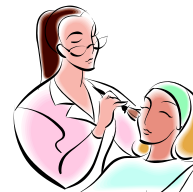
We buy because of the service of the object, even if it was an emotional 'service' i.e. things are **service avatars***

Mike Kuniavsky, 2010

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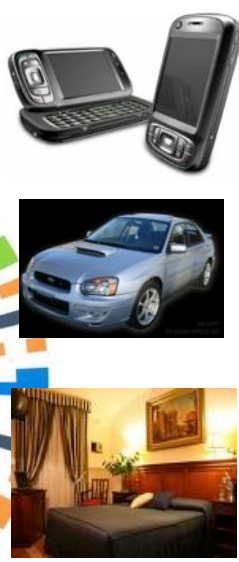
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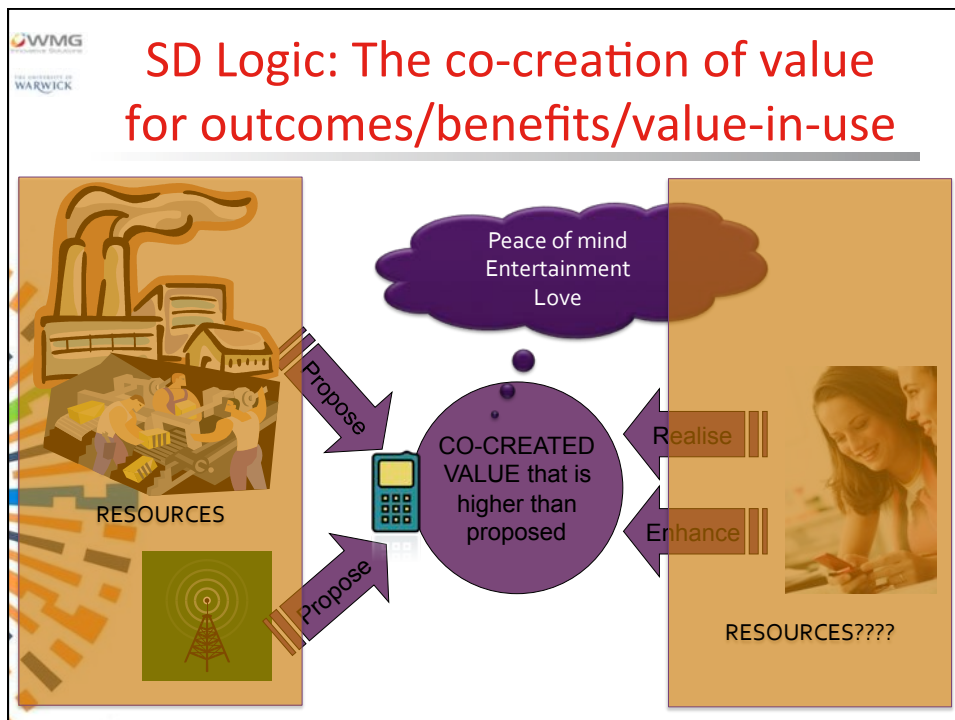
To find ways of innovating, we need to understand value-in-use

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So let's look at this logically



- We buy products to obtain benefits
- What are the benefits
- How do we get the benefits?
- What is the role of the firm? The customer?
- The GDLogic mentality of organizations.

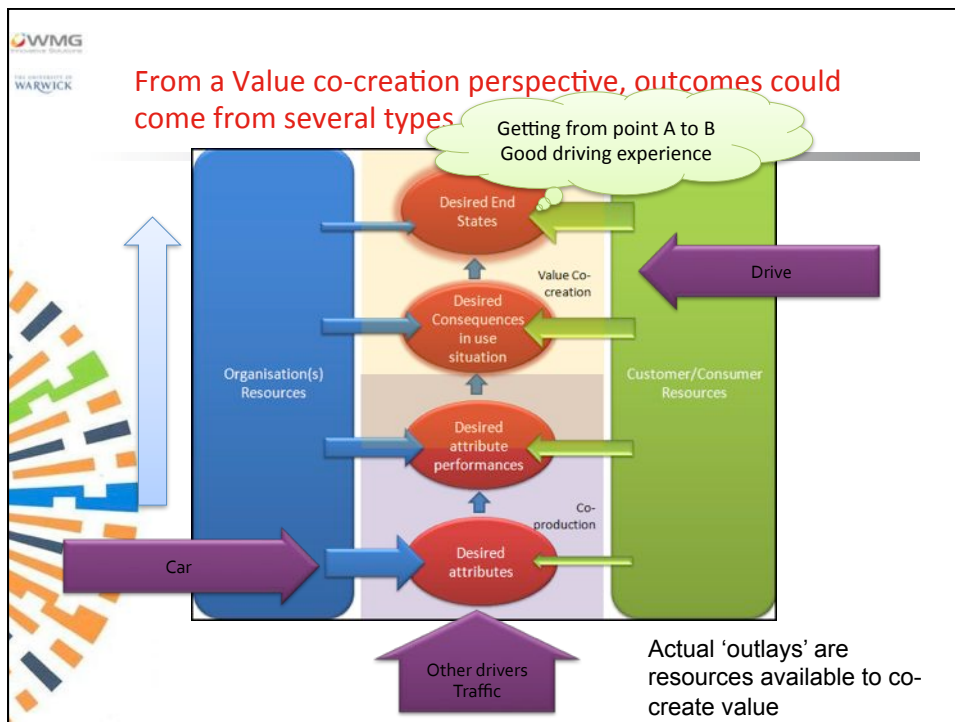


1. Value is co-created: Customer resource to co-create needs to be a feature of design & innovation



Ng, Irene C.L. (2010) "The Future of Pricing and Revenue Models", *Journal of Revenue and Pricing Management*, Vol. 9, No. 3, pp276-281

Ng, Irene C.L., and Laura Smith (2012), "An Integrative Framework of Value" in *Review of Marketing Research Special issue on Toward a Better Understanding of the Role of Value in Markets and Marketing*, Stephen L. Vargo and Robert Lusch (Eds) Vol 9, pp 207-243

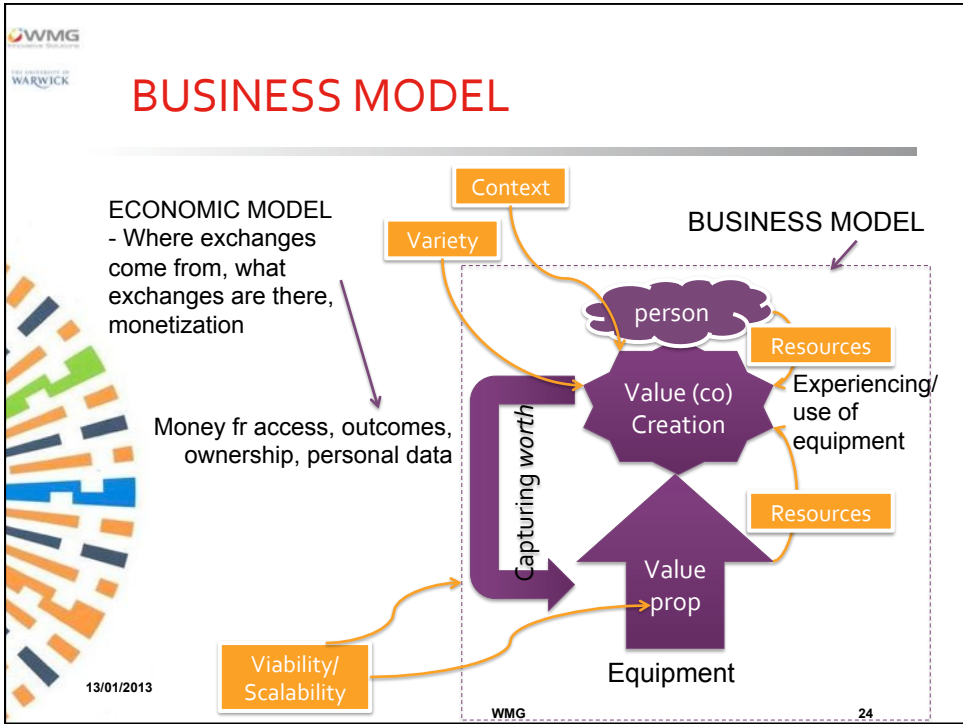


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Key issues in value co-creation for outcomes

- There is (perhaps) only a difference between a product and a service if you've already made the product
- From an outcomes perspective, the key issue is (a) what should be the value proposition (combination product/service) (b) how does the firm participate in value (co)creation by the customer to achieve those outcomes and (c) how do we capture 'worth' (\$\$\$). In other words – what's the *business model*

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Outcome-based Contracts

- Some simple analogies
 - English lessons, holes in the wall
- More complex OBC
 - Rolls Royce Power by the hour ©
Availability of equipment, Popularity of a fiction collection in a library

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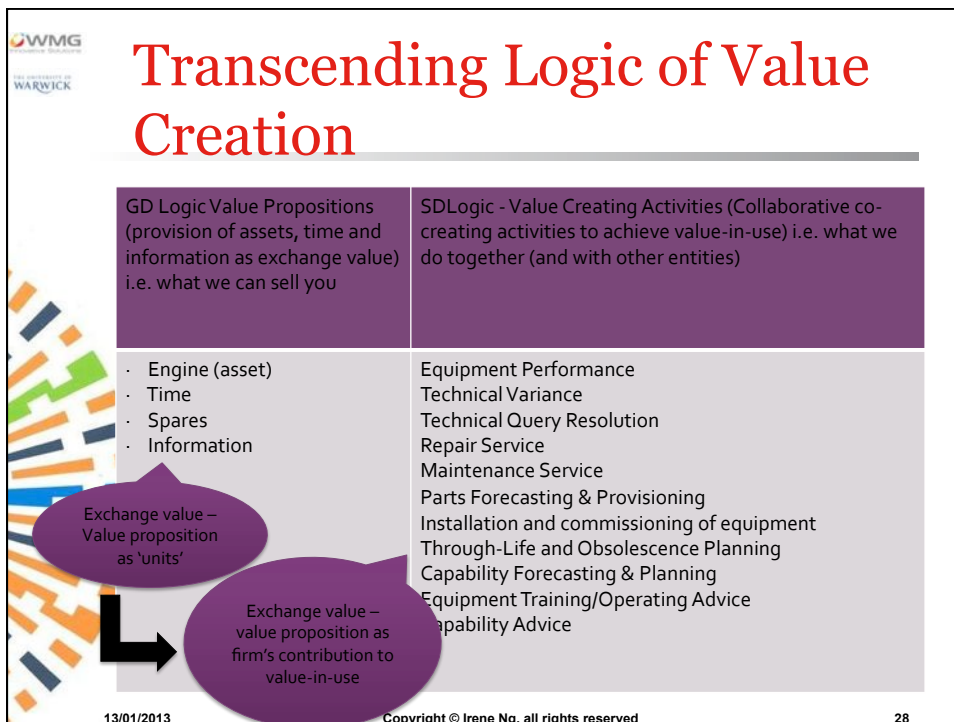
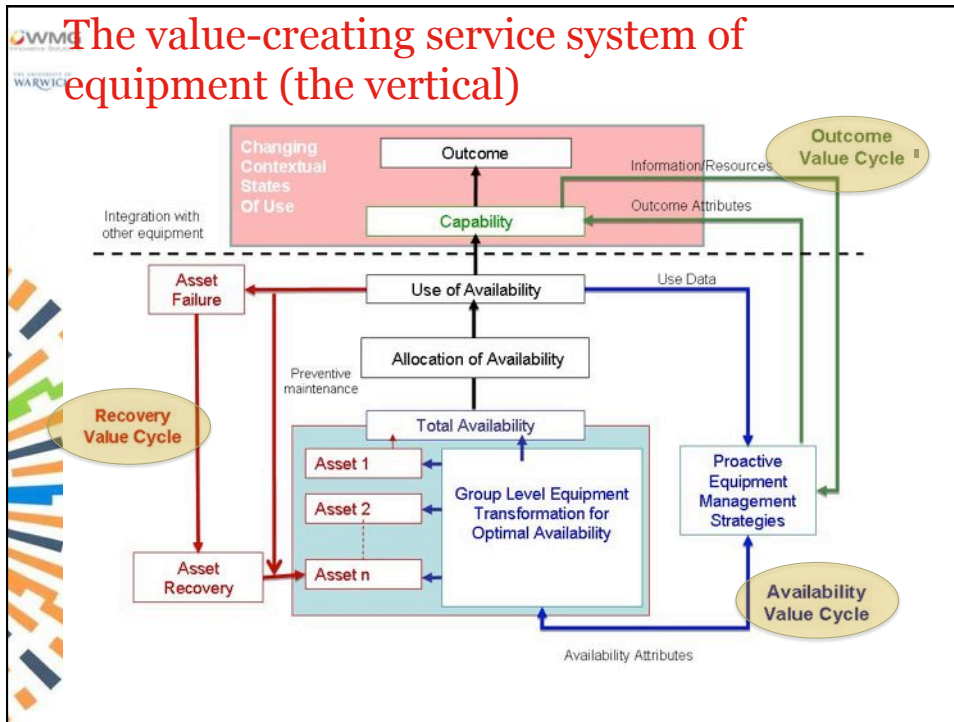
Understanding Efficient and Effective Value Co-Creation and the Marginal Analysis of Service for Outcomes

The Case of Rolls Royce

Smith, Laura, Irene CL Ng and Roger Maull, (2012) "The Three Value Cycles of Equipment Based Service," Production, Planning and Control, Vol 23, Issue 7, pp1-18, DOI:10.1080/09537287.2011.640055

Ng, Irene C.L., Glenn Parry, Roger Maull, Laura Smith, Gerard Briscoe (2012), "Transitioning from a Goods-Dominant to a Service-Dominant Logic: Visualising the Value Proposition of Rolls Royce," Journal of Service Management, Vol 23 (3), pp416-439

Maull, Roger, Laura Smith and Irene C.L. Ng, (2012) "Servitization and Operations Management: A Service-Dominant Logic Approach", International Journal of Operations and Production Management, forthcoming



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Visualising Exchange and Contextual Value & Resource Integration informed by SDLogic

- Visualising exchange value from value-in-use
 - Understanding customer choice through Conjoint Methodology
- Visualising Resource Integration
 - S-D Logic suggest that "resources are not, they become." (Vargo and Lusch, 2004, p.2)
 - resources are only active in enabling processes.
 - depiction of resources as activities and the focus on process in service is the domain of operations management (Silver, 2004; Ponsignon et al. 2011)
 - to visualise resources as activities we first developed a process model for each of the VCAs and then developed a discrete event simulation model to visualise the impact of changes in volume and variety of inputs on the resources.

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How should the firm contribute to value-in-use?

In comparing these three equipment based service packages, which service package would you most want? (Any identical features are greyed out for convenience)
(1 of 14)

Brand	Current Brand	Other Brand	Other Brand
Equipment Performance	Exceeds Desired Performance	Exceeds Desired Performance	Exceeds Desired Performance
Technical Query Resolution Speed	Within 'Customer Required By Date'	Within 'Customer Required By Date'	Within 'Customer Required By Date'
Concessions	Granted	Not Granted	Granted
Equipment Repair Service	Off-Site Repair Service	On-Site Repair Service	On-Site Repair Service
Equipment Maintenance Service	On-Site Maintenance Service	On-Site Maintenance Service	On-Site Maintenance Service
Component Forecasting & Provisioning	Provided	Provided	Provided
Through-Life Forecasting & Planning Recommendations	Provided	Provided	Not Provided
Capability Forecasting & Planning Recommendations	Provided	Not Provided	Provided
Equipment Operating Advice	Not Provided	Provided	Provided
Equipment Configuration Advice for Operational and Contextual Capability	Provided	Provided	Provided
	C	C	C

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Demonstrator (1)

Attribute Query Choose Attribute: 3 Technical Query Resolution Speed

[Home](#)

<Filters>
 Group by
 Customer
 Buyer Leaning
 User Leaning

Click here to simulate scenario.

Attribute Importance

Attribute Sensitivity

Click to Show Sensitivity Breakdown

Define Scenario:

Input variability	Current
Process variety	Current

Total cost of attribute delivery
£5,658

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Demonstrator (2)

Client Query: Attributes

[Home](#)

1	Brand
2	Equipment Performance
3	Technical Query Resolution Speed
4	Recovery Concessions
5	Equipment Repair Service
6	Equipment Maintenance Service
7	Component Forecasting & Provisioning
8	Through-Life and Obsolescence Forecasting & Planning Recommendations
9	Capability Forecasting & Planning Recommendations
10	Equipment Operating Advice
11	Equipment Configuration Advice for Operational & Contextual Capability

Attribute Importance

Attribute Sensitivity

Select Individuals to compare

Individual 1 (buyer leaning)	✓
Individual 2 (user leaning)	✓
Individual 3 (buyer leaning)	✓
Individual 4 (user leaning)	✓
Individual 5 (user leaning)	✓
Individual 6 (buyer leaning)	✓

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Demonstrator (3)

Client Query: Utility of Bundles

Define Attribute Preferences:

	Choose Bundle 1: Individual 1 (b)	Choose Bundle 2: Individual 2 (u)
1 Brand	Current Brand	Competitor Brand
2 Equipment Performance	Meets desired performance	Exceeds desired performance
3 Technical Query Resolution Speed	Delivered within date	Delivered within date
4 Recovery Concessions	Granted	Granted
5 Equipment Repair Service	Off Site Service	On Site Service
6 Equipment Maintenance Service	Off Site Service	On Site Service
7 Component Forecasting & Provisioning	Provided	Provided
8 Through-Life and Obsolescence Forecasting & Planning Recommendations	Provided	Provided
9 Capability Forecasting & Planning Recommendations	Provided	Provided
10 Equipment Operating Advice	Provided	Provided
11 Equipment Configuration Advice for Operational & Contextual Capability	Not Provided (ideal)	Provided (ideal)

Define Cost Scenario:

	For Bundle 1:	For Bundle 2:
Input Variability	Current	Current
Process Variety	Current	Current

	Bundle 1	Bundle 2
Total Preference	540	536
Total Cost	£99,999	£88,888

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Demonstrator (4) – Marginal analysis

E2E Tradeoffs

Home

Customer Heterogeneity (interacts with bundled preference loss)

Overall	6%
Buy-leaning	6%
Use-leaning	1%

CLIENT CONTRACT ANNUAL CONTRACT

Attributes	EFF Ideal	E2E tradeoff - REVENUES & COSTS				Net	E2E RECOMMENDED	Notes
		APL	Loss	Gains	%			
Bundled Preference Loss	-12%					-15%		
Annual Costs	£63,574.32					£33,466		
1 Brand	Current Brand	-23%	£19,759		0%	£19,759	Current Brand	No Costs Provided
2 Equipment Performance	Equal to desired	-33%	£28,633		0%	£28,633	Equal to Desired	No Costs Provided
3 Technical Query Resolution Speed	Delivered within date	-47%	£40,209	£453	1%	£39,757	Delivered within date	
4 Recovery Concessions	Provided	-34%	£29,442	£12,174	19%	£17,268	Provided	
5 Equipment Repair Service	Offsite	-17%	£14,456		0%	£14,456	Offsite	No Costs Provided
6 Equipment Maintenance Service	Offsite	-16%	£13,587		0%	£13,587	Offsite	No Costs Provided
7 Component Forecasting & Provisioning	Provided	-7%	£6,322	£14,545	23%	£8,223	Not Provided	
8 Through-Life and Obsolescence Forecasting & Planning Recommendations	Provided	-13%	£11,221	£8,452	13%	£2,769	Provided	
9 Capability Forecasting & Planning Recommendations	Provided	-3%	£2,945	£6,609	10%	£3,664	Not Provided	
10 Equipment Operating Advice	Provided	-10%	£8,200	£8,955	14%	£755	Not Provided	
11 Equipment Configuration Advice for Operational and contextual Capability	Provided	-11%	£9,342	£7,182	11%	£2,160	Provided	


Case study on value co-creation: BAE Systems & outcome-based contracts



ATTAC Outcome-based contract

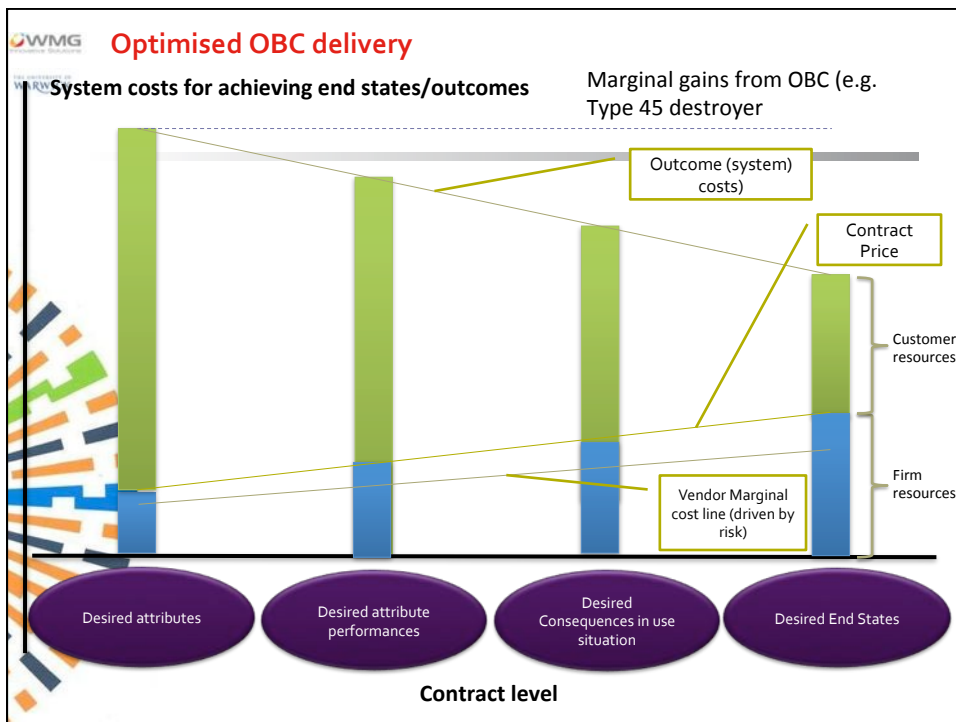
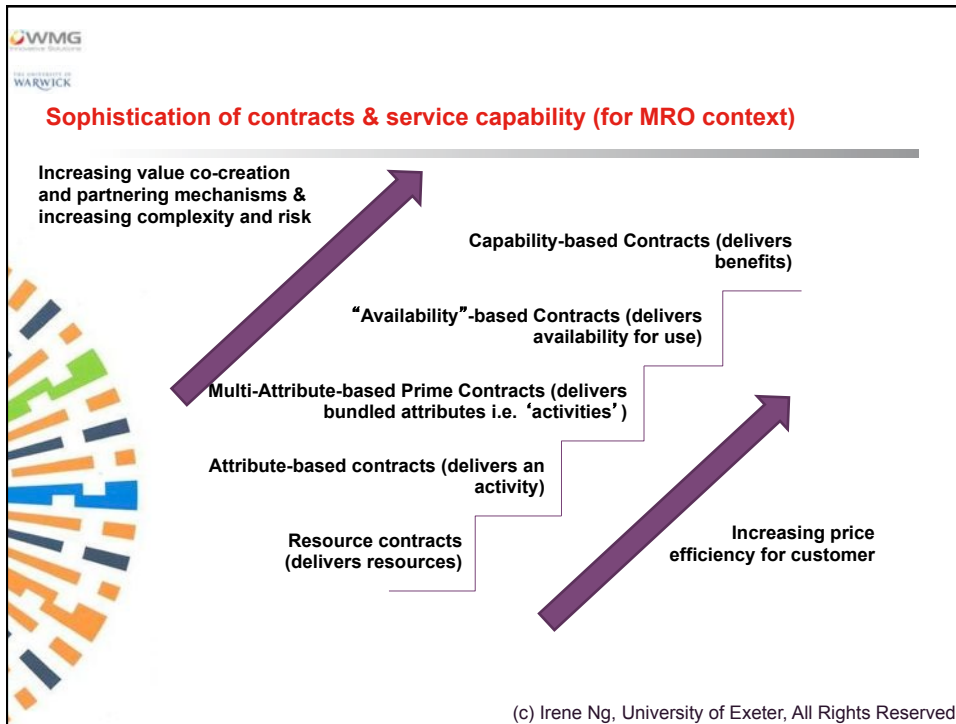
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BAE Systems

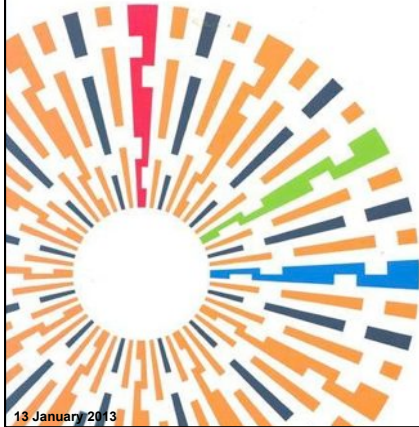


Ng, Irene C.L., Xin Ding and Nick K.T. Yip, "Outcome-based Contracts as New Business Model: The Role of Partnership and Value-driven Relational Assets," *forthcoming* in *Special issue on Business Models – Exploring value drivers and the role of marketing*, *Industrial Marketing Management*

Ng, Irene C.L., Sai Nudurupati and Paul Tasker, (2010) "Value Co-creation in Outcome-based Contracts for Equipment-based Service", AIM working paper series, WP No 77 - May – 2010
<http://www.aimresearch.org/index.php?page=wp-no-77>



Some lessons



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(1) Why/when systemic costs go down & margins increase for OBC

- Optimising marginal rate of technical substitution of skills & competencies
- Understanding risks, location and marginal rate of risk impact on operational effectiveness & efficiency – information asymmetry – related to skills & competencies
- Pain/gain shares
- Low transaction costs (partnership competency)
- Higher customer empowerment



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(2) 7 attributes of value co-creation (partnership competency)

- The system reflected seven attributes that enabled value co-creation towards outcomes (that enabled customer 'use' to change delivery, enable agility, flexibility, absorption of variety)
 - Congruence of Expectations
 - Complementary Competencies
 - Process Alignment
 - Behavioural Transformation
 - Empowerment for Behavioral Transformation
 - Perceived Control
 - Behavioral Alignment

Ng, Irene C.L., Sai Nudurupati and Paul Tasker, (2010) "Value Co-creation in Outcome-based Contracts for Equipment-based Service", AIM working paper series, WP No 77 - May - 2010 <http://www.aimresearch.org/index.php?page=wp-no-77> under second revision for resubmission to Journal of Service Research



(3) Outcome-based Contracts are not the same as solutioning

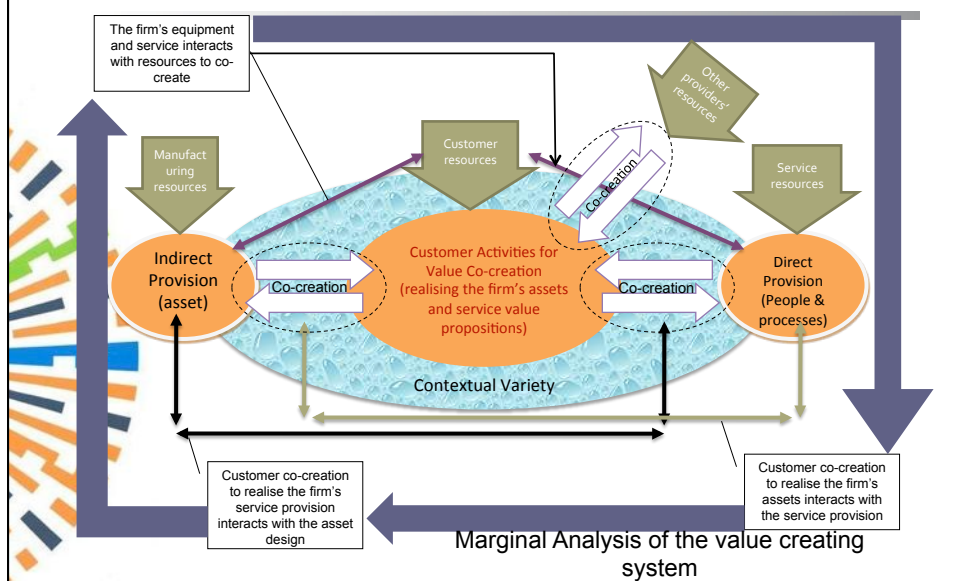
- Different org competency
- Different system (open, collaborative)
- Paradox of solutioning (engagement, emergence)
- Solutioning is sometimes more expensive (due to location of risks and info asymmetry)
- Complex outcomes vs functional complicated outcomes
- Variety
- COULD be pre-specified but on marginal cost of competencies


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(4) OBC change boundaries – focusing on value co-creation

- Shifts the boundaries of *service*
- Shifts the skills sets and capability of the firm – risks
- Joint system capability of customer and firm – rather than drawing a boundary and sub-optimizing
- Better re-configuration of resources and substitutability of resources
- Major impact on human skills of the future: systems thinking, what we try to achieve


(5) Starting to understand the interactions: the need to move to Service Dominant Value-creating Systems





(5) Manufacturing AND Service for Outcomes


- **Assets:** scalable to support customer resource co-creation for outcomes
- **People, processes:** support contextual variety, emotional value, experiences, engagement
- No conversation on manufacturing can be held without service conversations which include people, technology processes of the firm *and* the customer to realise the value that is high contextual variety
- No conversation on service can be held without manufacturing and design conversations which include requirement analysis, product design



Some extensions

(aka – what we have been thinking about)







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Boundaries

- What do we learn from the iPhone as a platform
 - Every iPhone is the same
 - Every iPhone is different
- Variety, stability & scalability
 - Between customer use resource, the firm's service resource and product resource




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OBC: Issue of distributing & delegating skills and competencies between firm, customer

- Boundary issue (product-service, service-customer, product-customer)
- Influence on boundary: Contextually personalisable (variety issue) & stable in positioning & growth (scalability issue)

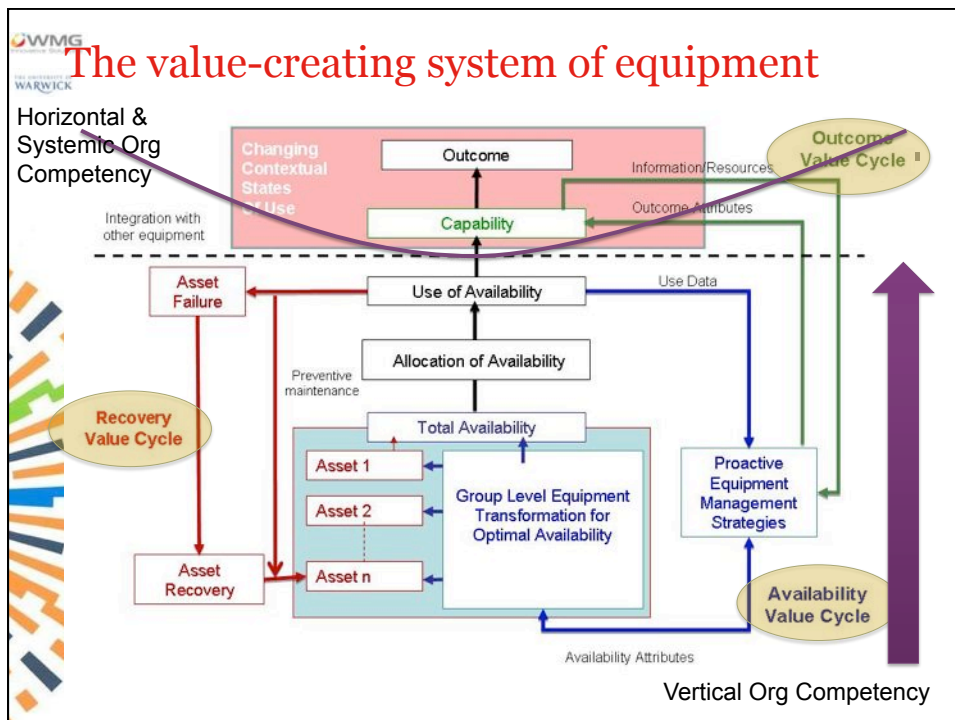



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Other extensions



New Economic Models
for Outcome-based
Contracts






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Systemic v Vertical business models

- Influence on boundary: Challenge of systemic (H&V) and vertical business models – appropriating revenues from other verticals

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Outcome-based business & economic models

- Has a huge impact on sustainability (engines fly longer, washing machine last longer)
- Shifts the focus from manufacturing/production to complex service systems – human, processes, assets – to achieve to outcomes
- Important focus for the economy (e.g. UK) that has lost a lot of jobs to manufacturing, a focus to build better competencies and competitive advantage
- Increasingly possible because of sensor technologies and IoT. Buying closer to contexts (see tomorrow's presentation)

Outcome-based service contracts in the defence industry – mitigating the challenges
 Irene C.L. Ng
 University of Exeter Business School, Exeter, UK, and
 Sai S. Nadarajah
 DBMS, Business School, Manchester Metropolitan University, Manchester, UK

Abstract
 Purpose – This case study aims to explore the risks and challenges associated with the implementation of outcome-based contracts (OBCs) in maintenance, repair and overhaul services in the defence industry. It also aims to identify ways to address and reduce them.
 Design/methodology/approach – The case study approach was used to capture the dynamics of OBCs in O&M service delivery. The challenge and data were captured using qualitative approaches such as in-depth interviews, and findings were abstracted through grounded theory. The factors identified from the above findings were embedded in a survey and validated using exploratory factor analysis.
 Research implications – Journal 0950-0804, 37, 131-140

Keywords
 Systems thinking; Service science; Outcome-based contracts; Value co-creation; Service-dominant logic

Introduction
 Outcome-based contracting, or its narrower equivalent of performance-based contracting, is a contracting mechanism that allows the customer to pay only when the desired outcomes, rather than merely activities and

Summary
 Two outcome-based defence contracts are studied in the attempt to better understand the provision of services in maintenance, repair and overhaul (MRO) environments that is contracted on the outcome of the equipment, rather than the process of equipment. The nature of the contract changes the dynamics of the delivery, bringing complex issues such as customer behaviour and involvement in the treatment, into the equation and the need for total cost-of-ownership and co-production, rather than the old party's contractual obligation. The uncover four areas that are crucial in the understanding of value co-creation in service delivery and analysed them through a systems approach consistent with the application of the service-dominant logic, both considered as the theoretical underpinning of service science.
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Transitioning from a goods-dominant to a service-dominant logic: Visualising the value proposition of Rolls-Royce
 Irene Ng
 Service Systems Group, Warwick Manufacturing Group,
 University of Warwick, Coventry, UK

Value, Variety and Viability: New Business Models for Co-Creation in Outcome-Based Contracts

aim RESEARCH
 icck, UK
 mbridge, UK

VALUE CO-CREATION IN THE DELIVERY OF OUTCOME-BASED CONTRACTS FOR BUSINESS-TO-BUSINESS SERVICE¹

is a value added process to such as setting, or the price in its market target both.

and service value proposition in customer-facing domains in the firm's viability may reflect the firm's value proposition. service models as the capability of managing customers, including emotional customer "pull" (growth) are a distinction mechanism group is in understanding the interactions to approach towards recognizing the firm's value-based service systems were analysed and, in which the authors found that the firm through the different value propositions to be considered. The study provides a way of firms in adapting emerging business logic into technical systems.

ner Experience, Service Dominant Logic.

Engle are in support of

n just transferring the ownership of a (Dohy, 2008; Bates et al., 2007), as that the value proposition of the user changes from exchange value to equipment provisions, to value based from the customers of equipment come-based contracts such as Rolls-Royce "Power-by-the-hour", exemplifies edge in value proposition, as the firm is according to its service activities internal and repairs, but based on the of such activities in continual use

that entire proposition of ICE Global is published.

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WIMG Service Systems Group Case Study

Towards Effective Collaboration: The Service Transformation Toolkit

Author: Steve Coomber

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