

Understanding the Relationship between the Adoption of Innovation and Institutions:

An exploratory qualitative case study on NHS Technology
Procurement

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 - Exogenous and Endogenous Institutional Features
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RESEARCH CONTEXT

- Adoption in the public sector perceived as slow and varied (Albury, 2005; Fagerberg et al. 2005)
- Increasing pressure on the public sector to achieve more efficient allocation of resources and higher quality public services (Cunningham & Karakasidou, 2009; Curristine et al., 2007)
- Public organisations as important customers to innovation (Lember et al, 2007; OECD, 2011)
- Innovation policy research has identified procurement and adoption as an important policy “tool” to foster the adoption of innovation (Edler et al., 2005; Rolfstam, 2008)

LITERATURE, STATE OF THE ART

Innovation Adoption Literature

- Lack of understanding of the underlying institutional factors which play a role in the process (Albury, Carljord et al, 2010)
- Understanding innovation adoption within multi-level and complex organisations, such as the NHS (Albury, 2005; Fagerberg et al., 2005; Carljord et al. 2010).

Key references: Hollingworth, 2000; Rogers, 1995; Pettigrew, 1987; Miles, 2012; Carljord et al. (2010), Greenhalgh (2004), Imperial College London (2010); Barry (2001)

Public Sector Innovation Literature

- Lack of context specific research – NHS (Albury, 2005; Hughes, 2001; Naranjo-Gil, 2009)
- Adoption varies considerably across public sector organisations, regardless of the perceived potential of the innovation (Naranjo-Gil, 2009)

Key references: Godin, 2010; Albury (2005), Borins (2001), Berwick (2003), Hughes (2001), Potts and Kastelle (2010)

Grey Literature

- Lack of evidence on the success of restructuring efforts of previous NHS systems (LSE, 2010)
- Emphasise the role of Institutional structures in organisation performance and behaviour (Hawkes, 2013)

Public Procurement of Innovation (PPOI) Literature

- Need for more empirical research to overcome the “research to practice gap” (OECD, 2011)
- Call for better conditions for improving the adoption of technological innovations in terms of the buyer/adopter (Rolfstam, 2008; Eder et al. 2005)

Institutional Theory Literature

- Framework to analytically capture innovation adoption from multiple institutional dimensions (Scott, 1995; 2007)
- Institutions argued as important determinants of innovation adoption (Powell & DiMaggio, 1991; Hollingworth, 2000)

Key references: Scott, 1995, 2007; Coriat and Weistein, 2002; Curries and Guah, 1991; Powell and DiMaggio, 1991

Systemic Perspectives key references: Edquist et al, 2000; Lundvall, 1998, 2000

Demand-side PPOI key references: Edler and Georghiou, 2007; Geroski, 1990; Hommen et al, 2009; Murray, 2009; OECD, 2011; Rofstam, 2009, 2010, 2011; Uyarra, 2010 ; Lember et al, 2007

Supply side key references: Pavitt, 1991; Mowery and Rosenberg, 1979

RESEARCH AIMS & QUESTIONS

Aim of the study:

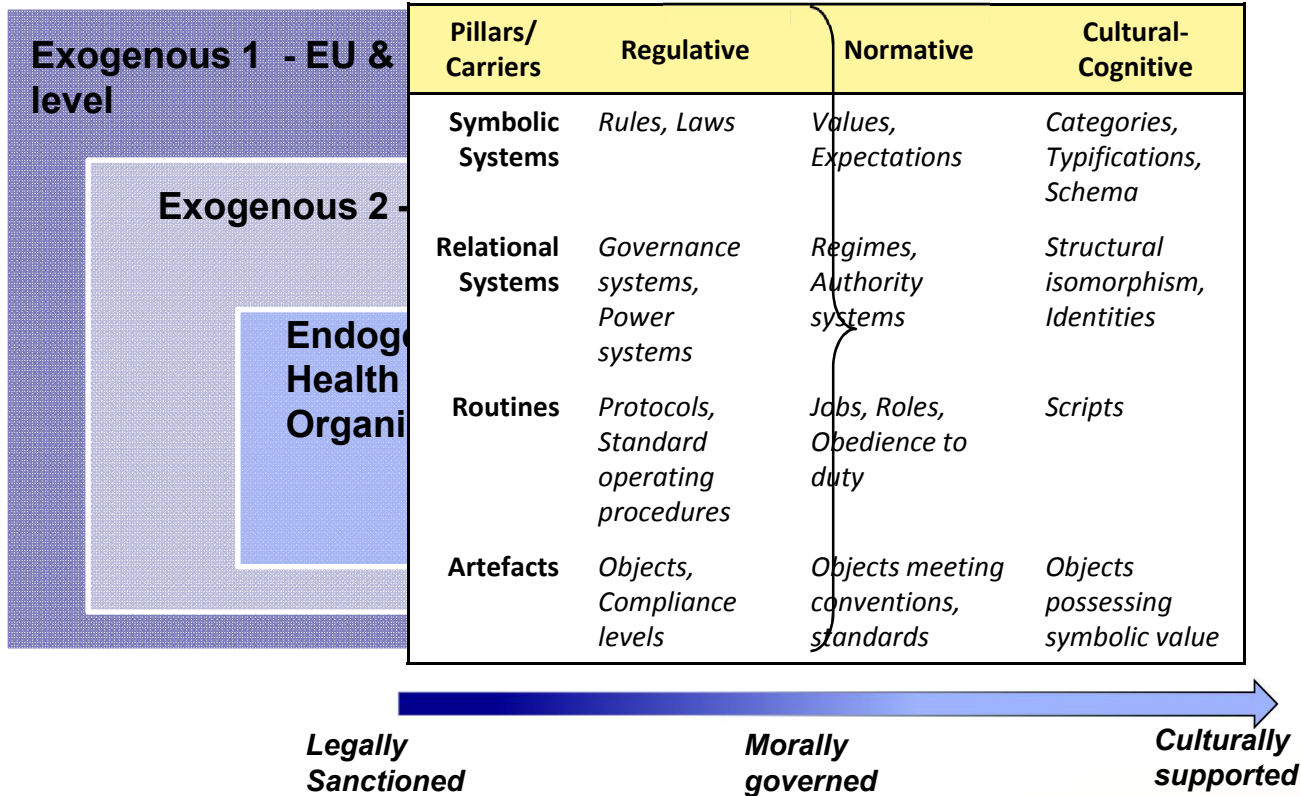
- To analyse the relationship between institutional features and variations in institutional set-ups in an organisation's **ability** and **willingness** to buy and use innovations.
- Understanding the “**exogenous**” (*external*) institutional environment and “**endogenous**” (*internal*) institutional set-up that make a difference in the adoption of innovation.

Main Research Questions:

- 1. What are the different types of institutional features which impact on the adoption of innovation technologies?**
 - *What are the key exogenous institutional features on the regulatory, normative and cognitive dimensions that affect the adoption of innovation?*
 - *What are the relative endogenous institutional features that affect innovation adoption processes?*
- 2. How do different types of institutional arrangements affect the willingness and ability of organisations to adopt innovation technologies?**
 - *How does the interaction between the exogenous and endogenous institutions affect the adoption of innovation technologies?*

CONCEPTUAL FRAMEWORK

LEVEL OF CONCEPTUAL FRAMEWORK BASED ON SCOTT (1995)



METHODOLOGY & FIELDWORK

NHS ENGLAND

Context Analysis

Innovation Experts

- Department of Health (DoH)
- ABHI

Procurement Experts

- DoH
- Former PASA
- NW Centre of Excellence

NHS Procurement Case Studies – Hospitals

Holmium Laser: Surgical Procedure

East of England

Central Lowlands
Scotland

Fibroscan: Non-invasive Diagnostic

North West England

South West
Scotland

DaVinci Robot: Min.-invasive Surgery

South West of
England

North East Scotland

Clinical and non-clinical perspectives:

- Users (Clinician, nurses)
- Suppliers
- Procurement
- Financial
- Managerial
- External Groups (Charities, Networks, Regulators)
- Archive, Policy & other Documentation

NHS SCOTLAND

Context Analysis

Innovation Experts

- Scottish Government
- Regional Innovation Centre
- Scottish Health Technologies Group

Procurement Experts

- Scottish Government
- National Procurement

Total number of interviews: 6

Total number of interviews: 40

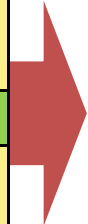
Total number of interviews: 6

RESEARCH FINDINGS

Q.1 Exogenous & Endogenous Institutional Features

EXO.	Governance Structures	Centralised	ENDO.	Structural Isomorphism	Low - More integrated and similar organisations
		De-centralised			High - More differentiated or organisations
	Accountability Links	Clearly defined Vertical links		Risk Mgmt	Tendency to shift "upwards", more mixed
		Indirect Vertical links			Local
	Central Authority/ Power	High		Compliance Levels	High
		Low			Varied, lower
	National Standards, Norms, Values or Expectations	Integration & Collaboration		Local Norms, Values or Expectations	More integrated priorities
		Efficiency & Patient Centredness			Pressure on cost savings while responding to patients needs
		Internal market & Patient Choice			"perceived" Inter-organisational Competition & patient choice

Q.2: Institutional Interplay & the Ability & Willingness to adopt

- 
- Slower adoption for complex items
 - Likelihood of potential delays in decision making due to more defined hierarchy
 - Faster adoption for routine, or less complex innovation items
 - More "uniform" adoption
 - More collaborative approach to decision making and adoption
 - Stronger involvement of "Procurement" in the decision making
- More varied adoption levels
 - Potentially faster spread of innovation – highly dependent on individual skill and knowledge base
 - Higher likelihood of unexpected delays due to misalignment of needs and priorities
 - Process following tendency, i.e. procurement plays a smaller role in decision making – "tick boxing"

RESEARCH CONTRIBUTIONS

Literature Contributions:

- Responding to the problem of slow and inconsistent adoption of innovation in the public sector
- Addressing the lack of context specific research, particularly in the light of the NHS
- Contribute to the growing empirical base in the procurement literature

Management and Policy Advice:

- Creating greater awareness on how the potentially conducive interplay of various institutional factors can affect the level of innovation adoption across an organisation or system.
- To promote learning across large, complex organisations such as the NHS

Thank you for your attention!

THE ENGLISH AND SCOTTISH NHS

- THE EXOGENOUS INSTITUTIONAL DIMENSION -

	Institutional Pillar	Regulatory	Normative	Cultural Cognitive	Regulatory	Normative	Cultural-Cognitive
	Key Features	English NHS Context			Scottish NHS Context		
Exogenous1		<p>Procurement: EU Procurement rules on Tendering & OJEU advertisement</p> <p>Products: FDA Approval CE-Marking</p>		<p>Local interpretation of EU procurement rules described as "process following" (Resp.1E, p4)</p>	<p>Procurement: EU Procurement rules on Tendering & OJEU advertisement</p> <p>Products: FDA Approval CE-Marking</p>		
	<p>Organisation, Governance & Accountability</p>	<p>Governance: de-layered accountability and funding structure (Resp. 1E,p10)</p>	<p>Governance: Application of bottom-up policy approach due to limited direct central control (Raising our Game Report i.e.)</p> <p>Monitoring: Central authority to set annual performance standards for NHS Trusts (Resp. 2E, p3)</p> <p>Standards/Norms: Conflicting aim for collaboration & internal competition (Resp.1E, p4)</p> <p>Problem of "perceived" competition induced by patient choice element (Resp. 1E, p6)</p>	<p>Structural Isomorphism: high due to focus on local autonomy in setting priorities (Resp. 1E, p10)</p>	<p>Governance: Unspoken "democratic accountability" (Resp. MO, p.9)</p> <p>Centralisation of general governance, funding and performance (I.e. NRAC formula "envelope of money"; HEAT Targets on national outcomes) (Resp. 3S, p9)</p>	<p>Accountability & Power lines: Trust accountability held through command and control policy (Resp. 3S, p.3)</p> <p>High level of scrutiny from media and close involvement of ministers "Goldfish bowl" (Resp. 3S, p.4)</p> <p>Compliance Levels: Perceived as strong (Resp. 1S, p15)</p>	<p>Structural Isomorphism: Perceived stronger cohesion of national and regional standards, norms and structures, driving towards an integrated service (Resp. 3S, p9)</p>
	<p>Procurement system</p>	<p>National procurement: (NHS Supply Chain) described as "passive procurement" (Resp. 1E, p.3)</p> <p>"disjointed procurement" system (Resp. 1E, p3)</p>	<p>Monitoring: No clear control and monitoring of local procurement activities (Resp. 1E, p4)</p> <p>Standards/Norms: Cost-reduction & Efficiency oriented national procurement contract agreement with suppliers (Resp. 1E, p9)</p> <p>Standard of choice on National catalogue (i.e. variety in gloves)</p> <p>Perceived lack of interest in procurement & Innovation (Resp. 1E, p.8)</p>	<p>Supplier-User Relationship: strong (Resp. 4E, p5)</p>	<p>National Procurement: an "instruction mandate to drive costs down" (Resp. 1S, p11)</p> <p>Obligatory to all boards to have a membership on the CAP panel board of NP.</p> <p>Key procurement Principles (CEP 05, 2012) to be adopted by all healthboards in Scotland.</p> <p>National Procurement Policy on fundamental rules, behaviours and standards to be adopted by local boards</p>	<p>Standards/Norms/Expectations: Maximising efficiency in public sector proc principles (NP, 2013)</p> <p>National expectations on "low cost", Collaboration and collective buying to reduce product variation, price and waste (Resp. MP, p7)</p> <p>Prioritisation: Slower decision making approach due to integration of different perspectives (Resp. 1S, p12)</p>	<p>Training/Skills and Knowledge: Described as "inwards looking" for acquiring new skills & knowledge (Resp. 1S, p.16)</p>
<p>Innovation system</p>	<p>Guidance/Reinforcement: NICE as a benchmarking tool on product performance and evidence research (Resp. 1E, p.7)</p>	<p>Incentives: Few Incentives (i.e. CQUIN payments to reward excellence in Innov & Qual at commissioning & provider level)</p> <p>Standards/Expectations: Direction setting publications "Winless Report" on "slow adoption", Darzi Report, Innovation Health & Wealth setting health standards (Resp. 3E, p1)</p> <p>Norms/Values: Perceived lack of demand for innovation "NHS Trusts not demanding the latest stuff" (Resp. 1E, p6)</p> <p>Competition and company image as driver for adoption to become "leading edge" (Resp.1S, p10)</p> <p>Compliance levels to Central direction: Low due to strong supplier-user relationship & local autonomy (Resp. 1E, p8)</p> <p>Trend in adopting non-evidence based products in the past (i.e. Metal to metal hips)</p>	<p>Risk Adversity: diverted towards local responsibility (Resp. 1E, p3)</p>	<p>Guidance/Reinforcement: NICE is considered as a guidance in NHS Scotland but not binding (Resp, 1S, p.3)</p> <p>Adoption of regional perspective on innovation adoption (McClelland Review) (Resp. 3E, p.2)</p>	<p>Norms/Values: Strong sense of collectivity and Integration in decision making to curb risk (Resp. 1S, p7)</p> <p>Local procurement perceived to be more involved in decision-making and relationship with supplier (Resp. 1S, p7)</p>	<p>Risk adversity: strong risk awareness on national level with fears to "pick wrong innovations and might never know whether we made a wrong decision" (Resp. 1S, p7)</p>	

- THE ENDOGENOUS INSTITUTIONAL DIMENSION -

Case	Innovation	Landscape orientation	Hospital Need	Adoption Process	Outcomes	Determinants
Da Vinci Robot	<p>Description: Sophisticated robotic platform for minimally invasive surgery Performed through master-slave tele-controlled manipulators and 3-D high resolution camera</p>	<p>Widely adopted worldwide (over 4000 systems) NHS England: apx 42 robots in Eng (28 NHS); Disproportionate adoption: S. of Eng.</p>	<p>Address skill shortage of difficult training process of laparoscopic surgery Competitiveness & Hospital profile: to "stay ahead of the curve" (SM, p2,4) Patient choice demanding newest procedures (JK, p.5)</p>	<p>Idea/Process: informal discussion among clinicians in 2006/2007 Exclusion of Trust Chairman in decision making, due to perception of a lack of innovative mind-set (SS, p2) Funding through local charity Adoption length: 6-9m</p>	<p>Forego NICE Cancer guidelines on use in larger Cancer centres As a smaller hospital, prostate surgery is banned by NICE Use in NHS, private and research purposes for managing costs</p>	<p>Compliance levels to processes and regulation low High level of autonomy of individuals Risk diverted to local level</p>
	<p>Benefits: High-volume potential, faster training competency, reduced operating times, faster pt recovery and fewer surgical complications</p> <p>Drawbacks: High cost; complex long-term cost evaluation</p>	<p>NHS Scotland: No adoptions in NHS Scotland</p>	<p>Address staff shortage Create capacity to reduce waiting lists Adoption part of a wider infrastructure change to extent cancer care centres</p>	<p>Process: BC filed in 2012 with agreement in principle by the health board Scottish Government mandated to withhold purchase until further evidence</p>	<p>No adoption Taking a collaborative perspective: planned regional adoption across elected cancer centres Supportive Cancer Charities raising money for systems</p>	<p>Integr. national planning & decision making High compliance levels to processes & regulation Risk jointly held at local and national, while tendency to 'shift' upwards due to accountability structure</p>
Holmium Laser	<p>Description: Powerful dual-wavelength surgical instrument for the treatment of stones, tumours and strictures and other fields.</p>	<p>NHS England: Adoption at over 120 NHS Trusts across UK and Ireland</p>	<p>Address capacity issue due to increasing prostate and kidney stone patients Strengthen Urology profile to avoid potential loss of activity to neighbouring health trusts Improving patient experience</p>	<p>Idea/Process: Pilot hiring Aug'11-Feb'13 (£900/pt) Business case (BC) approval Feb'13 Purchase: before Mar'13 to access remaining funds of financial year Use: end of Mar'13 Adoption length: 18m delay</p>	<p>Managerial resistance led to hiring decision Final restriction in use to 1x/week Maintenance cost increase for single use fibres indicated by the Trust's Infection Control Group</p>	<p>Leadership push innovation</p>
	<p>Benefits: safer and more accurate through effective cutting and sealing tissues</p> <p>Drawbacks: difficult learning curve; Higher cost per treatment (£2,300) in contrast to traditional methods (£500).</p>	<p>NHS Scotland: Very limited adoption in NHS Scotland, with approximately 2hospitals with 100Watt laser installations</p>	<p>Improving pt comfort & length of stay Address capacity issue through adopting the device as part of a wider hospital restructuring plan Address 'niche' pts who cannot have traditional operations Nice guidance driver Strong link to clinical networks on laser surgery</p>	<p>Process: Business case submission 2008 Collaboration with clinical networks to share knowledge and experience Purchase: 2009 Adoption length: 6-8m</p>	<p>Full use Scottish Government Regulations on Infection Control indicate need for single use Laser Tubes, augmenting overall price</p>	<p>Clinical networks in driving awareness and share experiences</p>
Fibroscan	<p>Description: Non-invasive diagnostic device for identifying the progression of liver damage through measuring liver stiffness with low-frequency vibrations</p>	<p>NHS England: Widely adopted with major concentrations in London area</p>	<p>Local incentive to address high liver profile in the region (NW Liver Mortality Report) Strong evidence base on clinical benefit Address pt needs on reducing surgical risks & complications of traditional methods Address certain pt groups lack of mobility with portable devices (i.e. prison)</p>	<p>Idea: One of first adopters Process: Initial BC in 2008 not reviewed 2010 revised BC followed due process Approval by Med devices Committee & Cap Planning Group Purchase: in 2009/10 without BC 2011 with BC Adoption length: 18m+</p>	<p>Initial adoption led to delayed use due to improper calculation of costing (Tariff problem) Now frequent use & allocated Fibroscan clinics (2000x per year) High Pt acceptability Significant drop in liver biops by 60%</p>	<p>Strong autonomy of individuals where personal relationships can override processes</p>
	<p>Benefits: alternative to direct performance of highly invasive biopsies and allows faster diagnosis & informed decision making (40-60% reduction in Biopsy performance)</p> <p>Drawbacks: cost – although least expensive</p>	<p>NHS Scotland: Highest adoptions per population capita, with installations across 13 hospitals</p>	<p>Strong national driver to address burden of liver disease in Scotland (NIHR, 2008; PR, 4) Government driven Hep C Action Plan with ringfence funding for managing and better staging of liver disease (NIHR, 2008)</p>	<p>Idea/Process: Observing adoption at other boards since awareness of device in 2005 Collaborative discussions with Procurement Ringfenced funding allowed capital Purchase: Jan'12 Use: Mar/Apr'12 Adoption length: 6-8m</p>	<p>Reduction of pt treatment length and diagnosis time from 42 weeks to 15-16 weeks (LH, p3)</p>	<p>Stronger Government support through funding facilitate adoption - while decentralised control makes trusts more self sufficient and risk bearing entities</p>