Using patient knowledge for better health systems

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### Structured Abstract

**Purpose** – This paper describes a “work in progress” research project being carried out with a public health care provider in the UK, a large NHS hospital Trust. Enhanced engagement with patients is one of the Trust’s core principles, but it is recognised that much more needs to be done to achieve this, and that ICT systems may be able to provide some support. The project is intended to find ways to better capture and evaluate the “voice of the patient” in order to lead to improvements in health care quality, safety and effectiveness.

**Design/methodology/approach** – We propose to investigate the use of a patient-orientated knowledge management system (KMS) in managing knowledge about and from patients. The study is a mixed methods (quantitative and qualitative) investigation based on traditional action research, intended to answer the following three research questions:

(1) How can a KMS be used as a mechanism to capture and evaluate patient experiences to provoke patient service change

(2) How can the KMS assist in providing a mechanism for systematising patient engagement?

(3) How can patient feedback be used to stimulate improvements in care, quality and safety?

**Originality/value –**This methodology aims to involve patients at all phases of the study from its initial design onwards, thus leading to an understanding of the issues associated with using a KMS to manage knowledge about and for patients that is driven by the patients themselves.

**Practical implications** – The outcomes of the project for the collaborating hospital will be firstly, a system for capturing and evaluating knowledge about and from patients, and then as a consequence, improved outcomes for both the patients and the service provider. More generally, it will produce a set of guidelines for managing patient knowledge in an NHS hospital that have been tested in one case example.

**Keywords –** Knowledge Management Systems, Health care, Patients, Customer Knowledge Management, Service Management.

**Paper type** – Academic Research Paper

# 1 Introduction

Knowledge management in health services has concentrated almost exclusively on clinicians and managers. Patient knowledge has rarely been considered except where the service is being provided in the patient's home ([Cegarra-Navarro et al., to appear](#_ENREF_2)). With health service providers trying to meet the growing demands of an ageing population with limited resources, it is time to seize this missed opportunity. There is potential to use this knowledge to improve the outcomes for both healthcare providers and patients.

Patient knowledge as a concept should not seem very unusual to those in the knowledge management (KM) field, even if the phrase is unfamiliar. It is the specific form that customer knowledge takes in health care. Customer knowledge management has been an active field of research since the paper by [Davenport et al. (2001](#_ENREF_8)). Two central concepts emerging from customer knowledge management are the categorisation of different types of customer knowledge, and the attributes of "attractive quality".

Using these and other concepts from research on customer knowledge management, and from broader research on service management, including service quality and service productivity, we plan an action research investigation of the use of a patient-orientated knowledge management system (KMS) in managing knowledge about and from patients. The study is to be conducted in a large UK National Health Service (NHS) public hospital. It is a mixed methods (quantitative and qualitative) investigation intended to address the following three research questions:

(1) How can a KMS be used as a mechanism to capture and evaluate patient experiences to provoke patient service change?

(2) How can the KMS assist in providing a mechanism for systematising patient engagement?

(3) How can patient feedback be used to stimulate improvements in care, quality and safety?

We intend to concentrate in the first instance on elderly patients and their carers. The elderly represent the greatest users of healthcare services, but also the group least likely to be familiar with ICT systems. Specific objectives with this group are to clarify what matters most to elderly patients, and what a UK NHS hospital as service provider needs to know about/from them; to develop a method to capture the voice of this group of patients; and further, to feed this back into the management of NHS service provision.

**SERVICE MANAGEMENT**

**KMS FOR PATIENT KNOWLEDGE**

**HEALTH INFORMATION SYSTEMS**

**CUSTOMER KNOWLEDGE**

**HEALTH CARE**

Figure 1: Logical structure of paper

Figure 1 illustrates the logical flow of this paper. Beginning with our domain of health care, the next section reviews ideas from service management and in particular the role of the customer and therefore customer knowledge. The focus then turns to customer knowledge management systems (KMS), bringing in ideas from the health information systems field, with the overall project aim being to help deliver better outcomes for both patients and health care providers. The project is "work in progress" at the time of the IFKAD 2014 conference.

## **2 Health care as a service and the role of customer knowledge**

[Lovelock and Wright (1999, p.6](#_ENREF_19)) define services as follows: "Services are economic activities that create value and provide **benefits** [emphasis in the original] for customers at specific times and places, as a result of bringing about a desired change in—or on behalf of—the recipient of the service." Thus there can be no doubt that health care is a service, even if it may include some tangible elements such as surgery and provision of drugs.

The role of the customer in a service is known to be important: [Cook et al. (2002](#_ENREF_7)) view the "service encounter" as a triad, consisting of the customer, the service organisation and the customer-facing contact personnel. However, there is still a long way to go on the journey towards truly regarding patients in a public health care system as customers. In this section we review relevant concepts from the literatures on service management and service productivity, and then on customer knowledge management.

## **2.1 Service management and service productivity**

Given the central involvement of the customer as the recipient of the service, the conventional manufacturing concept of value creation is not sufficient: it is more useful to consider a service as a process of value *co-*creation by the provider and the customer ([Parasuraman, 2002](#_ENREF_22)). This immediately raises the point that the customer's perspective is not necessarily the same as that of the service provider organisation, even if the real situation in health care is not as extreme as the old saw "the operation was a success but the patient died" implies!

[Chase and Dasu (2001, p.84](#_ENREF_3)) advise those designing and managing services to "put yourself in your customer's shoes and imagine their journey". [Parasuraman (2002, p.8](#_ENREF_22)) sets out five questions for such service executives, including two of particular relevance in health care:

* What inputs do our customers and we currently channel into our service process?
* In evaluating the results of our service operations, do we define the outcomes sufficiently broadly and from the perspective of our customers as well?

[Vargo et al. (2008](#_ENREF_23)) consider the concept of value co-creation further, arguing that the distinction that matters is not simply that between goods and services, but between "goods-dominant logic" and "service-dominant logic". The latter can apply even to the provision of goods, so that a car, for example, can be viewed not as an object but in terms of what one can do with it, even if that is simply show it off rather than using it to travel somewhere. Service-dominant logic is tied to the long-established concept of value-in-use, Vargo et al. ascribing the latter term to Adam Smith and the original idea to Aristotle. Vargo et al. go on to extend value-in-use to value-in-context, the latter based on the premise that "Value is always uniquely and phenomenologically determined by the beneficiary" (p.148). The money-based value-in-exchange may thus have no association at all with value-in-use. There is a clear linkage between the two to explain why the price paid for an "old master" painting varies so dramatically according to who is believed to have painted it, but it is much less clear in public healthcare provision, where there is often no direct cost for a specific service, the choice for the patient/customer is simply whether to have the service or not, and concepts of substitution or opportunity costs are far less well-defined than in conventional money-based economic theories. Nevertheless, the importance of customer inputs and perspective is well-established in this literature.

## **2.2 Service productivity in public health care and welfare**

This lack of a direct link between value-in-exchange and value-in-context raises the question of defining service productivity in public services. [Lönnqvist and Laihonen (2012](#_ENREF_18)) examine social service productivity in Finland. They first set out to define service productivity appropriately in what they term "welfare services" (which includes health care). The definition they offer (pp.132-133) is:

"Welfare service system productivity (WSSP) refers to the ratio between the services offered to the service user and the resources consumed by all organizations involved in the service process.

WSSP is affected by the productivity of the activities of each member organization of the system. In addition, at the core of system-level productivity lays the co-operation of participants, clearly defined and communicated system roles and agreed system-level objectives. System-level productivity stresses the customer perspective and, instead of focusing on direct service outputs, it turns the focus on the outcomes of a service."

Overall objectives in public health care usually at least partially meet this definition. In the UK, typically they are framed in terms of high quality of care, better patient outcomes and cost effectiveness. The fact that "high quality of care" normally comes first appears to meet the requirement of the [Lönnqvist and Laihonen (2012](#_ENREF_18)) definition to stress the customer perspective.

Another issue discussed by [Lönnqvist and Laihonen (2012](#_ENREF_18)) is the complexity of public welfare provision, with several organisations involved. The need for a systemic approach in public health care to avoid sub-optimisation and assist focus on the overall outcomes has also been pointed out by others, for example [Edwards et al. (2005](#_ENREF_10)). We will not discuss the complexity and coordination issues further here, as the first phase of our project concerns only services provided onsite by a single hospital.

## **2.3 Customer knowledge management**

Having established the importance of the customer perspective both in service provision and in understanding improvements in service productivity, it is necessary to consider how an organisation might know what the perspective of its customers actually is - customer knowledge management. The benefits to an organisation of actively managing knowledge about its customers were first described by [Davenport et al. (2001](#_ENREF_8)), on the basis of interviews with 24 for-profit organisations with headquarters in North America, and it has been an active field of study within KM ever since. Two concepts from customer knowledge management that are especially relevant to the research proposed here are the categorisation of different types of customer knowledge, and the attributes of "attractive quality".

Three types of customer knowledge have been identified ([Garcia-Murillo and Annabi, 2002](#_ENREF_12)): knowledge *for* customers, knowledge *about* customers, and knowledge *from* customers. The organisation must manage knowledge for customers in order to better satisfy customers’ needs for knowledge on products/services, the market, and other relevant items. Managing knowledge about customers enables the organisation to capture customers’ background, motivation, expectation, and preference about products or services. Managing knowledge from customers is central to the organisation's understanding of customers’ usage patterns or consumption experiences of products or services.

[Chen and Su (2006](#_ENREF_4)) then combined these three types of customer knowledge with the earlier work by Kano and others ([Kano et al., 1984](#_ENREF_16)) on "attractive quality". The three key dimensions of the latter are "must-have" quality, originally called "must-be" quality (the essential elements of a product or service, often taken for granted and whose absence leads to dissatisfaction), attractive quality (unexpected elements that surprise or delight the customer but whose absence would not leave them dissatisfied), and measurable quality (one-dimensional aspects where a strict quality comparison is possible).

The relationship between the three types of knowledge and these three dimensions of quality is not an entirely straightforward one. However, in thinking about - and managing - attractive quality - Chen and Su present a logical progression through the three types of customer knowledge. First, the organisation's knowledge of product/service benefits is used to provide knowledge for customers, then knowledge about customers yields customer satisfaction categorisation, then comes an interpolated step of market segmentation which Chen and Su see as codifying tacit knowledge, and finally knowledge from customers enables the organisation to understand customer usage patterns for the product/service.

In the next section, we look at how to manage this customer knowledge, especially in public health care.

## **3 Knowledge management and KMS in health care**

Our position regarding knowledge in this paper is a pragmatic one - the knowledge to be managed is whatever those involved (clinicians, managers, patients and their carers) think of as knowledge. Space does not permit discussion of the many definitions of KM and KMS. For knowledge management we prefer the early definition of [Wiig (1994](#_ENREF_24)):

‘‘In its broadest sense, knowledge management (KM) is a conceptual framework that encompasses all activities and perspectives required to making the organization intelligent-acting on a sustained basis. KM includes activities for gaining overview of, dealing with, and benefiting from the areas that require management attention by identifying salient alternatives, suggesting methods for dealing with them, and conducting activities to achieve desired results.’’

For knowledge management systems, we prefer that of [Gallupe (2001](#_ENREF_11)): “Knowledge management systems (KMS) are the tools and techniques that support knowledge management practices in organisations.” However, it needs to be understood that these tools and techniques do not have to be ICT-based, and may rely on people or process rather than technology ([Edwards, 2009](#_ENREF_9)). Progress in ICT nevertheless offers new forms of support for managing knowledge, i.e. new forms of KMS. An additional element that may be either a problem or an opportunity for KM is that large public health care organisations are large users of ICT, and often have to link their own systems with even larger regional or national systems.

[Myllärniemi et al. (2012](#_ENREF_21)) study the management of organisational knowledge flows in health care, specifically a laboratory and a radiology unit in South Karelia, Finland. They take an approach based on defining use case categories that trigger the need for these services. They observe (p.61): "a common challenge for knowledge management in healthcare relates to excessive focus on patient data [as opposed to information or knowledge], though, the important role of interpretation and a human aspect on knowledge management were emphasized".

Cross-functional knowledge sharing was also identified as a general challenge (p.62): "From the point of view of knowledge dynamics the challenge seemed to lay in combining the actors’ knowledge assets into a coherent and timely support for decision-making."

[Chua and Banerjee (2013](#_ENREF_5)) examine how four types of social media (blogs, social networking sites, location-aware mobile services, and corporate discussion forums) can be used to support the three types of customer knowledge management explained in section 2.3, using Starbuck's as a case example. They assert on theoretical grounds that all four social media types can be used to support any of the three types of customer knowledge, and present evidence that eleven of the twelve combinations are already in use by Starbuck's. The lessons they draw may not, however, transfer to the NHS because of the more personal nature of the interaction between a healthcare organisation and its customers, and its position as the sole provider of public healthcare in the UK.

[Berg (2004](#_ENREF_1)) categorizes important information types for informative-intensive organizations like hospitals and other healthcare organizations as follows:

* information about the patients;
* management information that contains information about the processes and outcomes of the organization;
* professional knowledge required to handle the patients optimally.

These categories offer some encouraging similarities to the customer knowledge types, but the use of the term “optimally” demonstrates that the crucial point about the difference between provider and customer perspectives is not part of this view. Thus, although we might term it “outcome-informed”, it is a rather more passive approach than is generally associated with KM.

With a more active viewpoint, [Gastaldi et al. (2012](#_ENREF_13)) examine Electronic Medical Record systems (EMR) in three large Italian hospitals in Lombardy, looking at the "feasibility of EMR as a trigger and an enabler of improved knowledge asset dynamics within hospitals" (p.17). The potential for improvement using the EMR is considered using the contrast between knowledge exploration and knowledge exploitation ([Henderson and Clark, 1990](#_ENREF_15), [March, 1991](#_ENREF_20)). Gastaldi et al. define 14 different types of "ICT-based solution" which they look for in the three case hospitals. The EMR (on their definition this is the local system, i.e. in that hospital only) and links with the (broader regional) Electronic Health Record are two of the 14. They find three emergent strategies of EMR development:

* horizontal, mainly to achieve efficiency in clinical data management (low level, across all specialisms, exploitation comes first);
* vertical, mainly to achieve effectiveness in clinical data management (pervasively in one specialism before moving on to others, exploration comes first);
* transversal, to simultaneously achieve effectiveness and efficiency in clinical data management (most critical areas first, wherever they are, exploration and exploitation alternate).

Returning to the types of customer knowledge management, providing knowledge for customers has been core to the work of the UK NHS for many years, especially with the growth of online resources such as NHS Choices. However, there has been less emphasis on knowledge about customers, except within specific research projects about innovations, and less emphasis still on knowledge from customers. In many cases, what the NHS has about and from customers is a great deal of data but not much knowledge, as with the findings of [Myllärniemi et al. (2012](#_ENREF_21)) in Finland.

## **4 Research project design**

## **4.1 Project aims and research questions**

This project is conceived as action research: research “which focuses on simultaneous action and research in a participative manner” ([Coghlan and Brannick, 2010, p.43](#_ENREF_6)). The purpose is to make better use of knowledge about and from customers/patients. Given that health care is a service, and so the outcomes must be considered from a customer perspective, greater patient involvement has the potential to improve the outcomes, certainly from the patient perspective and almost certainly from the NHS perspective. Note that we are moving back and forward between the words “customers” and “patients” here. The theory we use in this research is definitely about customers, but too much use of that term still tends to alienate many NHS workers. Thus apart from the term “KMS”, the research questions are phrased in ‘NHS language’ rather than ‘KM language’:

(1) How can a KMS be used as a mechanism to capture and evaluate patient experiences to provoke patient service change?

(2) How can the KMS assist in providing a mechanism for systematising patient engagement?

(3) How can patient feedback be used to stimulate improvements in care, quality and safety?

The emphasis on “how” signifies the action research focus, taking the “that” in each element for granted, but accepting that the research challenge is implemented these concepts effectively in public health care. Theory relating to knowledge about and from customers provides the foundation for the first two questions - that a KMS can help capture and evaluate patient (customer) experiences and help systematise patient (customer) engagement. Theory relating to service management, as well as customer knowledge management more generally, justifies the third - patient (customer) feedback is essential to properly incorporate the customer perspective in understanding and improving outcomes.

The research questions are also chosen to resonate with the “core principles” of the collaborating NHS Hospital Trust, especially the core principle relating to Patient Experience: “To ensure shared decision making and enhanced engagement with patients.” Note that a Trust hospital has more autonomy within the NHS than a non-Trust hospital.

A point to note is that NHS managers and clinicians have to act on the patient feedback. The collaborating Trust has made a good start here by formally monitoring and responding to comments made on the NHS Choices website: as [Gorry and Westbrook (2012](#_ENREF_14)) have observed, product and service providers even in the for-profit sector by no means always do this.

## **4.2 Project stages and activities**

The research element of the project is designed in three stages (after a preliminary stage), as shown in Figure 2. However, the intention of the ‘action’ part is not just to do this project as a one-off, but to set up a system that will carry out the key activities on an ongoing basis. Returning to the research questions, these are capturing and evaluating patient experiences, provoking patient service change, systematising patient engagement and stimulating improvements in care, quality and safety.

The research project necessarily has to place more emphasis on the capture and evaluation to help develop the ongoing systems that are needed, and hence these are distinguished as the first two phases before moving on to ensuring impact. Note also that the second phase (evaluate) explicitly incorporates the possibly different perspectives of clinicians and managers.

Figure 2: Research project stages and objectives

IMPACT OF PATIENT FEEDBACK

*(Value creation)*

EVALUATE

*(Knowledge sharing)*

CAPTURE PATIENT VOICE

*(Knowledge capture)*

**Impact on business performance**

**Changes in organisational processes**

**Changes in staff behaviour**

**Action planning**

**Patient involvement in design and development**

**Empowerment/Engagement**

**Shared partnership**

**Continuous-Regular Feedback**

**(Learning/innovation/improvement)**

**IMPROVED PATIENT EXPERIENCE**

**KMS**

**PORTAL**

Service Level

Consultant Level

Through the eyes of the patient

**Reporting**

**Changes/**

**Improvements**

A most important caveat is that the preliminary phase of the project is to involve a selection of patients in the final design and development of the project as a whole. Thus Figure 2 at present represents not a fixed plan, but rather a proposal for their discussion and if necessary amendment. hence we will not go into more detailed discussion of precise details at this stage.

## **4.3 Research method**

Figure 2 is constructed around the “action” part of the project, but also guides the “research” part. Specifically it will be traditional action research ([Coghlan and Brannick, 2010](#_ENREF_6)) as conceived by, for example, [Lewin (1973](#_ENREF_17)). As in the previous section, our comments here have the status of proposals until the preliminary phase has been completed. Nevertheless, the project will definitely be a mixed methods (quantitative and qualitative) investigation. Qualitative semi-structured interviews will take place with patients, clinicians and managers, and focus groups with patients. The interview guides will be based on the theory from service management, customer knowledge management and KMS: as with the research questions, they will be phrased in health care rather than KM terms. At least three sets of interviews are envisaged: the preliminary study; guiding the development of the KMS; and once the KMS is in use. The latter in particular may need to be repeated. The main quantitative element is expected to be the analysis of performance and outcomes from the provider perspective (before and after implementation of the KMS), although if it is possible to carry out quantitative outcome analyses from the patient perspective we shall do this as well. Standard “provider” outcome measures are well-defined and recorded across the UK NHS. By contrast, devising appropriate patient outcome measures is part of this research project.

Broadly, therefore, the design of the implemented KMS will be based mainly on qualitative analysis, while the assessment of whether there are improvements as a result of the implementation will be based on both quantitative and qualitative analysis.

**5 Conclusions**

There appears to be considerable potential to use patient knowledge to improve the outcomes for both healthcare providers and patients. The theories of service management and of customer knowledge management both offer examples from other sectors of the benefits that the use of this knowledge could potentially provide. The challenge facing this action research project is to devise and implement ways to realise these benefits in the specific context of a public health care provider, a large UK NHS Trust hospital.

The project is work in progress at present. We hope to be able to report further developments (but not final results) by the time the IFKAD conference takes place.

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