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Report for the Wales Audit Office

Lean and Systems Thinking in the Public Sector in Wales

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Executive Summary

Introduction

Cardiff University's Lean Enterprise Research Centre (LERC) was commissioned to undertake an evaluation of systems thinking in the public sector on behalf of the Wales Audit Office as part of its programme focusing on efficiency and the constrained public sector financial environment.

The Wales Audit Office is planning work with public sector partners on innovation and efficiency which the LERC research will inform. The LERC research involves three public sector organisations, in which 'systems thinking' has been deployed. The organisations have been assessed in terms of the results that have been achieved so far, as well as investigating the improvement approach used.

The authors would like to express their gratitude to the organisations that agreed to participate in this project. As well as this report, summaries of the case studies are available on the Wales Audit Office 'Good Practice Exchange' Website (http://www.wao.gov.uk/goodpracticeexchange.asp). The participating public sector organisations whose approval has been granted to publish are: Neath Port Talbot (NPT) County Borough Council - Case Study A, Blaenau Gwent County Borough Council (BG) - Case Study B and Portsmouth City Council - Case Study C.

Key Findings

- There are four themes which emerge from an analysis of the case studies:

    1. How systems thinking provides a framework for change

    2. The impact of current targets and measures

    3. Wider system implications

    4. Sustainability of improvements

- Each case followed the same systems thinking methodology. In doing so, the methodology gave a framework for understanding the true nature of their current performance and thus current problems (which in each case was different to that which had been perceived).

- There was no 'toolkit' to be applied to managers' problems, or no training course for managers to attend. Instead, participants were required to continue to follow the method and to ensure that they were engaged in the study of their service in a systematic way.

- Workers themselves were therefore responsible for the redesign of the system in which they worked – a powerful way of engaging the workers in improving the service.

- In each case, the current measures and targets were raised as a system condition after going through the 'Check' process.

- All found examples of the unintended consequences of managing by targets, which led to poorer service to local residents in the form of longer end-to-end times and unnecessary extra work for the local authorities.

- By redesigning their systems, the authorities were able to realise that the boundaries of the systems which they were operating stretched further than the domain in which their service had control. Each case study had examples where other agencies had received benefits from the improvements from redesign.

- Cumulatively, this evidence suggests that the benefits that can be achieved from systems thinking interventions can be even greater than expected when seen at the level of higher system interactions.

- The three case study organisations had been using systems thinking methods for different periods of time from 2006, demonstrating a degree of sustainability in that the principles were embedded across all of the services and involved staff at all levels.

- The limited scope of this study means that it would be unreasonable to make grand claims for the broader applicability of systems thinking and sustainability of the improvements. Further research on a larger scale would be necessary to make these claims.

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Improvement Approaches in UK Public Sector

Within the UK public sector, there are many improvement techniques and methodologies in use including lean, Six Sigma, business process re-engineering (BPR), PRINCE2, total quality management (TQM) and theory of constraints (TOC). This report was commissioned by the Wales Audit Office to investigate the efficacy of the application of systems thinking approach in the public sector in Wales. The report focuses on the application of a particular form of systems thinking which has its roots in lean but emphasises particular approaches in improving public services such as a profound understanding of the purpose and demand in service delivery. The researchers accessed three public sector organisations where systems thinking had been deployed to assess both the results and the methods which had been adopted.

The report begins with a review of the key literature on lean and systems thinking. It then discusses their evolution and relevance to public services. Lean is a term coined by academics to describe a unique approach to management initiated in Toyota Motor Company (Womack, Jones and Roos, 1990). Arguably, a holistic approach to the management of operational systems perpetuates lean thinking and therefore lean and systems thinking have much in common as will be discussed in the literature review.

The report will then briefly describe the methodologies adopted to conduct the research and continues to present three case studies on the application of system thinking in three organisations, i.e. Disabled Facilities Grant at Neath Port Talbot County Borough Council, Housing Benefits at Blaenau Gwent County Borough Council and Portsmouth City Council. Each one of the three case studies is presented as a standalone case, to make them both accessible and usable for reader who wishes to refer to a single case. Therefore, a level of repetition has been inevitable in describing the systems thinking methods.

The authors would like to take this opportunity to express their gratitude to the organisations who agreed to participate in this project. All three organisations exhibited openness and honesty. The case studies that appear in this report include the versions approved by each of the three participating organisations.

The report concludes with a summary of the findings across the three organisations and recommendations for further study.

Literature Review

Background to Systems Thinking

Until the middle of the 20th century, the dominant method of scientific inquiry into an organised system was to reduce it into separate elements and to study each component individually. Underlying this reductionist approach was the notion that the whole is no more than the total sum of its parts. However, during the 1930s and 1940s, an understanding gradually emerged amongst both scientists (von Bertalanffy, 1940 & 1950; Wiener, 1948) and philosophers (Fries, 1936) that a complete understanding of a system required holistic study of not only the individual constituents of the system but also their inter-linkages and the relationships with the wider system. Underlying this

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systemic approach is the idea that additional characteristics emanate from the whole which are not attributable to any particular part of the system; in other words, the system is more than just the total sum of its components. Systems thinking then is "the scientific exploration of 'wholes' and 'wholeness' which, not so long ago, were considered metaphysical notions transcending the boundaries of science" (von Bertalanffy, 1972, p. xviii). Flood (1999) states that "*we can only meaningfully understand ourselves by contemplating the whole of which we are an integral part*".

Although initially introduced in science, systems theorists soon extended their organismic metaphor to include social and human-made entities. As such, systems thinking diffused into disciplines such as general management (Deming, 1982; Ackoff, 1971), logistics (Forrester, 1958), cybernetics (Wiener, 1948), and most recently in the service industry (Seddon, 2005). Systems thinkers in service industries and the public sector have also drawn upon the ideas developed in manufacturing in Japan after World War Two, especially those of influential thinkers such as Deming (Deming 1982) and Ohno (1988) (Seddon 2005, ODPM 2005).

Deming was a distinguished management advisor to the Japanese during the American post-war reconstruction of their economy. He argued that Western organisations and thus Western economies were in crisis because of their beliefs in flawed management assumptions. "*Most people imagine that the present style of management has always existed, and is a fixture. Actually, it is a modern invention – a prison created by the way in which people interact*" (Deming, 1994).

Deming's point was simple: mankind invented management, therefore mankind could re-invent it. His work included a scathing and detailed critique of Western management assumptions. The main targets for criticism were the use of arbitrary measures to govern the way work is managed, the management of separated functions independently within an organisation and the separation of decision making from the worker. The better alternative, he argued, was to understand and manage organisations as systems.

Lean Thinking

Today lean is at the forefront of advances in operations management and has become the dominant paradigm for organizing order fulfilment systems (Tracey and Knight, 2008; Karlson and Ahlstrom, 1996). Some commentators have even declared lean is "*the paradigm for operations and its influence can be found in a wide range of manufacturing and service strategies*" (Lewis 2000 p. 959).

The term 'lean' was coined by John Krafcik – now Acting President and CEO of Hyundai Motor America. In his Masters dissertation at the Massachusetts Institute of Technology where Krafcik was researching the comparative performance of automotive assembly in Japan and the West, he used the term to describe Toyota's ability to do more with less.

Though coined by Krafcik, the term 'lean' was popularised by Womack, Jones and Roos (1990) in their seminal work *The Machine That Changed The World*. In their benchmarking of the automotive industry the authors suggested that there was a dramatic performance gap between the Japanese in general and Toyota in particular and western car manufacturers. They compared the Toyota Production System with conventional mass production and argued that "*it uses less of everything – half the human effort in the factory, half the manufacturing space, half the investment in tools, half the engineering hours to develop a new product in half the time. Also, it requires keeping far less than half the needed inventory on site, results in many fewer defects, and produces a greater and ever growing variety of prod*ucts". (Womack, Jones and Roos, 1990, p.13)

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According to Ohno, the father of Toyota Production System, the two pillars of lean are Just-in-Time (JIT) and Jidoka. JIT can be interpreted, in a broader context, as continuous uninterrupted flow while Jidoka is translated as automation with a human touch, intelligent automation or 'autonomation'. The following will describe the two pillars of lean in summary. Underpinning these two pillars is a relentless striving for perfection and continuous improvement philosophy.

The first pillar of lean thinking: Continuous flow

The major discovery of Toyota Motors was that the mass production assumptions of scale economy could be outperformed by economies of flow. "*To think that mass-produced items are cheaper per unit is understandable, but wrong*" (Ohno 1988 p68).

Ohno found that the true cost of production is end-to-end (from the start to the finish of a process), and that more variation in the line left fewer parts tied up in inventory and work in progress. Whilst the unit cost for each product was higher, the total production costs were considerably lower (Womack, Jones and Roos 2007). Toyota made these discoveries through necessity, innovating in a time of adversity. The Toyota Production System remains an exemplar of world-class performance as Toyota continues to take fewer man-hours and requires less inventory to produce the highest quality cars (with the fewest defects) in comparison with any competing manufacturer (Liker 2004).

Therefore, the key tenet of lean is to develop a system capable of producing at the rate of customer demand in an uninterrupted continuous flow with minimum spare capacity (Ohno 1988). By optimally responding to customer demand the lean process is increasingly capable of utilising capacity.

The second pillar of lean thinking: Jidoka or intelligent systemisation

The second pillar of lean is translated as automation with a human touch or 'autonomation'. In Ohno's language, automation applies to any sort of systemisation – any situation that involves replacing human activities and decisions with a process. Outside manufacturing and in a service environment this could be translated as intelligent systemisation, i.e. introducing systems and standards of work without turning off employees' ability to think and actively take decisions. Yet this aspect of lean is mostly ignored in the West where the vast majority of the lean literature focus on the 'continuous flow' pillar of lean with a strong emphasis on rigid standardisation. Whereas simple automation is concerned with efficiency and labour reduction, autonomation focuses on effectiveness, on quality improvement, and the independence of the worker from the system.

Arguably, while billions have been saved through implementing flow processes across many industries, engaging people and sustaining improvements remain enormous challenges for managers. Managers are faced with the dilemma that implementing new and more efficient systems and standards could lead to losing employees' engagement in new ways of working. This can be regarded as the creation of 'dumbed down' systems within which the role of the worker is reduced to a powerless doer. 'Dumbed down' systemisation refers to the elimination of 'thinking' from working, ironically even in the case of lean systems that are meant to deliver continuous improvement. Jidoka is about putting thinking back into the frontline and into systems and standards.

Far from turning the worker into the adjunct of the machine, true lean insists on frontline employees' ability to make decisions, to absorb variety and to react to quality issues as much as possible, for example, stopping the line to fix the problem which on the surface appears to be even

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disruptive to the continuous flow. Simply put, Jidoka is about putting the thinking back into working. That is why in the Toyota Production System standardisation is a way of workers helping themselves to improve the process, rather than a method of control implemented by the managers to monitor activity. The reader may compare this to any average service operation like a call centre where frontline staff have very little authority to address variations in work outside the imposed controls, let alone to stop the line and ask for help. The case studies below demonstrate that 'dumbed-down' systemisation is ubiquitous in the public sector.

Systems Thinking in the Public Sector

The application of systems thinking in the UK public sector goes back to at least the introduction of the Soft Systems Methodology (SSM) by Checkland (1999). Checkland (1999) made a distinction between hard systems characterised by clearly defined processes and structures, which can be readily quantified, and soft systems that are ill-defined, fuzzy and difficult to quantify. The definition of hard systems often applies to man-made and physical systems whereas soft systems largely concern human and social activities.

By assuming inherent complexities in social systems, SSM tries to deal with the divergent views of various stakeholders about the definition of the problem within the system. Through discussing and exploring those divergent views in a series of iterative learning loops the decision makers arrive at a number of feasible changes to accommodate different stakeholders' views. Moreover, in exceptional cases, it could be possible to arrive at a consensus amongst all stakeholders about the desired solutions. So SSM assumes a diverse number of customers and a multitude of purposes for the system and applies action learning methods to find the optimal solutions.

However, despite the efforts of various systems thinking experts (Chapman, 2002), there is currently no evidence of a wide acceptance of SSM within the UK public sector beyond a number of isolated applications (Checkland, 1999). The lack of applicability of the SSM approach has led to the criticism that it supports the status quo by default rather than taking radical action on the system. Similarly Jackson (2003) criticises the method for being non-emancipatory and reproducing the essential elements of the status quo by not acting on the existing structures.

On the contrary Seddon (2005) proposes a systems thinking approach which is more akin to hard system methods where the system is assumed to be identified with a single unifying purpose. Previously some research suggests that this approach has found success in the UK public sector (OPDM, 2005; Advice UK, 2008). Seddon (2005) distinguishes between two approaches to management and the design of work: conventional approaches (which he terms command and control) where fragments of an organisation are optimised with little reference to the wider organisation; and a systems approach which focuses on the interrelationship between the various parts of the organisation.

Command and control is defined as "*regulation by management, with its battery of computer and other informational aids … where decision-making is distant from the work and based on abstracted measures, budgets and plans*" (Seddon and Caulkin 2007). Systems thinking emphasises not just 'wholeness', but also the 'thinking of the system' (i.e. that of the managers and workers within a system) which needs to change in order for the system to be able to improve. Figure 1 shows some of the key differences between the two approaches.

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Figure 1: Command-and-Control vs. Systems Thinking

Command-and-Control thinking		Systems Thinking
Top-down	**Perspective**	Outside-in
Functional specialisation	**Design**	Demand, value and flow
Separated from work	**Decision-making**	Integrated with work
Budget, targets, standards, Activity and productivity	**Measurement**	Designed against purpose, demonstrate variation
Extrinsic	**Motivation**	Intrinsic
Manage budgets and the people	**Management ethic**	Act on the system
Contractual	**Attitude to customers**	What matters…?
Contractual	**Attitude to suppliers**	Partnering and co-operation
Change by project/initiative	**Approach to change**	Adaptive, integral

(Source: Seddon, 2005)

The following case studies will report on methods developed for applying systems thinking in public sector transactional services. The application of systems thinking in all three cases follows a 'Check-Plan-Do' cycle (adapted from the Plan-Do-Check-Act cycle recommended by Deming). The Check phase of the improvement provides a framework for obtaining understanding and knowledge about the system.

Moreover, it is designed so that the thinking of the participants is changed during the analysis (Seddon 2005). 'Check' opens the eyes of the organisation to the 'command-and-control' principles and philosophy which are underpinning the design of the current system. It is these command-and-control principles which cause the sub-optimal performance of this system. Thinking needs to be changed before acting on the system and being able to achieve the improved performance (as illustrated in Figure 2).

Figure 2 - The relationship between the thinking of management, the system and its performance
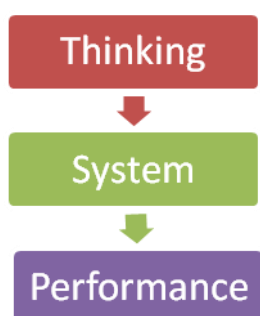
Source: (Seddon 2005 p10)

Another key feature in the following case studies is the issue of targets and measures in the public sector. The cases will demonstrate how imposing arbitrary measures in the shape of targets and

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standards could create a de facto purpose (i.e. meeting the targets). Elsewhere, the literature has covered the numerous unintended consequences of centrally set targets, and their limitations (Bevan and Hood 2006). The imposition of targets creates a de facto purpose of 'meet the targets' and hence the instances of so-called 'gaming' become myriad. Also, by specifying how services should be run against standardised models, the ability of local service providers to innovate and continually improve could be removed (i.e. 'dumbed–down' standardisation).

This above literature review considered the role of broader systems thinking in the management literature, the development and innovations which emerged in the context of lean thinking and the translation of these principles for application in service systems. The case studies which form the basis of this report go further to describing the efficacy and implications of applying systems thinking in public services.

Methodology

The researchers deployed a case study methodology in this project. Case study can be defined as an empirical mode of inquiry for development of rich, detailed and contextual knowledge about a single case. In this project the aim of the research was to understand and extend experience about a contingent, contextual and complex process, i.e. the application of systems thinking improvements in public services. According to Yin (2003) in such situations case study method could be the method of choice. Case study research is particularly suitable for answering 'why' and 'how' questions when researching contemporary phenomena in their real life contexts. In this project the overarching research question is: 'how and why might the application of the systems thinking approach improve performance in public sector?' Clearly, the aim of case study research is not to address universal forces; on the contrary, case study understanding comes from immersion in and holistic regard for the phenomena. (Yin, 2003)

Our research is based on multiple case studies and includes the use of both qualitative and quantitative evidence. Yin (2003) distinguishes between three types of uses of case study: exploratory, where cases are used to define the questions and hypothesis of a subsequent study; descriptive, where cases are used to provide a complete description of a phenomenon within its context; and explanatory, where cases are used to provide data collection and testing on cause and effect relationships. In this project, the case study research method has been used for both exploratory and descriptive purposes.

The three cases selected for this research represent a 'purposive sample'. Purposive sampling or (qualitative sampling) involves seeking out the groups, settings and individuals where the processes to be studied are most likely to occur (Denzin and Lincoln, 2000). Purposive sampling enables the researcher to select cases that will best enable the answering of the research questions and to meet the research objectives (Saunders *et al*, 2000). In this project, the cases selected for investigation were selected following discussions with systems thinking experts who are aware of organisations that have been experimenting with the approach for some time (at least one year). The three organisations selected for investigation had varying degrees of experience in process improvement. Two are Welsh Local Authorities and one is a Housing Department of a local authority in England which was selected for its greater experience with the approach.

Several authors have developed guidance and recommendations to ensure a systematic and rigorous approach to the conduct of case study research in order to be able to maximise reliability

and validity of the findings (Stake, 2000; Yin, 2003). In this project, a detailed protocol for data collection was developed which was followed by researchers in conducting the three case studies. The data collection involved three distinct phases:

1. In-depth interviews with the individuals in the organisation most closely associated with systems thinking implementation in that organisation.

2. Short interviews with at least three members of staff impacted by systems thinking improvement.

3. Producing a case study draft followed by ongoing discussions with the respective organisation to ensure the factual accuracy of the findings.

The Case Studies

The three separate case studies will provide analysis through a 'before and after' story and will include data collection information. They are presented in this report as standalone entities and therefore include an inevitable repetition of the methods.

1. Neath Port Talbot County Borough Council (NPT) - Case Study A
2. Blaenau Gwent County Borough Council (BG) - Case Study B
3. Portsmouth City Council Housing Department - Case Study C

Case Study A – Neath Port Talbot County Borough Council

Systems Thinking Review of the Disabled Facilities Grant Service

This case study report provides an overview of the improvement process carried out in the Disabled Facilities Grant (DFG) service in Neath Port Talbot County Borough Council (henceforth NPT) and the progress made by November 2009.

Background

The DFG 'systems thinking' review was part of the Council's service planning programme which followed immediately after the 'Development Control' review as a pilot intervention at NPT. The background to the review of the DFG service was the increasing demand and the perception that there was a need to expand capacity. One of the key aims of the review, *inter alia*, was to design a new system capable of responding to the high level of demand for DFGs which reflects the national data on long-term disability, produced by the Office of National Statistics, indicating that approximately 34 per cent of the population of Neath Port Talbot have a long-term disability.

In support of the demand for DFGs over the last five years NPT has invested £15 million in disabled facilities adaptations for private householders. A further £5.5 million has been spent on similar works for council tenants. Notwithstanding the high level of investment over this period, demand for adaptations has continued to grow. Currently, and despite significant improvement in the service, there are approximately 450 cases on the waiting list.

The service was judged to be performing poorly with a national indicator for DFGs which placed the council 21st out of 22 authorities on the average end-to-end time for delivery of a DFG. However this conflicted with the annual customer satisfaction questionnaire for the same period which indicated that over 99 per cent of customers were satisfied with the DFG they received.

The DFG 'systems thinking' improvement began in November 2008 as a means of expanding in house learning and was fully supported by an external consultant. It must be noted that demand presents itself in DFG service via referrals and the Occupational Therapy (OT) service provides the first point of contact for DFG. Each application must be supported by a disability 'needs' assessment, which was carried out by the OT at the start of the process. At the outset the aim of the review was:

- To maximise the benefit of the Council's investment in DFGs
- To ensure the efficiency of the DFG service

However, in a gradual process of learning and gaining a thorough understanding of the ability, or inability, of the current system to achieve customer needs, the objectives of the review were redefined as to design a new service that:

- Is capable of responding to demand for DFGs.
- Will have little waste, if any.
- Is based on a continuous process of measurement, review and improvement.
- Trains staff to meet the demands on the service.
- Focuses delivery on maximising independence at home.
- Effectively uses resources to ensure that the purpose of the service is achieved.
- Takes full advantage of partnership working with health, social care, social landlords, independent providers and the third sector.
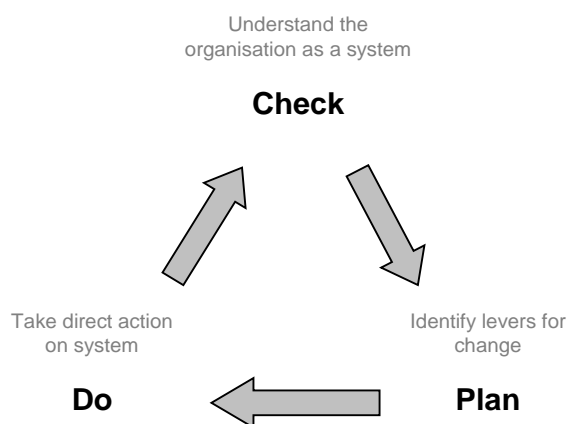
One important point is that the systems thinking review team realised that their role was to create capacity through efficiency, to support the high levels of demand evident from waiting list queues as opposed to simply delivering financial savings.

The Improvement Process

In November 2008 a team was put together to take DFGs through a systems thinking review. The multi-skilled team consisted of five officers each with considerable experience of the way DFG system works. The team was led by the service manager and was fully supported by senior leaders who also got involved in experiencing the nature of the work on the front line. This involved senior leaders in participating in front line activities such as listening to demand, speaking to staff members about their work, asking 'what stopped them doing a good job', and asking customers 'what mattered' to them.

The improvement started with the external consultant training the senior leaders and team members in the principles of lean and systems thinking. The team followed system thinking method which consists of three steps as outlined in the following diagram. Figures 3 and 4 provide explanations and the timeline of each step of improvements.

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*Figure 3 - Systems Thinking 'Check Plan Do' Approach*

Source: Seddon, 2005, p.110

Figure 4: Stages of Systems Thinking Review

Phase	Activities	Time
Check	Study demand by collecting information and understanding what matters to customers. Define the real 'purpose' of the service from customers' view points Map the flow of work and identify waste and systems conditions that stop the flow Examine how capable the old system was in achieving the (new) purpose	Nov. 08 – Feb. 09
Plan	Redesign the system to deliver purpose with minimum waste	March 09 – June 09
Do	Release capacity Integrate and engrain new process, measures and method	July 09 – ongoing

Findings from the 'Check' phase

Purpose: Figure 5 illustrates various stages of the 'Check' phase. The team began by defining the right purpose for the service. The purpose of the system was defined from the customer's point of view as follows: ***"To provide the right help for me, when I need it, to maximise my independence".*** This was achieved by spending considerable time listening to demand studying 'what mattered' to customers. One team member explained that the new purpose is our "*proper purpose"* and what we should be delivering from a customer's viewpoint not the stated purpose (mission statement) or *de facto* purpose (which could be driven by targets or budget such as spending within 12 months). Having examined demand on the service and after asking customers face to face what mattered to them the team was also able to identify the steps in the process that were of value to customers linked to this purpose, i.e. the 'value steps' were ***"Get the information to find the right help for me"*** and ***"Get the work done when I need it".***

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Figure 5: Check Model of Systems Analysis
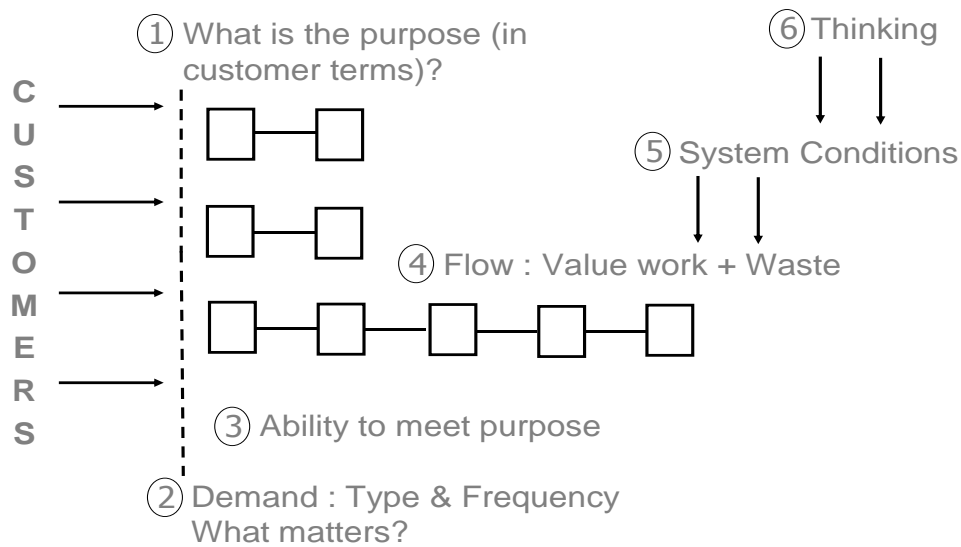
Demand: Having defined the purpose the team continued studying the demand. It must be noted that potentially only a fraction of the demand are referred for a DFG. Figure 6 explains that a large proportion of the demand is not referred to DFG mainly due to long lead times. Moreover, of the 68 average monthly referrals from OT service to DFG department, 17 drop out due to long lead time (25% dropout rate). Figure 7 illustrates the average monthly demand over three consecutive years excluding dropouts.

Figure 6 - A large proportion of the demand is not referred to DFG mainly due to long lead times
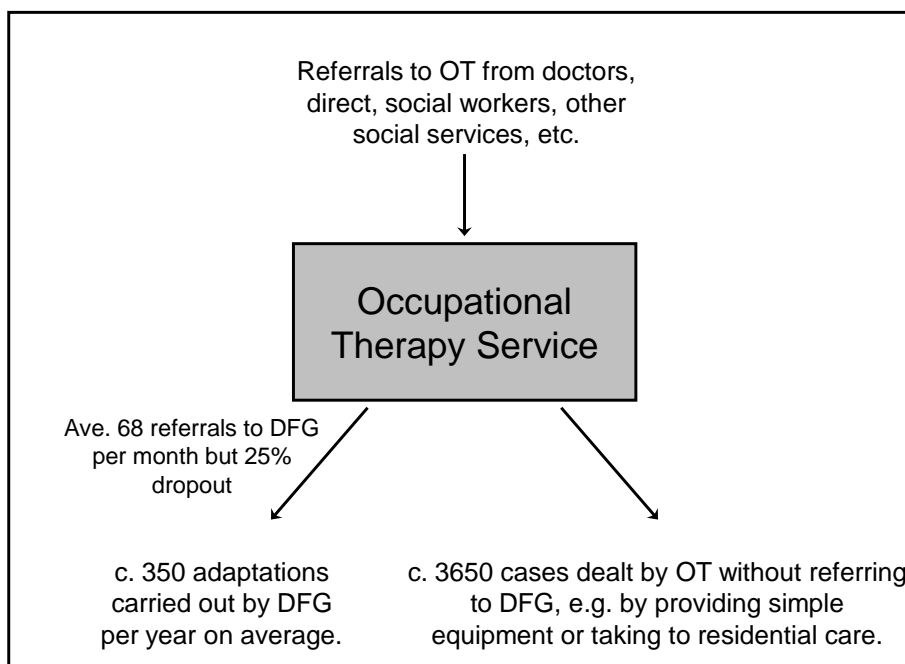

Referrals to OT from doctors, direct, social workers, other social services, etc.

Occupational Therapy Service

Ave. 68 referrals to DFG per month but 25% dropout

c. 350 adaptations carried out by DFG per year on average.

c. 3650 cases dealt by OT without referring to DFG, e.g. by providing simple equipment or taking to residential care.

Figure: Demand into DFG Service at NPT CBC

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The improvement team found that 92 per cent of DFG's are delivered to people over 50 which account for 57 per cent of Neath Port Talbot population and this figure is growing. Moreover, 56 per cent of those over 50 in NPT (around 30,000 people) have some sort of long term limiting illness. This evidence suggested that the DFG service had more to do with age than disability which helped put the service into context.

Figure 7 - Average monthly demand for DFG over three consecutive years (excluding dropouts)

Total Referrals Received Sep 05 - Jul 08
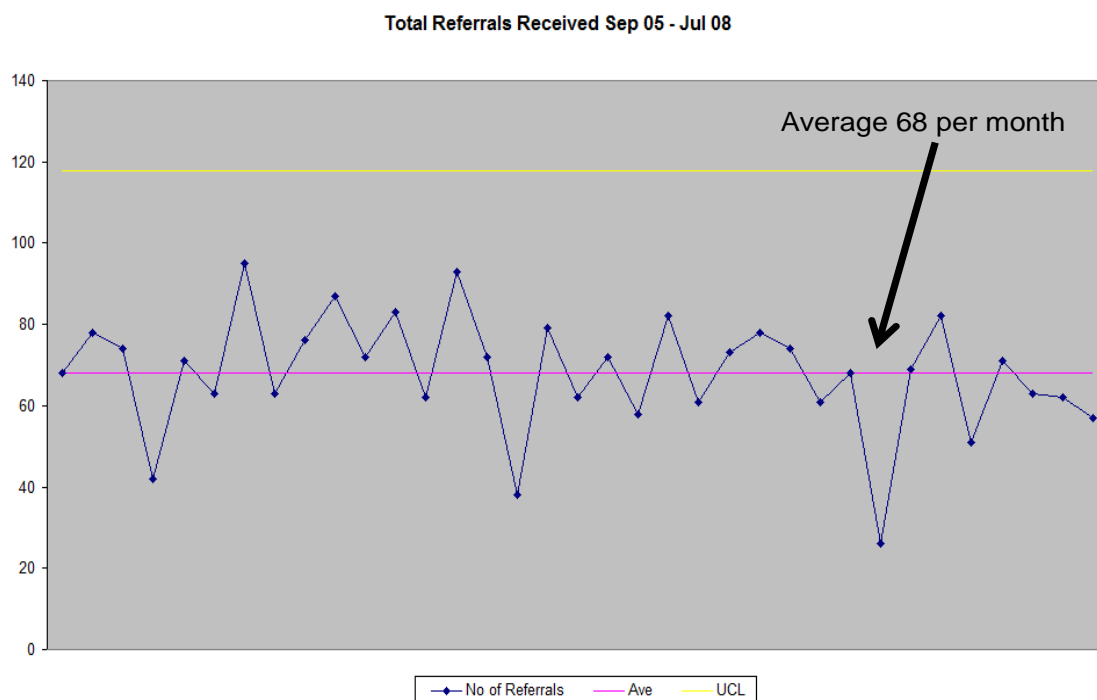
This was an important point of learning which led to further investigation. Further study showed that of the 750 people who went into residential care over a five year period, 244 had been identified by OT services for a DFG. 85 of them had received the DFG but later went into residential care at an average age of 84 years. 159 did not receive a DFG due to the waiting time and were admitted to residential care at an average age of 80 years. The evidence suggested a strong correlation between the average age of admittance to residential care and the completion of DFG works, i.e. a potential delay of four years where a DFG was received. In this case, it is suggested that four years' additional independence at home could have been possible for the 159 people who were admitted to residential care at the age of 80, if adaptations had been available earlier.

This period would cost on average £380 per week per person in a residential care home with a total cost of £12.57 million (159 x £380 x 52 x 4). DFG works for the same group of people, to delay admission to residential care potentially by 4 years, at an average DFG cost of £7,000 per case would

have cost £1.12 million or less than 9 per cent of the above figure[1]. It must be noted that this only indicates a potential and hypothetical saving and that the figures are calculated in retrospect rather than actual savings.

Clearly, by providing appropriate DFG at the appropriate time people can be sustained within their own accommodation, not only reducing residential care costs but arguably delivering considerable emotional and community benefits to service users. Nevertheless, the impact of timely DFG service could go beyond delaying admission into residential care, for example to alleviate costs in the home care service or to discharge existing clients from residential care. Figure 8 provides examples of individual cases referred directly to the DFG review team from social care sources which have been identified as representative of cases typically managed by social and health care officers.

Figure 8: Examples of the Impact of Timely DFG Service

Care Type	Value of DFG Work	Value of Equivalent Care (projected)	Basis of Calculation
Residential care (can also apply to nursing care)	£18,000	£80,000	Client identified for residential care placement, delay in admission by providing shower room extension and extending bedroom via DFG.
Home Care	£1,500	£12,500	Client receives commode cleaning 15 minutes daily. Offered WC installation via DFG. Based on the 2 years of service already provided and a projected further 8 years independence at home.
Discharge from Residential care into independent living	£6,500	£280,000	Client currently in residential care. Suitable level access property to be sought and further adapted via DFG. Based on the 4 years of service already provided and a projected further 10 years (linked to the age of the client)
Discharge from hospital care to home	£8,000	£60,500	Client in hospital with future admission to nursing care. Level access facilities to be provided via DFG will enable independence. Based on 3 years' average wait DFG (if referral is made) and the equivalent time 'waiting' in nursing care.

The above findings illustrate the importance of understanding the end-to-end system in measurement. Whereas conventional public sector targets and performance measures focus on silo-

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[1] It must be noted that the cost of not going to residential care is not just the adaptation (i.e. £7,000 towards DFG) but also any home care package received by the client. However, analysis showed that only 2 per cent of those who received DFG's later received home care. A more detailed analysis should also take into account the average cost of homecare. Moreover, arguably the total cost of the client in residential care is less than £380 due to means testing and client contribution. Unfortunately no reliable average existed. Therefore the conservative estimate of £380 was used for the analysis which was the minimum in a report covering 800 cases who received residential care. Further research is recommended to establish a reliable average.

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based efficiencies, activity costs and managing the budget, the evidence suggests that the actual cost lies in the end-to-end flow of delivering the purpose of the wider system.

More importantly, further detailed study of the demand revealed that 71 per cent of the demand presented at DFG was preventable based on investigating 3,435 phone calls coming into both the OT and the Housing Renewal and Adaptation Service (HRAS). Preventable demand ('failure demand') is demand resulting from the system failing to do something or to do something right, for instance when customer is asking "I don't understand your letter?", "why am I waiting?" or "when will you be here?" Preventable demand needs to be addressed systematically and designed out of the system.

Simply put, attempts to improve the efficiency of the service flow without understanding the often high percentage of preventable demand will lead to designing a process which is both ineffective and inefficient. That is why efficiency and effectiveness are inextricably linked in service improvement. Figure 9 illustrates analysis of demand by type and frequency as they were presented at the OT Administrative department (1,114 phone calls were studied over 20 working days). Figure 9 should help to further understand preventable demand.

Figure 9: Demand Analysis by Type & Frequency

"Demand – Type & Frequency" *OT Admin Telephone Demand*

Unclassifiable – Can I speak to	506 calls
Classifiable (Value & Preventable)	
Value Demand:	38%
"I am a client having problems & need help"	36%
"I want to change my appointment with the OT"	2%
Preventable Demand:	**62%**
"Referral made, when are you coming out - Client"	22%
"Equipment enquiries – What should I do?"	5%
"Incorrect call transferred"	4%
"Social worker calls – when is the client being assessed"	3%
Remaining Demand – Chasing calls, I don't understand your letter, Enquiries from other staff, I have a defect etc	28%

Ability to meet purpose: In the 'Check' process the ability of the system is measured against the purpose or what matters to customers. Therefore, the DFG's ability was looked at in terms of the end-to-end time measure of completing the work (meeting the value demand). As illustrated in Figure 10, the average lead time to complete DFG work was 675 days consisting of 435 days' waiting and 240 days' installation time. Again, Figure 10 shows that the upper control limit is 1,420 days meaning that the DFG service is predictably delivered in no less than 1,420 days. It therefore was no surprise to discover that 25 per cent of those who had been referred for a DFG had dropped out from the waiting list over five years leading up to December 2008 (1,060 people). Of these:

- 234 died while waiting;
- 193 dropped out of the system due to concern about the means test;
- 115 decided to do the work themselves rather than wait;

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- 45 went into residential care; and
- 271 dropped out for other reasons that are unknown.

Figure 10: Total Elapsed Time (TET) of Delivering DFG Service
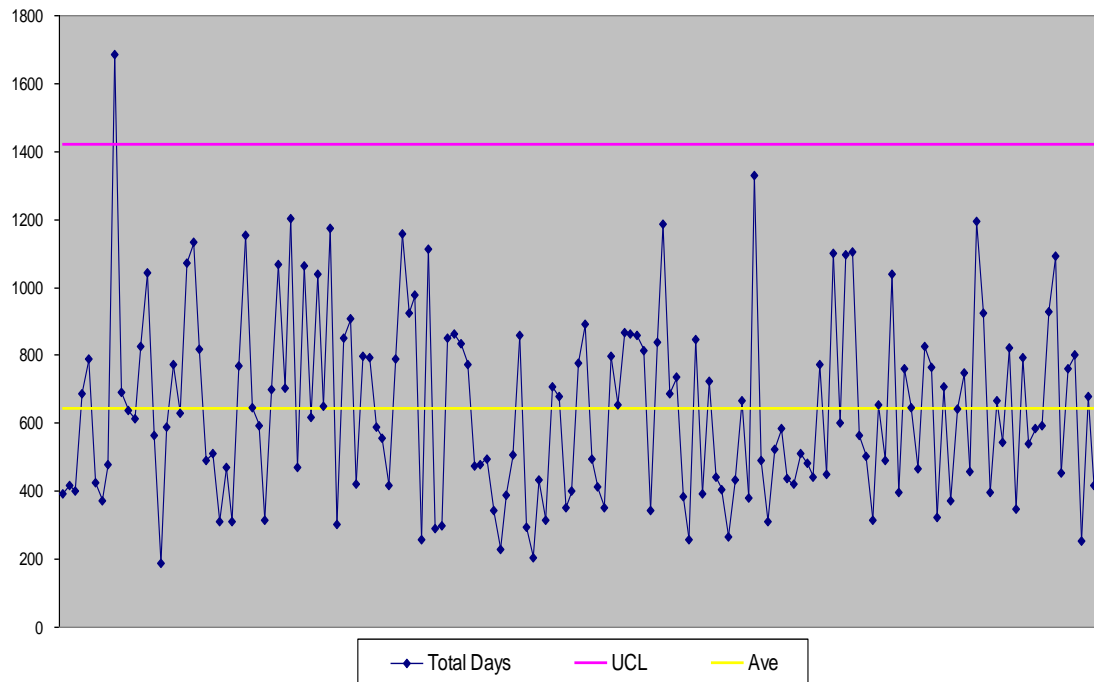
Moreover, the evidence showed that of the referrals made (first point of contact) in the past 12 months, 45 per cent dropped out while waiting for an OT assessment. Even worse, over the past five years 850 people had dropped out after DFG preparatory works had begun:

- 130 died while waiting;
- 198 dropped out due to the need to pay a contribution; and
- 312 withdrew for reasons that are unknown.

The above evidence does not take into account the likelihood that many citizens were not referred for DFG in the first place because of the long lead times. The evidence suggests that by delivering an effective DFG service the average age of referral to residential care can be substantially reduced with a tenfold cost saving . Again, the evidence shows that the financial knock-on effect of not delivering service in reasonable lead times extended beyond the immediate costs to the service. That is why operational measures of system ability, such as the Total Elapsed Time, can be regarded as leading measures of performance as opposed to activity cost and budget which are lagging measures. However, the overt focus on lag measures of performance in public sector resembles driving a car while looking back in the rear mirror.

Flow: The Model for 'Check' comes to mapping the service flow only after extensive study of purpose and demand. This is essential in order to make sure that the improvement process is driven by effectiveness rather than a suboptimal emphasis on efficiency. Understanding preventable demand and being able to design the flow against real (value) demand is a basic advantage of the

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approach. Mapping the flow showed many hand-offs between various experts, agents and administrators.

The end-to-end DFG process involved 291 steps, of which only 20 were of value to the customer (based on the purpose). Figure 11 illustrates an overview of the flow prior to redesign through systems thinking review. As shown, DFG expert staff only got involved in work after the case had been through several hand-offs while the front line staff had little expertise or authority to deal with the case. The managerial thinking behind such system design is that expert staff are too expensive and too busy to deal with demand at the first point of contact.

Figure 11: Flow of DFG Process before Redesign
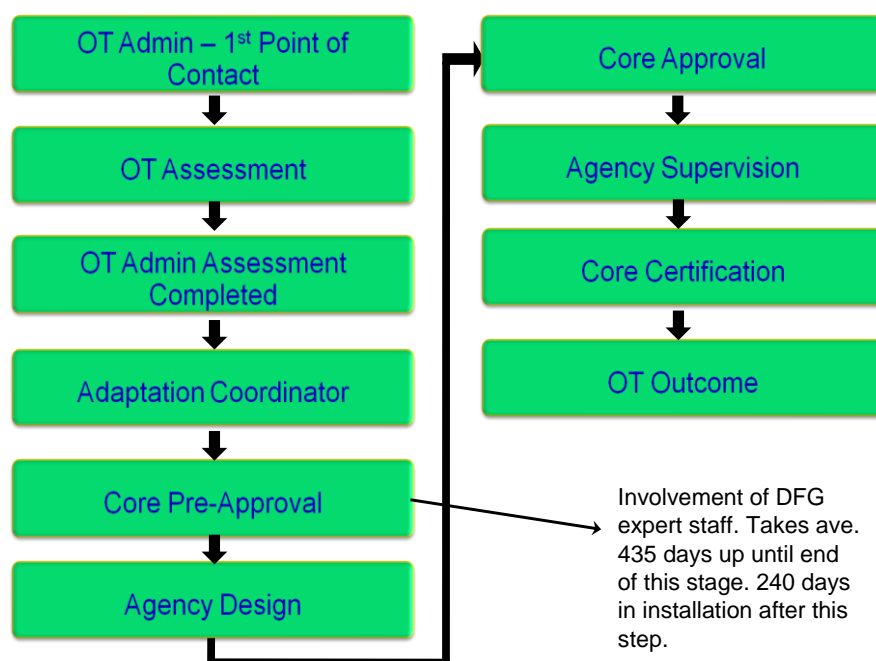
System Conditions and Management Thinking: As illustrated in Figure 5, in order to redesign an efficient service against the purpose, it is important to understand the system conditions which drive the current performance as well as the managerial assumptions which inevitably underpin the system design. System conditions in DFG were exposed by asking front line staff what got in the way and stopped them doing a good job. They replied **targets, procedures, controls, authorisation requirements and IT systems**. These system conditions could often become *de facto* purposes for the system. The national performance indicator for delivery of a DFG is a good example of how targets or centrally imposed measures become a *de facto* purpose and drive the wrong behaviour.

The national indicator measures the time taken to deliver a DFG from the first point of contact to the completion of work end-to-end. The indicator is in effect a 'league table' comparator across Wales which, maybe unintentionally, sets a competitive target for authorities. It presumes that all authorities follow the same process and are working on the same end-to-end times. However, in practice, DFG delivery process across Wales is not consistent and the measurement of the data is not necessarily a true reflection of performance or a true measure of efficiency. The DFG service could fall within various parts of Local Authorities and the lead-time could vary depending on the

stop/start of the clock. This arguably leads to the design of DFG systems to achieve the *de facto* purposes aimed at improving the ranking rather than providing the best solutions for disabled people. The indicator offers only one piece of 'evidence' namely the average time taken by each council to deliver a DFG. For example:

- it fails to capture differing levels of demand received at authorities (in certain areas like Neath Port-Talbot the disabled population is much higher than that national average);
- it does not indicate the variation between Councils in DFG delivery processes especially with regards to the way DFG operates within the wider system;
- it does not show the different levels of priority placed on DFGs by each Authority; and
- it does not indicate the financial commitment of different Local Authorities.

*Figure 12: An example of How Systems Conditions Drive Wrong Behaviour*

Example: *Mr & Mrs A (88 and 84 years of age respectively) required a ground floor shower facility due to Mr A having bone cancer. Mr A slept on the ground floor as a result. Mrs A has other disabilities but is also Mr. A's carer. While preparation for delivery of the DFG was underway Mr A passed away. The works were also needed for Mrs A. Due to the 'de facto' purpose linked to the national indicator and the council's budget arrangements; Mrs A was pressed to allow works to start in January 2009, to ensure completion by the end of March. This involved work progressing within three months of her husband passing away and at the coldest and wettest time of the year. Mrs A continued to occupy the house while the demolition works were carried out to provide access to the new shower room. The period of the construction led to increased costs due to foundation problems caused by the wet weather, and clearly caused Mrs A distress and discomfort.*

The Welsh Assembly Government's annual published results place Neath Port Talbot with the 'poorest' performing authorities. The continued use of the indicator may be damaging to DFG services across Wales since it does not compare like with like but affects staff morale and could lead to higher costs where improving a Council's ranking becomes the purpose, rather than delivering DFG services that help the customer. A typical example of its effect is outlined in Figure 12, where in order for the DFG works to hit indicator timescale 'targets' at the end of each financial year, DFG related installations are started in January to ensure completion before April.

The following chart shows DFG expenditure over 6 years; the budget and national performance targets visibly drive the whole DFG system leading to huge spikes towards the end of each financial year marked in red. In order to experiment with redesign, the system conditions were removed in the DFG service at NPT. This sent an essential message to staff that management thinking had

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changed and showed senior leaders' commitment to change. The following explains the redesign phases of systems thinking review, i.e. 'Plan' and 'Do' stages.

Figure 13: DFG Expenditure Pattern and Target Driven Behaviour
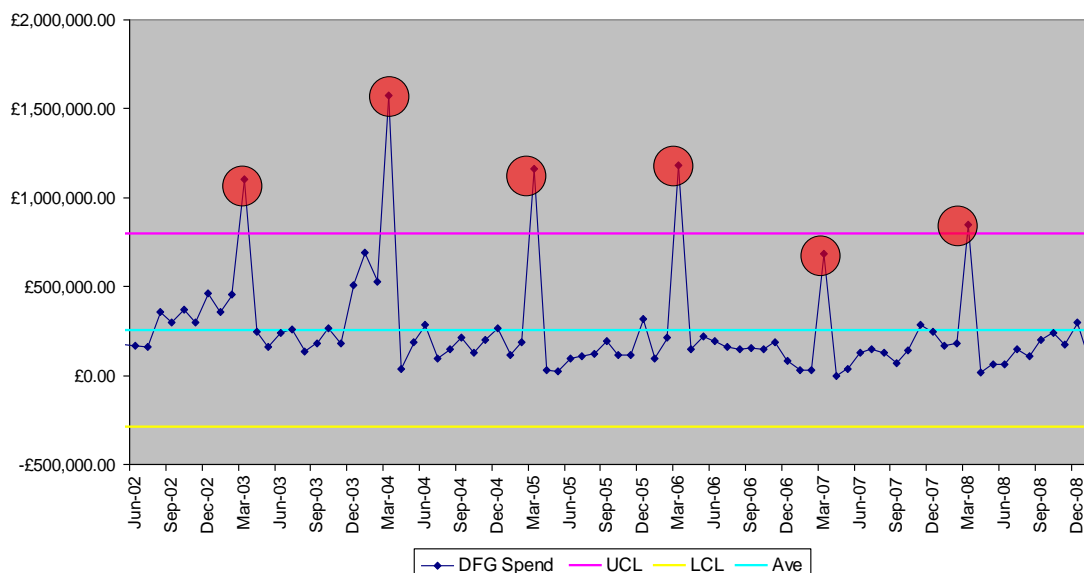
Plan: Following the completion of 'Check', the 'Plan' phase involved experimenting to find a better system which, in achieving the purpose from the customer's point of view, is also simpler and cheaper. Given the data collected during 'Check', this also involved looking at the cost benefits for social care and health care that can be found by early DFG intervention. Briefly, the aim of the 'Plan' was to redesign the DFG service to:

- respond to demand, based on the new 'purpose';

- achieve 'perfect flow';

- develop measures to help understanding the work and enable improvement (understanding and acting on variation is an integral part of measurement); and

- ensure management roles added value to the new system.

The above analysis revealed that performance is driven by system conditions which in turn are rooted in management thinking. Therefore, in order to change the system it is necessary to change the underpinning management beliefs. The review team decided that the new DFGs should be provided based on the following 'systems thinking' management principles as designed by the senior leaders directly involved in the review:

1. Redesigned services should respond to demand, based on the 'purpose'.
2. Managers check and act upon the system.
3. Employees are motivated to do a good job.
4. Those working in the system should design the system.
5. Decisions must be based on data and evidence.

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6. Managers facilitate process of change and redesign to meet purpose.
7. Managers should create a supportive environment to encourage individual decision making to deliver the purpose.
8. When employees raise an issue, managers must jointly visit the problem then act.
9. Managers should regularly spend time walking the system end-to-end.
10. The system should provide help to the customer going through the process.
11. IT should support the whole system end-to-end.
12. Use measures to tell us how we are achieving the purpose.

The above principles show a radical shift away from old ways of management thinking. The leader of the service said "*if we focus on delivering service to citizens in the process of doing so we also become more efficient*". Thus the redesigned system was driven by a profound understanding of the way work worked. Based on the above principles the team asked themselves "how would you deliver service from a blank sheet of paper?"

The improvement team experimented with the redesign to ensure it was delivering results against the right measures. Therefore the 'Check' team also became responsible for implementing the redesign. One of the key aims of the redesign was to eliminate non-value adding steps where possible. For example, expert staff were brought to the front allowing them to face the customer at the first point of contact. This meant that the redesign team met customers when they required them (which suits customers), rather than handing off work to others (unless it is essential) and they arrange for installations to start at a time which suits the customer.

Staff were closely involved in the examination of the effectiveness of the old system to ensure that front line knowledge drove the redesign. For those involved in the improvement, the experience has been dramatic. Officers have commented that the review is the most important piece of work that they have ever been involved in. One of the managers involved in redesign commented *"if we had been through redesign without 'Check' then it could have been very different"*. Discussions with the redesign team revealed that the action learning approach has had a drastic effect on their ability to redesign. Also, the team commented that the knowledge-based approach (i.e. decisions based on facts only) was very different from using experience which could be influenced by biases and assumptions.

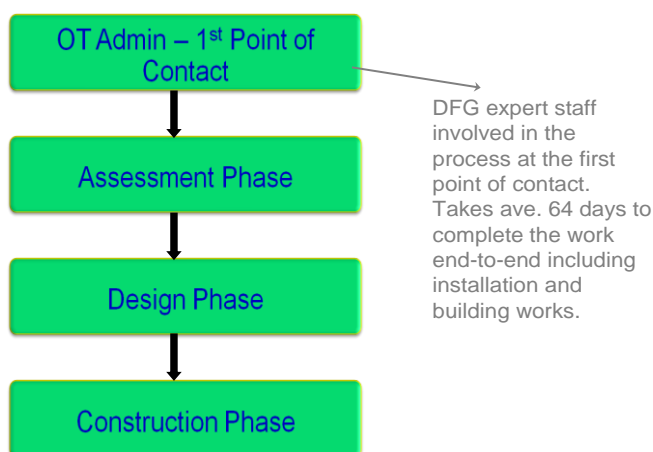*Figure 14: Flow of DFG Process after Redesign*

Figure 14 shows the flow in the redesign system. In this model the officers get on site as quickly as possible (subject to when the customer wishes to be paid a visit by the officers). More importantly, various holders of expertise within the team (i.e. occupational therapist, surveyor, adaptation coordinator and even installation contractor) were present for the first visit and work was dealt with there and then without any hand-offs. A fundamental problem with hand-offs is that often information passed between experts is not 'clean' (for example, inaccurate or incomplete information) leading to 'preventable demand'.

Moreover, the team was able to glean all required information from the customer and eliminate yet another major source of 'preventable demand'. Furthermore, the redesign team might provide additional help such as benefits assessment, essential repairs, minor equipment, energy advice and health and safety advice, all of which aimed to keep people living longer in their own home. The DFG redesign model intervenes as early as possible since data showed that early response reduced costs and further calls on social services.

During this phase 15 cases were used as an experiment to test the redesign. Another key feature of redesign is that the same surveyor takes the build process (design, cost, supervise and certify) through from start to finish. Also the team started collecting data (based on more meaningful measures) to support continuous improvement. Early evidence on the benefits of the redesign was positive. As a result of reducing lead-times and creating space for officers to think, the liaison officer on the team had the opportunity to investigate consider alternative procurement processes such as materials supply, specification and contractor options. This resulted in finding options to reduce the cost of installations from £7,000 down to around £6,300. A Senior Surveyor on the review team commented that:

"Savings have been achieved by getting the work right first time. This is a result of the improved communication between the customer, OT, surveyor and contractor. 'Check' showed an average £1,200 of variation on each grant. As a result of identifying this data 160 cases were reviewed in detail. 25 per cent of the variation was found to be a result of re-work due to failure to get the work right first time. Eliminating this will reduce the overall cost of the grant. Also through encouraging experimentation and continuous improvement further savings have been identified, for example by negotiating discounts with suppliers and investigating alternative arrangements for tendering the supply and installation of specialist equipment".

Do: This report was written during the early stages of the 'Do' phase and therefore full explanation of the outcomes is not yet possible. However, the redesign team is disseminating the redesign by gradually involving the entire DFG team (around 30 officers) in the redesign way of working. This means that the other officers become fully aware of 'why' the system is redesigned this way and get 'their say' in the process. One of the key principles at this stage was to have a planned roll-in to take staff from the old to the new system. In contrast to most change programmes, this has been the opposite of roll-out where staff are expected to follow new methods.

In order to achieve this, other teams are being formed with one expert from different areas in each team (for example, occupational therapist, surveyor and adaptation coordinator). Staff are not only trained in the 'systems thinking' approach but also allowed to experiment against purpose and demand to create maximum buy-in and achieve the same 'action learning' and profound

understanding through experimentation. This aims to produce sustained results. Another key aim of the 'Do' phase is to make sure the right measures are implemented and that the system is capable of monitoring and reacting to demand by means of the right measures. The following explains more about measures.

Results before and after

The following measures are used to gain knowledge and understanding of the system, and review results of experiments:

- end to end times;
- variations (e.g. additional costs);
- delivering service right first time;
- demand (e.g. volume in);
- cost of works (for example, work categories, contractor performance);
- staff morale (e.g. sickness);
- expenditure (e.g. monthly); and
- client satisfaction based on two questions:
  - "Please rate the service given on a scale of 1 to 10 (10 being highest)"; and
  - "If the service is not rated as 10, why not?"

Figure 15: Key Improvements to DFG Service

DFG Measure	Old System	Redesigned System*	Comments
Average. end-to-end time	675 days	64 day	675 made up of 435 wait and 240 install
Flow steps (end-to-end)	291 steps	34 steps	Every step from first point of contact to completion of works
Preventable demand	71%	40 %	See above
Costs of delivery (Average per grant)	£499	£319	Staffing activity costs (36% improvement)
Cost of physical works; average per case	£7000	£6300	Procurement savings & reduction in re-work
DFG drop outs	33% of cases	Nil	Early intervention prevents dropouts

* The results are based on a sample of 39 completed cases. The redesign of the service is still evolving and continuous improvement may lead to further improvements.

According to the redesign team and service leaders these measures may be turned on and off as required by service officers or could be replaced by new measures if necessary. Each measure can be broken down from a full service picture to reflect the progress of teams, individual officers, work categories, specific projects or ongoing experiments. Figure 15 illustrates some of the key measures and results from the 'system thinking' improvement.

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Conclusions

The leaders and team members equally stated that the change process could be difficult at the beginning, especially for managers who have set the process up. People's familiarity with old ways of working can cause a difficult spell at the beginning. They also explained that the emphasis on facts (scientific approach) and designing improvements as action learning (learning by being involved at the front line) instigated a profound realisation within the team. This can be assessed as an important feature of the systems thinking approach. In this case senior leaders and DFG officers alike sat down to listen through calls or go out on visits with occupational therapists (including the Head of Housing and Director of Social Services). The team felt that now *"management can better understand the problems we have"*.

Another interesting finding is the level of engagement of the DFG officers or the 'doers'. Public sector managers and central government are often faced with the dilemma that implementing new and more efficient systems could lead to losing employees' engagement in new ways of working. Some organisations attempt to communicate or to 'explain' the need for the new system by sending middle managers on training programmes. However, this hardly solves the problem since explanation is barely synonymous with understanding which comes from a far deeper and more hands-on engagement with the work itself. At the same time, it is no wonder that change does not always stick if workers do not appreciate the necessity of the new way of working. Organisations and managers, who think they see the benefits of the new system, often respond by forcing change through with an iron fist. The result is the creation of 'dumbed-down' systems within which the role of the worker is reduced to a powerless doer. As such, systemisation by a central authority simply eliminates 'thinking' from working and improvement. This is clearly in stark contrast with the very core of lean and systems thinking which aim to put thinking back into the frontline.

The team members in this case expressed concern regarding 'best practice' or 'guidelines' from the centre since they often *"don't make sense"* and lack contextual knowledge about the way work works. One member of the redesign team said "*what we find is that best practice tends to be good pieces from different systems put together and imposed on all different authorities which doesn't necessarily lead to better performance"*.

Furthermore, the improvement has intensely engaged various layers of the organisation due to an emphasis on system conditions and underlying thinking that drive the existing behaviour of the system. It is widely accepted in the systems thinking literature that system structure and system conditions drive behaviour. It is also established that in order to change behaviour, it is important to change the thinking that underpins the system structure and conditions.

The lead officer for the DFG service commented that *"as with most of the service staff, front line mangers and senior leaders I believed that the system was appropriate for the needs of service users and I was trying to do a good job. However, I came to understand that the controls, targets, procedures and service standards which were put into place to 'manage' the service, had in fact led to the separation of the decision making from the work leading to the introduction of waste, de-motivation of front line staff and increased delivery cost. Unfortunately well intentioned policies had led to wrong results. Acceptance of this has changed my thinking and my understanding of how the service should be delivered. This is an experience that I believe every public service manager would benefit from"*.

The authors' observation is that 'dumbed–down' systemisation is ubiquitous in the public sector, from local authorities to health. By putting expert staff at the frontline who are enabled to think and absorb the requirements of the customers, this local authority has not only delivered savings but also improved service waiting times considerably. Interestingly, the activity cost of service delivering DFG has only decreased by 36 per cent (from £499 down to £319) whereas the wider systemic costs could decrease at an even higher rate as shown in the operational measures in Figure 15. For instance, independence at own residence by potentially (on average) four years across the sampled cases, £700 savings in the average grant size and reduction of the service delivery from 675 days to 64 days.

According to the renowned systems thinker, Peter Senge (1990), "The deepest insight comes when they [managers] realize that their problems and their hopes for improvement are inextricably tied to how they think. Generative learning cannot be sustained in an organisation where event thinking predominates. It requires a conceptual framework of structural or systemic thinking, the ability to discover structural causes of behaviour".

Case Study B - Blaenau Gwent County Borough Council

The Introduction of a Systems Thinking Approach in Housing/Council Tax Benefits

Background

Blaenau Gwent County Borough Council is a Welsh unitary local authority serving 68,400 citizens, with a budget of £131,758,000 (net approved budget 2009/10). Blaenau Gwent has the highest unemployment rate in Wales and there has been a significant increase in demand for housing and council tax benefits in the last year (increased caseload of over 1,000 since November 2008). Although this intervention began in November 2008, the council have been thinking about introducing systems thinking since 2007.

The Council's Service Efficiency Improvement Team (SEIT) has been involved in all of the systems thinking activity at the Council. The SEIT was set up three years ago following the publication of the Welsh Assembly Government's "Making the Connections" policy which called for local authorities to achieve at least a 1 per cent saving year on year over a 5 year period, reflecting the financial constraints within which councils would increasingly be required to function.

Before discovering the systems thinking approach to improvement, the work of members of the SEIT often consisted of undertaking ad hoc projects from all areas of the Council, with limited success in achieving changes and action that could make a real difference.

Process(es) selected for improvement activity

After some discussion and negotiation about which area would be most suitable for a full-scale systems thinking intervention, the Corporate Director Resources went to the Council's Corporate Management Team (CMT) and suggested the Housing /Council Tax Benefits service. Work on this system therefore began in November 2008.

The Benefits service was considered to be a strongly performing section (achieving a top six UK position back in 2004 in Performance Indicator league tables). This had been much celebrated at the

time. It was felt that it would be an interesting test of the Systems Thinking methodology to apply it to a strongly performing service, such as Benefits.

Housing benefits are paid to three groups of people:

- private tenants (private landlords, housing associations and hotels providing homes for vulnerable individuals (although these are very rare);
- owner-occupiers (in the form of council tax benefits); and
- Council tenants.

The systems thinking review revealed that although the service was performing well as far as performance indicators were concerned, the system was holding a level of waste in systems thinking terms that equated to around 56 per cent showing massive scope for improvement.

An initial Senior Review Team was formed consisting of the Corporate Director for Resources, Divisional Manager – Revenues & Benefits, Assistant Divisional Manager, Revenues and Customer Services, Assistant Divisional Manager, Revenues, Development and Recovery and members of the SEIT. Subsequently, five front line staff/team Leaders joined the Review Group. The team was assisted by an external consultant.

It is noteworthy that approximately a year before the intervention, the housing/council tax benefits section, consisting of over twenty employees, had been structured into a front office (referred to as customer services) and a back office consisting of processing (meaning using the IT system) and verifying (meaning gathering/verifying evidence). Frontline workers speak of a clear demarcation between the three tasks prior to the systems thinking intervention and of tension and rivalry between customer services and the back office. This is a standard service design for housing benefits, as identified by Seddon (2008, p27).

The systems thinking intervention followed the "Check, Plan, Do" improvement cycle offered by Seddon (2005) where understanding purpose and demand is followed by the analysis of capability and flow before redesigning the process around demand. The following diagram explains various stages involved in the Check phase.

Figure 16: Check Model of Systems Analysis
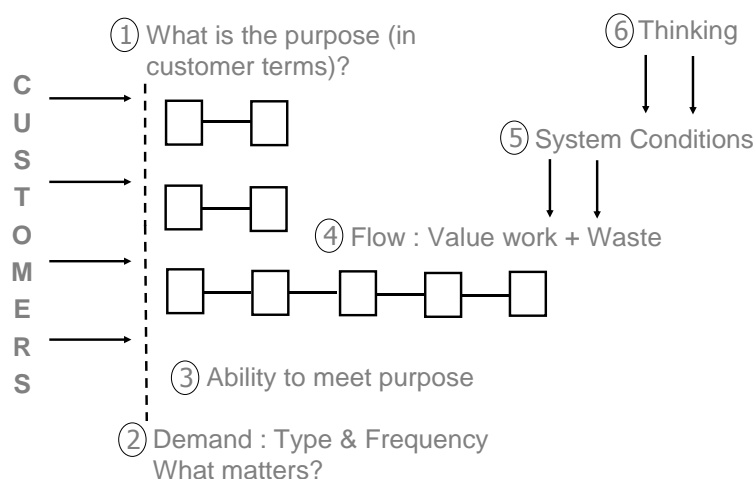
Purpose

Understanding customer demand enabled the team to formulate a single purpose for the housing/council tax benefits service from the customer's point of view. The articulation of purpose is central to improvement and provides an overarching yardstick against which changes can be measured. The improvement team referred to this as the "proper" purpose of the service which was defined from customers' point of view as: "help me get the right benefit as quickly as possible".

Demand

Understanding demand involved sitting in on the work and listening to calls coming in or visits paid by the public, in order to find out why customers were calling. The nature of the call was logged for analysis later. The members of the team were shocked by listening to calls and at how the organisation dealt with and treated customers. This contradicted the performance indicator information which indicated that Blaenau Gwent had a top quartile performing benefits service. They found that:

- customers did not understand the letters that were being sent out;

- customers had provided information, but often being asked to provide more;

- customers frequently had to chase up progress on their claims; and

- customers were often not given enough time to respond to query letters.

Listening to calls continued for weeks until the team were confident they had logged all types of calls and had therefore captured the variety of demand. The logged calls were revamped into 107 different questions which were then categorised into nine themes. Of the nine types of calls, three types represented value demand and six failure (or preventable) demand as shown in Figure 17.

Figure 17 – value and failure demand

Value demand	Failure demand (preventable demand)
• How do I/Can I?	• Have you received?

• My circumstances have changed	• Additional information being provided
• I want to pay	• When will I get?
	• Just give me information/Can you explain
	• Why are you asking for?
	• Not for us, i.e. the call should have gone to different department

The team found that 44 per cent of calls represented value demand and 56 per cent of calls represented system-generated failure demand. The discovery that this level of waste existed in the system confirmed that a full review of the service area needed to be carried out.
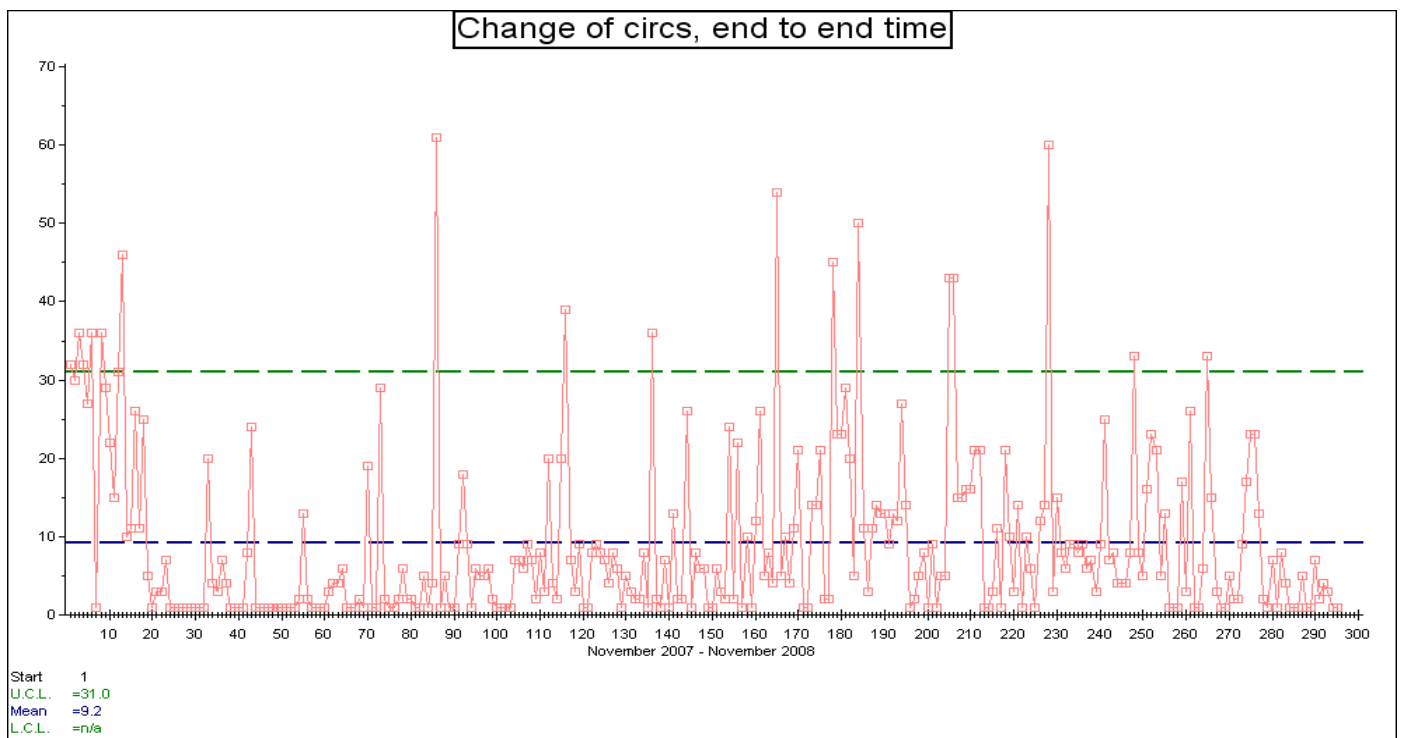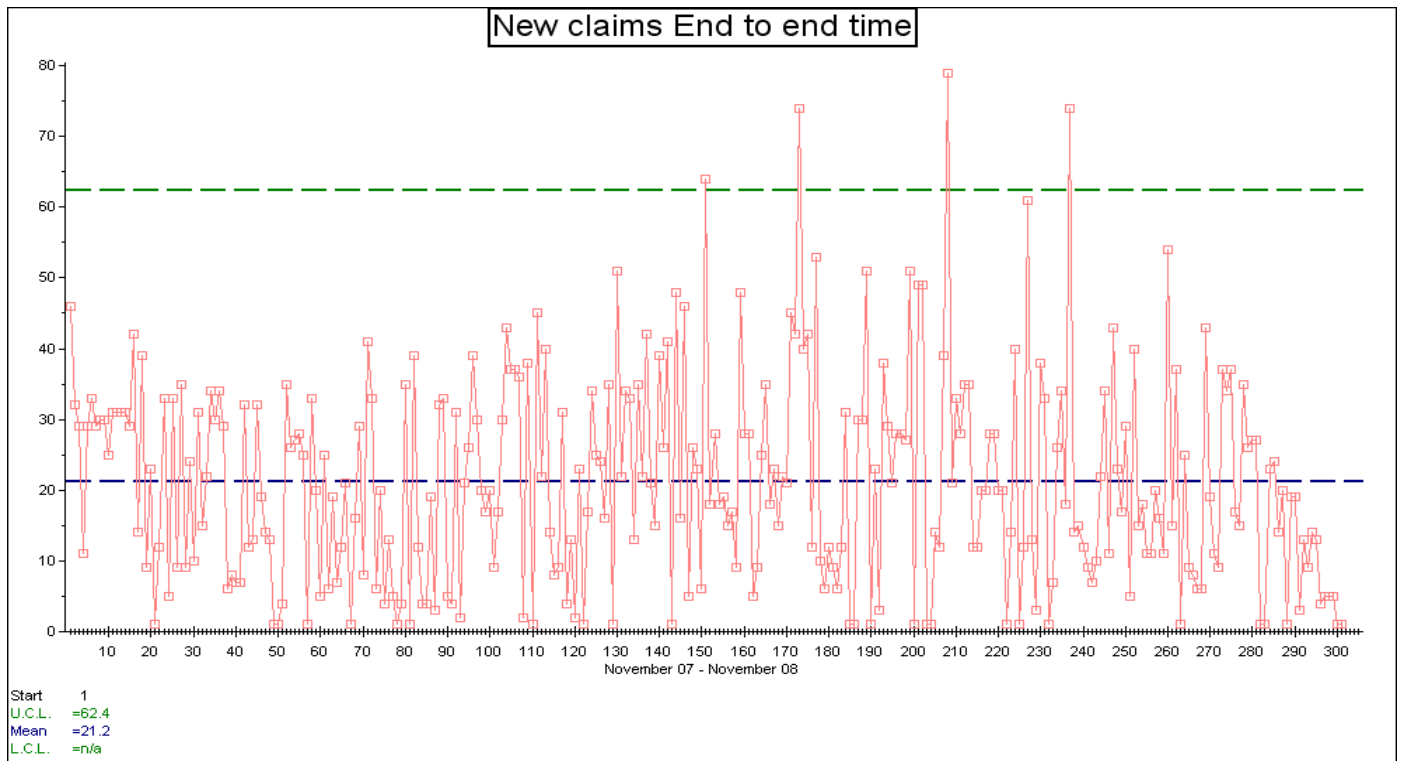
Capability and Flow

The next stage involved an analysis of the capability of the service to respond to the two forms of value demand:

(i) new claims (a first time demand of the type 'I require housing benefit'); and

(ii) changes in circumstances (e.g. 'I've moved house').

The two forms of demand were handled separately in order to facilitate the improvement implementation (for example changes of circumstances are generally more complex than new claims in terms of knowledge and skills of systems). Capability charts derived from the IT system generated information indicated that on average it took 21.2 days to process a new claim and 9.1 days to process a change of circumstances.

Figure 18 – Capability chart showing time taken to process new claims and changes of circumstances

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New claims End to end time

Start 1
U.C.L. =62.4
Mean =21.2
L.C.L. =n/a

Change of circs, end to end time

Start 1
U.C.L. =31.0
Mean =9.2
L.C.L. =n/a

However, following analysis of the demand and dealing with numerous actual customers during the early stages of Check the team had doubts about the validity of the above data. Also, the team had observed that often the system only picked up one part of a process. For example, the customer may have submitted an application previously but the system set the previous claim to 'adverse inference' or 'ineligible' because the customer had failed to provide the requested evidence. In this case the "clock" would start again upon resubmission of an application. The data gleaned from the IT
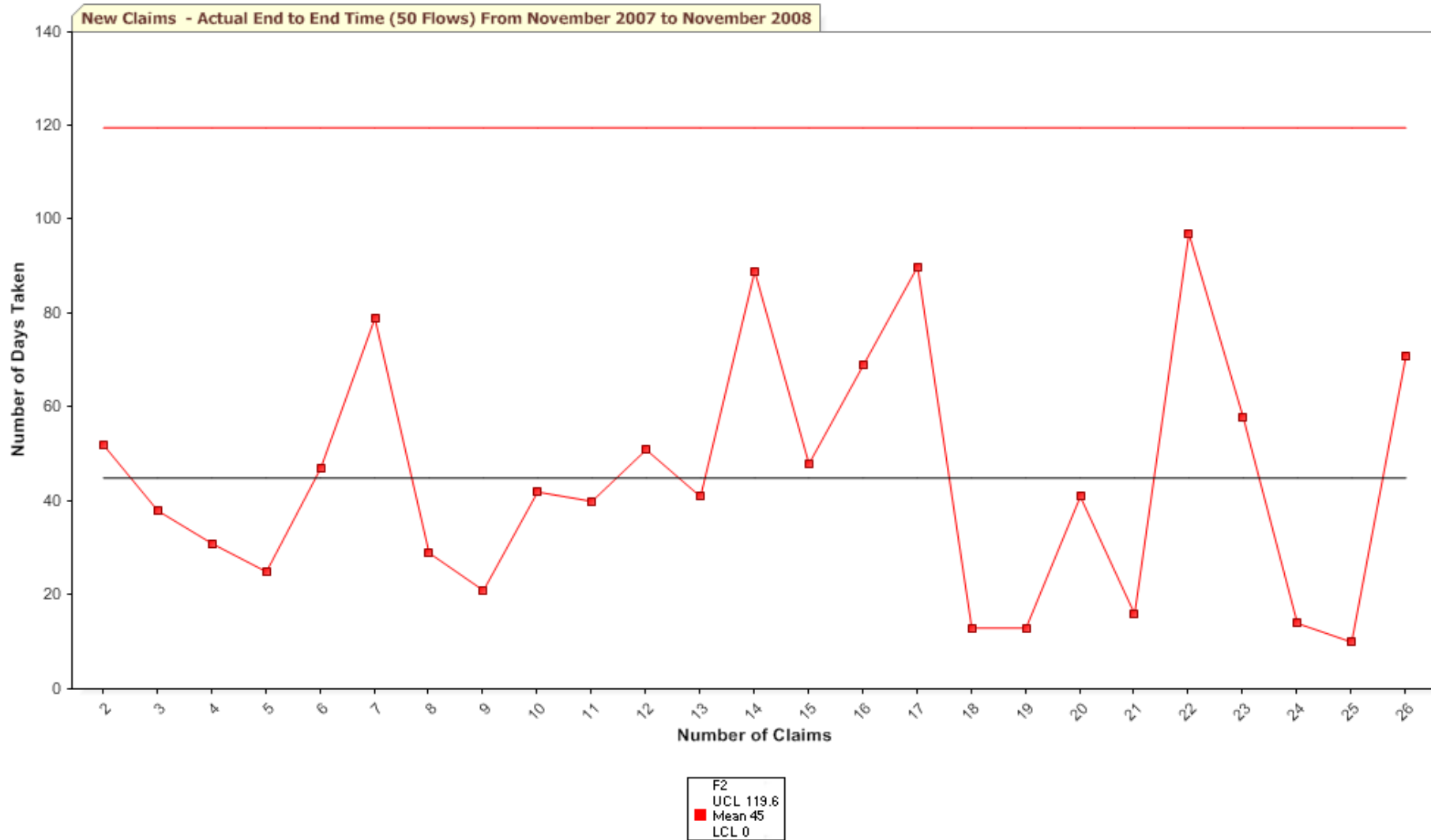
system, therefore, would not reflect the final outcome for a claim or the true end-to-end time from the customer's perspective. Arguably the system had been adapted to ensure targets were met.

Accordingly, the team looked at 50 actual benefit cases to determine the end-to-end time from the customer's perspective and discovered that these times were actually much higher than the system indicated. Evidence from actual cases is illustrated in the following diagrams. It must be noted that creating these capability charts has been a very time consuming exercise which requires detailed study of each case by poring over historical data.

However, from these run charts it was evident that the actual service received by claimants was far from what one might expect from a 'top quartile' performing service. From the 50 cases analysed, the real average time for processing "new claims" was 45 days and "change of circumstance" 35.3 days.

Moreover, some cases were identified where the system meant that individuals had been treated appallingly. One example was developed as a case study referred to as Mr and Mrs B, which was presented to all staff as evidence of the need for change. Mr and Mrs B were, in fact, offered an apology and compensation for the poor service after the awareness raising.

Figure 19 – Average end-to-end processing times

New Claims - Actual End to End Time (50 Flows) From November 2007 to November 2008

F2
UCL 119.6
Mean 45
LCL 0

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Change of Circumstance - Actual End to End Time (50 Flows) From November 2007 to November 2008

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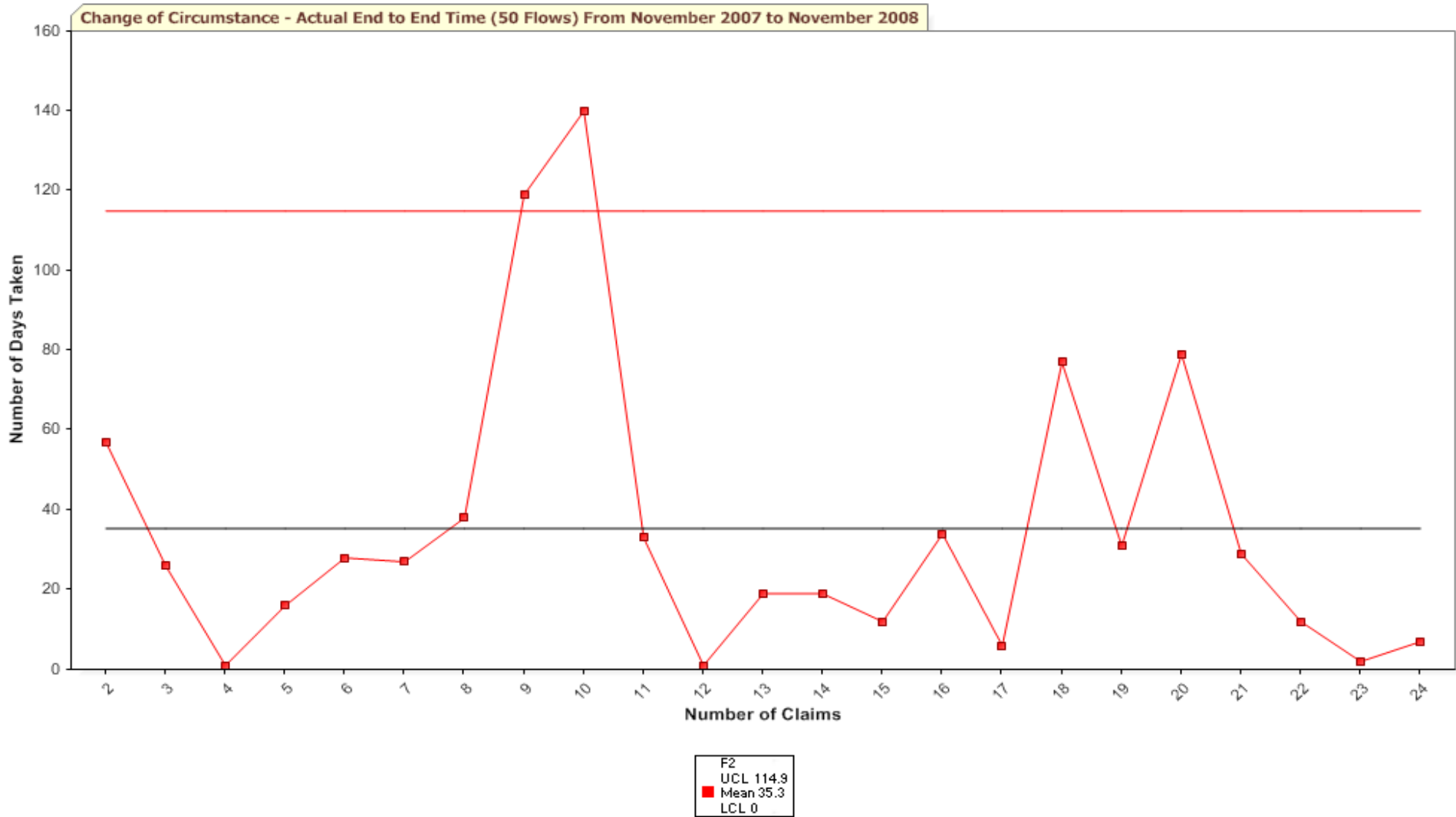
The detailed analysis of 50 actual cases led to the discovery of a range of problems with the current system:

- There was a lack of case ownership in the system so that customers were handed over from one person to another.
- The system demanded that for a simple change of circumstances, full applications had to be completed.
- Customers were asked to provide more information than necessary and sometimes the same information more than once.
- The system included a mechanism which would artificially halt a claim so that claimants would have to re-apply (the mechanism was designed to help achieve performance targets and indicators).
- The majority of backdating requests were refused.
- Information was requested from customers even though it could be obtained from other sources.
- Crucially the end to end times were not accurate from the customer's point of view, i.e. 45 and 35 days as illustrated in the above.

The detailed analysis of actual cases provided further compelling evidence that the service needed to be radically redesigned.

System Conditions and Management Thinking

As illustrated in the figure for the Check model, in order to be able to redesign an efficient service against the purpose, it is not only important to understand flow and system's ability to deliver value, but also the system conditions and the managerial assumptions which underpin the system behaviour. These conditions and assumptions inescapably drive performance. System conditions were exposed by asking front line staff what got in the way and stopped them doing a good job. In this case, for example, the indicators and the way there were being collected by the IT system were system conditions. These often became the 'de facto' purpose for the system driving the wrong behaviour.

Redesign (Plan and Do stages of the intervention)

Redesign commenced in June 2009. A team of five was created, consisting of a middle manager, four members of frontline staff (with a mix of experience in customer services, processing and verifying), and members of the SEIT in a facilitating and support role. The team was charged with designing and implementing a new way of working. The team was freed from their day to day responsibilities and were given the scope to experiment with different approaches based on achieving the purpose and working to a set of principles (with advice from a consultant). The principles the team worked to were:

- do what matters to each claimant;
- verify according to knowledge;
- take each case on its merits;

- do the right thing once at first point of contact;
- be as safe and legal as you need but no more;
- "pull" expertise – don't refer on; and
- "ownership" – end-to-end.

Real new claims demand was fed one by one to the team and the team discussed the right thing to do for this customer. Eventually individual team members took full ownership of a claim, processed it from end-to-and, pulling on expertise if it was needed, but never handing the claim to anyone else.

Redesign helped to identify all sorts of system conditions which were preventing the delivery of a perfect service. Cumbersome IT system and interactions with the Department of Works and Pensions presented particular and ongoing constraints. These, along with any other issues stopping them from 'doing the right thing', were logged on flip-chart pages which soon wallpapered the office area.

Processing a claim from end-to-end required the redesign team and later all members of the department to up-skill. Staff members under the old systems may have only ever verified, for example, and had little experience of dealing with customers directly or processing. Understandably there was some apprehension and fear of the changes at first. Some of these new skills only came with experience. The new system allows staff to gather that experience.

Gradually the redesign team gathered confidence in dealing with new claims. Under the old system there was a seven week delay in processing new claims due to the backlog. However, in just under three weeks all new claims taken on the counter were being processed under the new system.

The redesign team now had to "roll-in" other members of staff into the new process. Other staff members were drip fed into the new process. They were 'buddied up' with members of the redesign team until their confidence grew. In a few months the new systems was being used by all members of staff. Today, staff rotate the various aspects of their work over the week by spending one day on the customer services desk dealing with customers, one day manning the telephones and three days processing claims at their desks and they take responsibility for claims from beginning to end. Figure 20 shows the system capability in processing new claims after the redesign (actual end-to-end time) which averages at about 12.3 days.

Figure 20 – system capability after redesign

NEW CLAIMS - 10th JUNE TO 18th NOVEMBER 2009
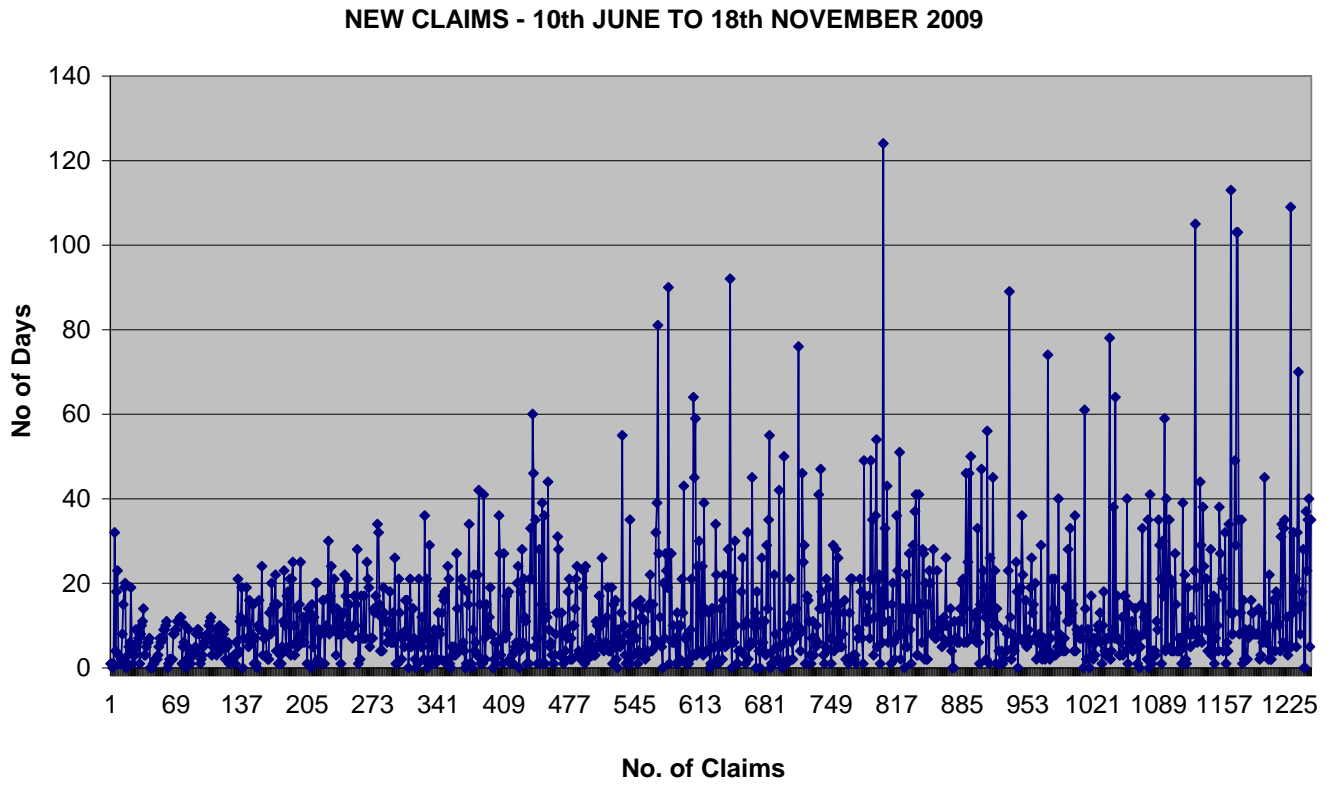
The redesign team then began tackling changes of circumstances in September 2009, the other main form of demand. Changes in circumstances are often complicated, with repercussions in many related areas. Previously, customers had to advise of changes in circumstances by completing the full 36 page benefit application form. However, four new forms have now been introduced, ranging from two to five pages.

This has had a huge impact on both the customer, in terms of much quicker turnaround time and also internally for the housing benefits section in terms of requiring massively fewer resources. The benefits for the customers are illustrated in Figure 21 which shows that the average times taken to process both new claims and change of circumstances have fallen dramatically. The times taken to process council tax benefit for both new claims and change of circumstances have also fallen following a similar pattern. That is because council tax benefits are also handled within the same system and by the same staff.

Figure 21 – processing times for new claims and changes of circumstances following system redesign

NEW CLAIMS
NUMBER OF DAYS TO PROCESS

CHANGE OF CIRCUMSTANCES
NUMBER OF DAYS TO PROCESS
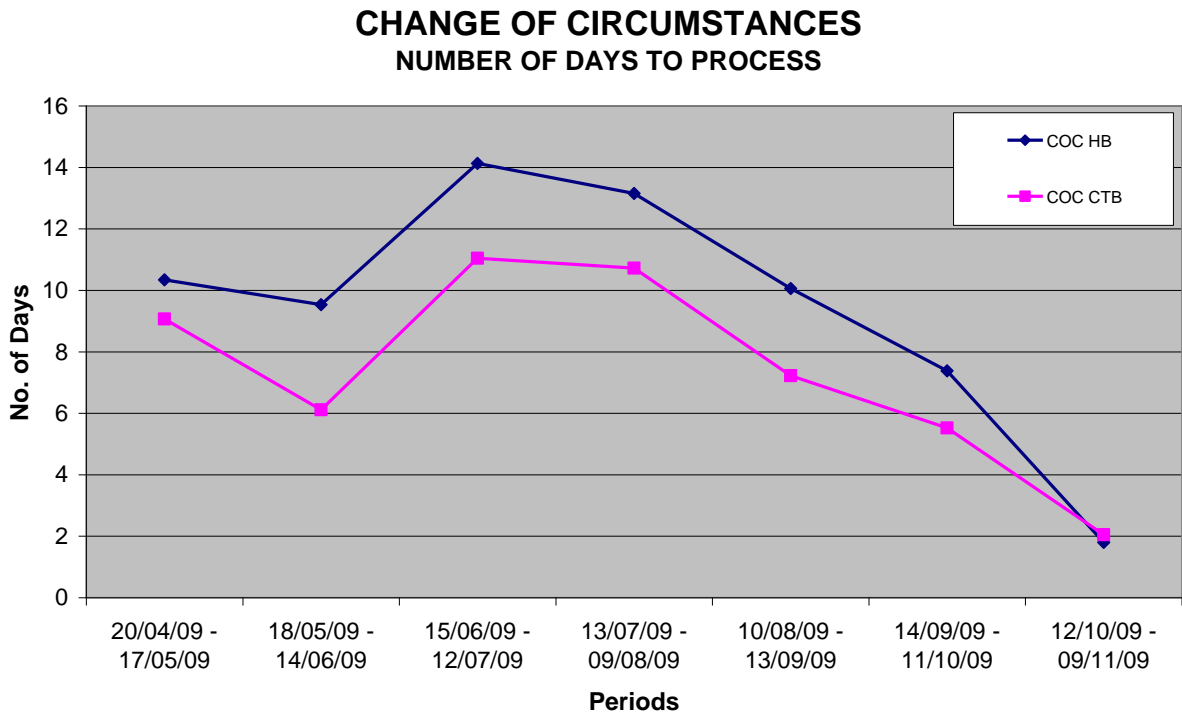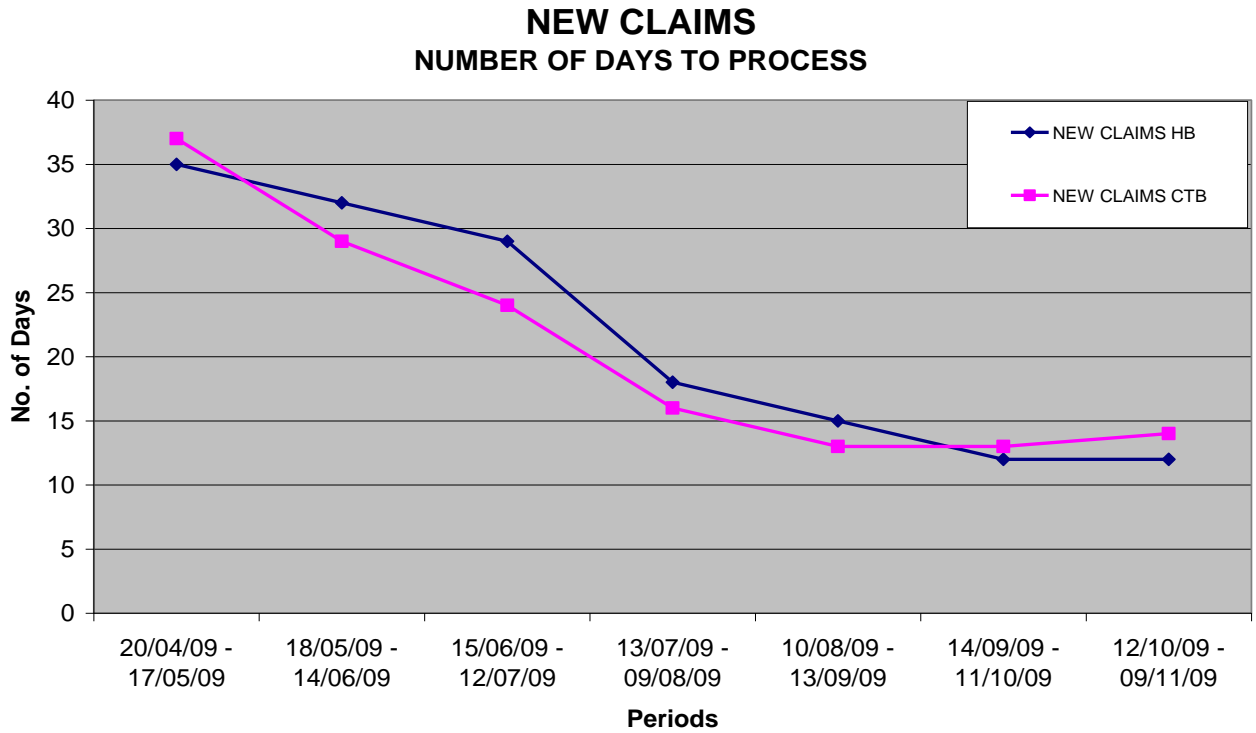
The slight increase in time taken to process change of circumstances in June/July is explained by the fact that resources were redeployed at that time to start the re-design on new claims. However, overall early results on changes of circumstances also look promising.

Main benefits to the customers of the service include:

- They now only have to complete a maximum of five pages to inform Blaenau Gwent of a change in circumstances, instead of 36 pages - making the process much quicker service.
- They now deal with one person from the beginning to the end of the claim and know who to contact with any queries, making it a much more personal service.
- They now have clearer letters advising of their entitlement, so they don't have to ring up and have them explained, making it a much more efficient service.
- They now have the option of having a Visiting Officer call at their home to help them complete applications or pick up documents, making it a much better service.

Main benefits to Blaenau Gwent include:

- It has shown Blaenau Gwent to be a Local Authority willing to experiment with innovative ways of providing more efficient and effective services, to minimise the impact of limited funding and as an alternative to cuts in services. The reputation of the Authority has been enhanced.
- Employee morale has been raised. A staff questionnaire indicated that 80 per cent of staff are happier under the new way of working than they were a year ago and the vast majority feel they now provide a better service to the public and that they work better as a team - happy staff will surely give a better impression and service to the public. In addition, encouraging them to have an input into the way the service is delivered and therefore designing their own jobs, should maintain the current high level of morale.
- Because claims are handled more quickly and the system is more supportive of requests for backdating, further financial benefits have accrued from reduced rent and council tax arrears, reduced recovery action, fewer overpayments and fewer appeals.
- As a result of removing the 'waste' from the system the number of visitors to the Counter has reduced by 40 per cent since June.
- There will also be a reduction in the resources needed to deliver the service, but details are not yet available.

A member of the Service Efficiency Improvement Team commented: "We know we haven't got the service perfect yet and we will shortly be distributing a Customer Questionnaire to find out what's working for them and what things we still need to improve on. We will also be looking at trying to measure the impact on other organisations of the improvements we've made for example we expect that referrals to the Citizen's Advice Bureau have reduced, and possibly even domestic abuse cases caused by money pressures". The approach will clearly lead to less cost, but importantly, this is a 'by-product' of the approach not the focus".

Another member of the Service Efficiency Improvement team commented: "Really, all we are doing is going back to basics and enabling staff to do the right thing for the customer. Already we have seen a reduction in 'waste' demand coming into the system, which will eventually lead to a reduction in cost whilst still providing good quality customer-focussed services".

Figure 22 - Process before and after improvement

	Before	After
Characteristics	Customer claims took a lot of time to process	Customer claims are handled far more quickly
	Service was fragmented – no ownership (Customer dealt with many people)	Customer deals with one person who owns the claim end to end
	Customer was sent complicated letters detailing how their claim has been calculated	Customer are still sent complicated letters (IT changes are ongoing) but on the front a summary sheet is included containing the critical pieces of information they want to know
Live case load	9,422 at November 2008	10,594 at November 2009
Failure demand	56%	This has not yet been re-measured. There is still likely to be some failure demand in the system.
Backlog	300 - new claims	0
	700 - change of circumstances	500 – i.e. reduced since redesign in September 2009
End to end time	45 days - new claims	12.3 days*
	35.3 - change of circumstances	8.6 days**
System/policy issues	Local Housing Allowances	Ongoing system constraint
	DWP	Plans are being made to improve communication with the DWP
	DWP system – Blaenau Gwent receive a DWP admin subsidy for each case entered to Housing/Council Tax benefits process system	Redesign identifies ineligible cases up front by carrying out manual calculations, which do not then enter the system Thus assessors do the work but avoid unnecessary system entry. Blaenau Gwent may lose £48,000 administration subsidy from DWP – despite this sensible reduction in unnecessary work (i.e. failure demand). Under discussion with DWP/WAG

* This average is related to the data presented in Figure 20. Latest data suggest that the average has increased to around 18.3 days.

** The average end-to-end time since the redesign of "change of circumstances" service which was put in place in August 2009. Notably less than one year's data is reported in here. The improvement team is constantly monitoring the trend for stability the system.

Conclusion

This case study has shown the application of systems thinking to Blaenau Gwent's housing and council tax benefits section. The previous system design had been centrally specified, and yet it was discovered to have been the cause of a great deal of waste and poor service to local residents. The whole process has been enlightening and has made those involved more convinced than ever as to the ongoing value of Systems Thinking.

The team is also now initiating work to introduce the systems thinking approach into the Council Tax and Adult Social Care Services, with particular excitement about the potential success of applying systems thinking in adult social care to release greater capacity in front-line social care delivery.

Members of the SEIT commented on their experiences with systems thinking so far: 'we were sometimes shocked to see the way the system made us treat our most vulnerable residents. However, to see the improvements in service being achieved so far, and knowing that we are providing a much more personal and efficient service to our residents, which will continue to improve, makes it all worthwhile'.

The Corporate Director of Resources commented: "The approach of re-designing services from the customer's perspective has proved that Systems Thinking works, with a far better service to our residents and far superior performance than that which was previously achieved. Systems thinking has enormous potential in re-shaping public sector services at a time when change is necessary due to the difficult financial climate the Country finds itself in".

Case Study C – Portsmouth City Council

Local Authority Housing Management[2]

Background

Portsmouth City Council is a unitary local authority on the English south coast. Unlike many local authorities, Portsmouth City Council's housing management service has retained direct ownership and management of its housing stock. It is the largest social landlord in the south Hampshire sub-region with over 17,000 tenanted and leasehold dwellings, representing 18 per cent of tenures in the city. Portsmouth's council homes play a significant part in meeting regional housing priorities. The department has an operational budget of £80 million and comprises a staff of approximately 600 people.

After studying their service in detail, the Portsmouth housing managers made an informed choice to set their own measures rather than focusing on the centrally set targets and specifications which were imposed on their service. Their housing service has become one of the public sector's most fully-developed examples of systems thinking, with systems principles in use across the whole department. In particular, the Council's housing repairs and maintenance service is now delivering beyond previous expectations as it is fully designed around meeting customer needs instead of achieving targets. However, before it made these changes, the department was ranked highly against conventional measures of success.

In July 2006, the Audit Commission rated the Council as doing very well: the Housing Service had been rated as three out of a possible four on the council's Comprehensive Performance Assessment (CPA) scorecard and had achieved Beacon status. The repairs and maintenance service was rated as a 'good 2 star service, with promising prospects for improvement'. Performance indicators from 2005-06 had shown voids (empty residences) being turned around and re-let within 30 days, which placed them in the upper quartile of performance for other local authorities.

Despite this strong record of achievement in the service, local councillors would regularly accost the Head of Housing Management, to tell them that their surgeries were filled with residents complaining about having to wait for up to a year for repairs to be attended to in their council houses. This ran contrary to the council's survey results which said that 98 per cent of residents were happy with the service they were providing. This rating was based on the answers to questions such as whether workmen were friendly and smiled when they came round, and whether they had cleaned up after their work. The Council's KPIs showed that repairs were being carried out within budget and within the time targets as specified centrally and measured

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[2] Thanks to Paul Sorrell of Portsmouth City Council for his assistance with much of the collection of the data that informs this report

by the Audit Commission. The Head of Housing Management decided to investigate further what was causing these contradictory messages. Discussions with colleagues led to attendance at a systems thinking course, and the subsequent decision to apply systems thinking to the council's housing repairs service.

As a result of extensive demand analysis throughout the department, Portsmouth has found that managing in accord with centralised housing policies was resulting in poorer services for local residents that were rife with inefficiencies. The Council's experience shows that a 'one-size fits all' approach to centrally specifying housing services does not draw strengths from local individuality and identity.

Processes selected for improvement activity

As a department, Housing is able to operate with a degree of independence from other council functions, as it is governed by a different set of legislation. This level of independence has been a contributing factor to the success of the systems thinking interventions in Portsmouth's housing department: there has been more freedom for the department to take its own line with regards to dealing with the 'system conditions' which have been discovered to prevent the department from delivering an excellent service. The managers within the department have embraced the autonomy their status affords them and taken on the responsibility of improving all services for residents.

Within the housing department, there have been interventions in the following services:

- Repairs and maintenance;
- Planned maintenance;
- Void management;
- Cleaning and grounds maintenance;
- Housing allocations;
- Rental income; and
- Sheltered housing services.

As the housing department's systems thinking team became more established, it has also been given the opportunity to become involved in redesigning the Council's corporate human resources and recruitment systems.

The housing repairs intervention

Portsmouth first applied systems thinking to the repairs and maintenance service. As this has been the system which has now been running for the longest period of time, systems thinking has been integrated throughout the service and down into the layers of suppliers and contractors in the system. Whilst housing repairs systems thinking interventions have been documented elsewhere (ODPM 2005), this intervention is especially noteworthy for the level of integration throughout the supply chain.

The learning acquired during the Council's own intervention led the contractors who provided the housing operatives to also acknowledge some of the problems within their own

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organisations. The Council subsequently required all of its housing contractors to become systems thinking organisations in their own right – a challenge to which four of the five original contractors responded. The fifth did not change its systems and as a consequence did not have its contract renewed.

*Figure 23: Systems Thinking 'Check Plan Do' Approach*
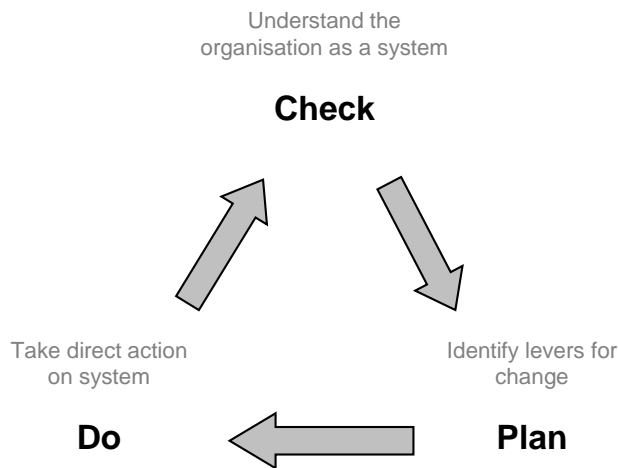
Source: Seddon, 2005, p.110

In the first intervention in the repairs and maintenance service, the initial process began with selecting a team to undertake 'Check', the first stage in the 'Check-Plan-Do' model (Figure 23). These were representatives from throughout the repairs and maintenance service structure. All had different skills, perspectives and personal attributes. Importantly, all were selected as they were known to be respected by their colleagues, but all joined as willing team members.

The members of the team were made fully aware that this was not just another training course. All representatives were workers selected from within the existing system (i.e. there were no representatives of residents in the check team). Team leaders and senior managers who had management responsibility for this service were also required to contribute to the check process and to assist when necessary.

Figure 24: **Improvement work/project: the stages of 'Check'**
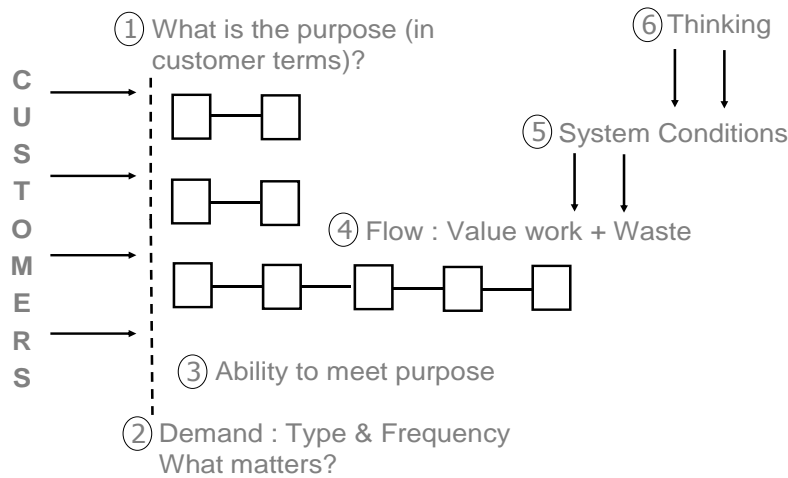
Source: Seddon 2005 p112

Purpose

After an initial period listening in on actual customer phone demands that were coming into the call centre, the check team were given an insight into the customer's housing requirements from the system. It was then that the team agreed upon what they thought was the purpose of the system:

'To do the right repair at the right time'

This was in contrast to the existing de facto purpose, which paid more attention to the Council's strategies and business plans, focusing on measures of activity for elements of work over specified time periods or budget expenditure or against Key Performance Indicators (KPIs). This simply defined purpose was continually validated by the other findings of check, listening to customer demand and feedback throughout the intervention.

Demand

Step two of check focuses on demand and what matters to the customer. The team were required to gain first hand understanding of demand by listening to calls and spending time observing at the housing department's seven area reception counters. The team found that perceptions about the type and frequency of demand (for example that it was unpredictable) were not borne out empirically. In fact, the opposite was true: demand could be shown to be predictable throughout the times of the day, month and year. Figure 25 records demand into the system and shows that the mean number of jobs per week was quite predictable over time.

Figure 25 – new demand was predictable over time (Number of jobs raised on the system by week jobs per week)
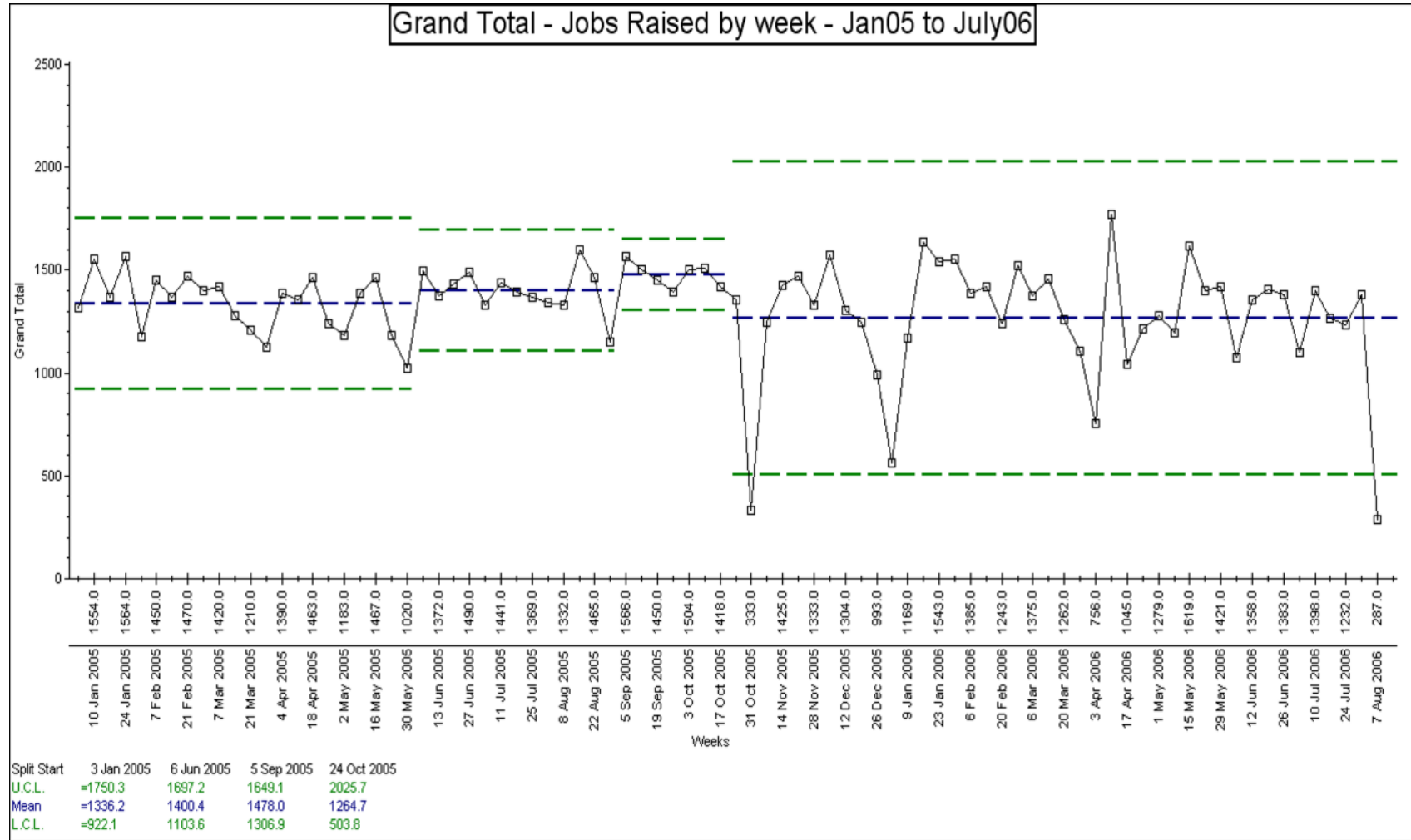
When this demand was broken down and analysed, it was discovered that value demands were typically in the form of 'I need something fixed' (i.e. they were first time requests for repairs to be carried out) and presented themselves as "can you help / advise me?". Failure demands were of the type "I've reported a repair - not heard anything since?", "You've been to repair but it's not finished", "I'm unhappy with the quality of the repair", "I need a repair fixed again (repeat request)" or "you said you'd be here but you didn't turn up". Failure demand was discovered to be running at 60 per cent of all demands.

The second stage of demand analysis involves deciding what matters to the customer, which should inform how the organisation responds to the value demands they were receiving. The elements that the team agreed upon, based on the experience of listening to demand included that repairs would be completed which were:

- completed in one visit;
- would stay fixed, not requiring another call to the council for a further repair;
- undertaken either;
- as soon as possible; or
- at a time convenient to the customer.

As these were the agreed measures of what mattered to the customer, the team investigated the capability of the service to deliver against these measures.

Capability

The statistical process charts (SPCs) as shown in Figure 26 demonstrate the capacity of the system to deliver end-to-end repairs. Predictably and reliably, it was taking 98 days for a repair to be completed, with a mean time of 24 days.

Figure 26: End to end times taken to make repairs
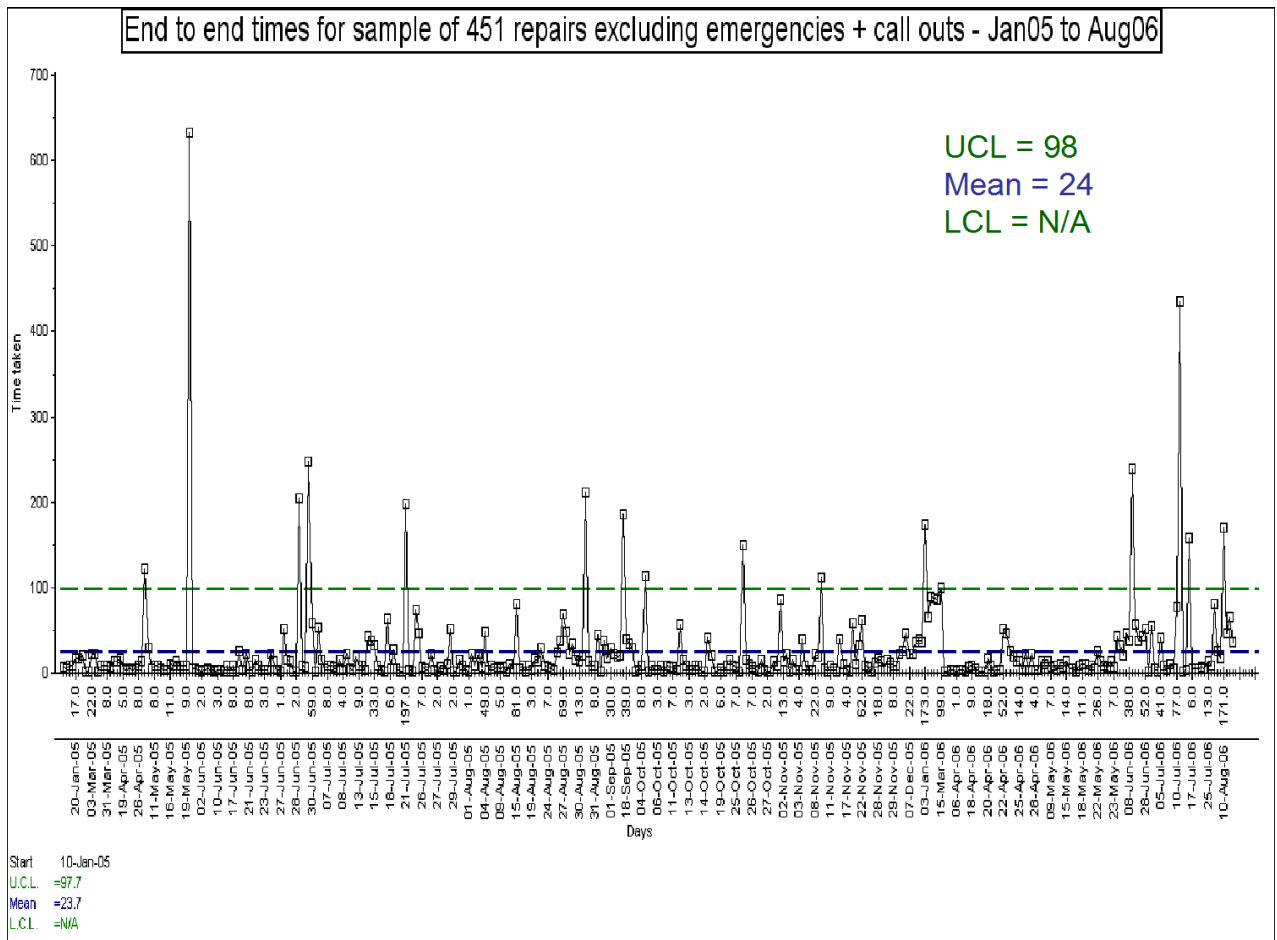
When investigating the current system's capability to deliver against the purpose of the system, the check team were astonished to find that none of the current measures in use were relating to this purpose. All of the existing measures variously related to activity, budgets or performance against KPIs as specified centrally and measured by the Audit Commission. A great deal of the staff's time was being spent collecting unreliable, inaccurate data. As soon as the team began to piece together end-to-end times for repairs based on historical records, they found that actual times were substantially longer than the previously reported conventional measures were suggesting. In fact, they discovered that 15 per cent of all repairs required four or more visits for a job to be completed.

Flow

When the flow of work was mapped from the initial receipt of a request for a repair through to completion of the task, the team was able to construct a diagram showing all of the various steps and decisions points in the flow (Figure 27).

The Head of Housing Management was able to relate a personal anecdote which demonstrated what he had learnt during his time exploring the flow. He had quickly found that, in reactive repairs, things were only fixed when they became really bad. On one occasion, he was following a plumber in the work for a day when they went to see a repair of a leaky tap. The plumber's behaviour was driven by the fact that each patch had an amount to spend each month, so repairs were only undertaken on the problem which was reported, not any other problems which presented themselves.

He quickly realised that this was causing calculations about costs based on false economy. For example, changing a washer in a dripping tap costs approximately £25, whereas it was estimated that changing a tap would cost £35 plus parts. The plumber would therefore be required to do the cheaper piece of work and change the washer to provide a short term fix to a leaky tap. Of course, the plumber usually did this because he was doing the job that was specified on his ticket, instead of being free to use his professional expertise in order to put in the 'right' repair. However, when the check team drilled down into the information, they found that some washers had been changed 3 times.

Therefore, a more realistic calculation was to compare the costs of 3 x £25 + £35 + parts = £105 + parts against the one-off cost of £35 + parts. The right repair would have been the right one for the property and the customer. In learning this, there were clear lessons about the capacity for improvement in both performance as judged by the customer and costs accrued over time in the planned and reactive maintenance services.

Figure 27 illustrates the decision points in the repairs process and the system conditions which were affecting these decisions. Marked in bold are the main steps in the process of making a repair and getting paid in this system. Below this line of steps are records of how often problems would occur which would either require repeat visits or delays.

Figure 27: System picture of the housing repairs system, including the system conditions – the manifestations of the thinking behind the design and management of the system.
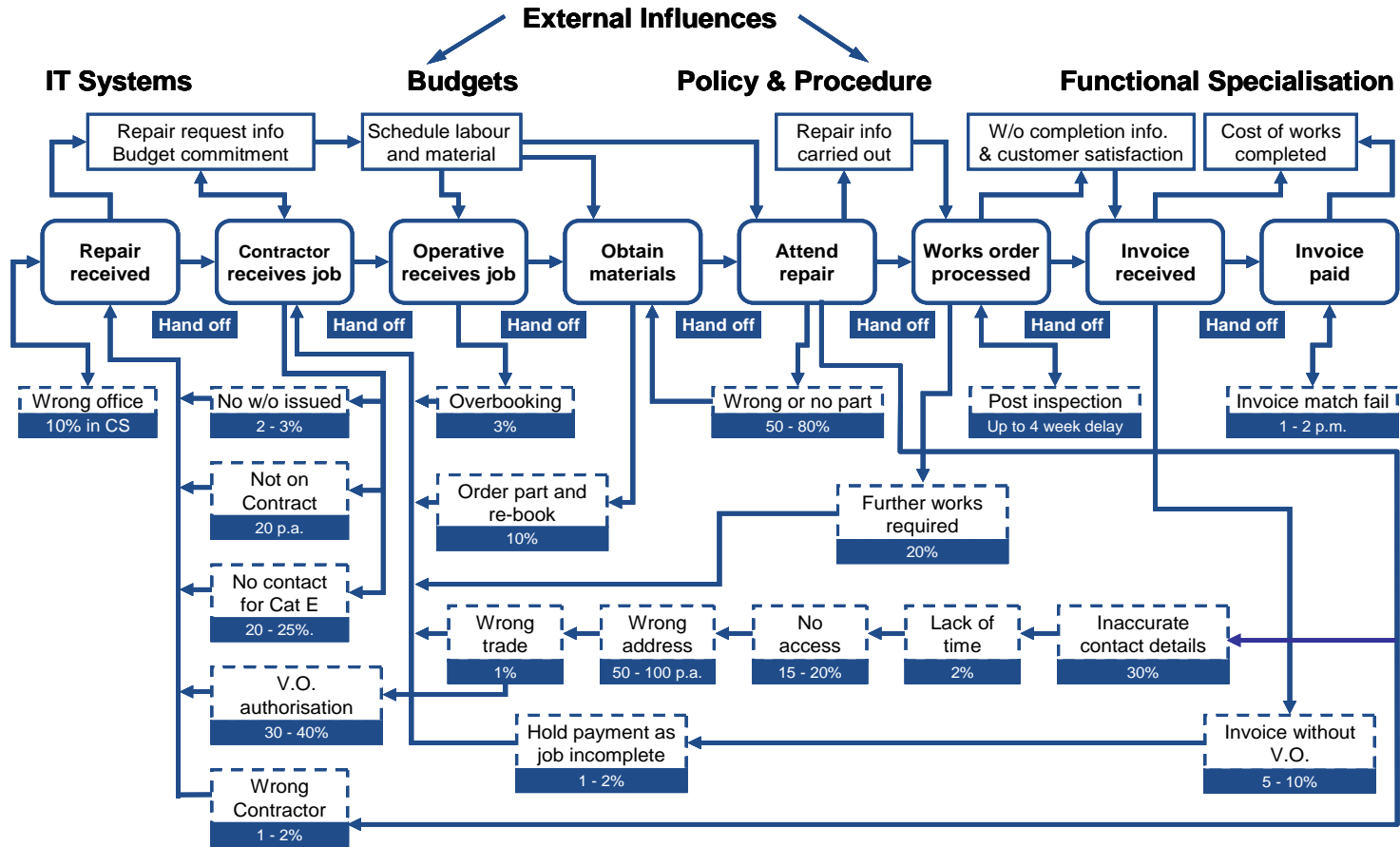
Marked in bold are the main steps in the process of making a repair and getting paid in this system. Below this line of steps are records of how often problems would occur which would either require repeat visits or delays.

Going through the check process meant that the team learned many more detailed things about the system along the way. These included:

- The pre- and post-inspections which were being carried out on repairs by non-technical staff to check that operatives were doing their job in fact were adding no value from the customer's point of view, and were only causing delay and inconvenience to customers.
- Staff throughout the system were focussed on meeting budgetary targets and improving KPI scores. In turn, this was aimed at protecting the organisation's good external image.
- The service was completely reactive rather than proactive, and good service was being judged on the quantity of complaints received rather than direct feedback from residents.
- Repairs were not treated as a high priority for non-technical staff in the organisation.
- There were very high levels of waste, which were resulting in poor utilisation of staff resources and skills.
- Contractors were carrying little or no stock on their vans as the contractor companies did not trust their workmen not to use the stock to do other things. As a result, contractors had to make several visits to a residence in order to complete a single job.

Previously, the Head of Housing Management said that the Department had spent money on marketing the department to their residents, which in turn was aimed at keeping the results of satisfaction surveys high. Through check, it became obvious that this was adding no value for the customer, and hence there is now no money spent on marketing. Instead, the only satisfaction data would come from directly from tenants who have received a service and used in order to improve, rather than to demonstrate performance.

System conditions and what was revealed about management thinking

In the systems thinking model, the system conditions are the things that explain why the system behaves in the way it does, and the major conditions identified here (as shown in Figure 27) were summarised as being:

- the targets imposed on the system from above in the form of policies and procedures;
- pressure to meet budgetary requirements (managing costs);
- the division of work into functional specialisms; and
- the inflexibility of the I.T. systems.

Identifying these system conditions exposed the thinking which was underlying the way the system had been designed and managed. Changing this thinking is the ultimate goal of systems thinking: "Thinking" governs the "System" which in turn governs "Performance" (Seddon 2005 p10).

The system conditions were discovered to have many distorting effects on the actions of people in the system:

- Managers are driven to pressure call centre workers to change job classifications on the system. This is because emergency jobs are perceived to be more expensive for the

organisation than routine repairs, and also in order for the organisation to be able to achieve its quotas of job categorisation targets which it has to report to the Audit Commission.

- One job from a customer could be turned into multiple jobs on the system. Jobs would be cancelled and restarted, for example when a tradesman was not able to gain access to a property. This would avoid missing time targets for jobs.

Pressure would also come from the targets that try to get Housing Associations to do more planned than reactive repairs. When the system is studied, it is found that the arbitrary separation between planned and reactive repairs drives the organisation to refuse to replace kitchens for some people because they are due to have a planned replacement in six months' time, whilst for others they find perfectly good kitchens being ripped out to meet the planned schedule. The team learned that it was actually better to make replacements when it is best for the property and the resident, based on knowledge of when such repairs are necessary.

Many of these system conditions were resulting from the need to comply with centrally dictated specifications that emanated either from government or inspection bodies. These requirements to comply were identified as external threats to the sustainability of the service redesign.

Redesign

The redesign incorporates the experimentation with both the new methods of working in the 'Plan' stage and then the roll-in of the rest of the organisation in the 'Do' stage. The team agreed that the crucial 'value' steps in the process, as judged form the customer's perspective, were:

- ensuring access to the property;
- diagnosis of the problem; and
- completion of the repair.

By experimenting with new ways of delivering repairs to residents, several further discoveries were made about ways to improve the process:

- Specific timed repair appointments enables better access.
- Accurate diagnosis of what is required to conduct a repair can only effectively be carried out at the property by the correct operative (for example electricians for electrics).
- For repairs undertaken and appointments, customers need to be seen as individuals with all having different 'nominal values' (different things that matter to them about how they receive a service) which need to be acknowledged. This is in contrast to the way times were previously categorised as emergency, urgent or non-urgent which did not allow for customers' needs to be differentiated.
- Each visit to a property is an opportunity to maintain it and prevent future repairs. The operative would always ask 'Is there anything else that requires doing?' when on a job.

- Repair decisions must be separated from other influences such as budget or other targets and practices. The priority becomes 'do the right thing for the customer/the property' rather than 'put in the cheapest solution'.
- The correctly skilled operative must be given the right resources to undertake the right repair
- By working in a responsive manner, the Council not only satisfies their customers but is also proactive in looking after its housing stock to prevent future maintenance issues.

The key points are:

- Portsmouth now carries out repairs when it finds them rather than batching them into 'planned maintenance programmes';
- if a kitchen or boiler needs replacing, on the professional judgement of the tradesman, then it is carried out at the convenience of the customer;
- it has been established that the previous 'textbook' component lifetimes (which were driving the 'planned' maintenance programmes) are not borne out in practice; and
- the external decorations programme was previously carried out in a five year cycle; however, the changes made mean that currently 40 per cent of the blocks have external decorations over five years old and yet there has been no increase in related demands.

The changes of redesign aimed at only doing the value steps (assess, diagnose, complete repair). This required the best expertise to be placed at the front end of the process. Housing staff now focus on questioning customers about their problem to ensure the right skilled tradesperson is sent to the repair at a convenient time for the customer. This has resulted in the right tradesperson making the first assessment of the problem.

As they progressed through redesign the team realised "wouldn't it be good to fix everything which may need fixing at the same time?" This required a change of thinking: they now had to trust the tradesman to act professionally, which the system was not doing previously. This change of thinking was not easy for all managers to accept. To produce normative learning they had to take some of these managers through the process several times before they were comfortable. They found that they had to overcome people's suspicions that tradesmen would be workshy by seeing the work circumstances for themselves.

Figure 28: Results of the process before and after improvement

	Before	After
Purpose	Manage all activity in order to meet the targets and keep down costs	To do the right repair at the right time.
Measures **End to end**	Predictably 24 day average for all repairs	Down to average of 6.9 days to fix the originally reported repair and 11.2 days to fix all repairs identified at the property
Failure demand	60%	Currently running at approximately 14% for repairs
Customer satisfaction	Old MORI measures were running at 98% for the service. However, true satisfaction rates with the old repairs service, as measured in the process of Redesign, was 6 out of 10	Repairs service has been recorded at an average of 9.9 out of 10 for past 6 months
Right First Time	Not measured	91.8%
Appointments kept	Not measured	77.5%

Costs: Reactive repairs costs increased as they discovered latent demand from houses that had become run down over time. Portsmouth report that costs per job fallen by 7 per cent through the redesign. However, by removing the arbitrary distinction between planned and reactive repairs, Portsmouth discovered that the savings from the planned maintenance budget more than funded the increase in reactive repair costs. Repair costs have also fallen year-by-year. The Council has now worked on (and succeeded in) reducing the end-to-end time for all repairs, including those only discovered on arrival at the property.

Systems thinking integrated along the supply chain

Similarly, dramatic results have been achieved by the individual contractor organisations in the supply chain who have adopted systems thinking methods. One contractor was shocked to discover that they previously had no measures which were helping them to learn and improve in their business.

Their aim has now become to be a true end-to-end repairs business. They have substantially increased their capacity whilst only using the same staff, moving from a mean of 85 jobs per day of up to 225 jobs per day, allowing for additional work to be taken on from other council contractors. They also found that the key element of being able to complete a job right first time was the requirement for suitable van stock.

This was designed against demand for parts, meaning that the vans were replenished at the right frequency. They decided that fast access was required to parts that could not be carried as van stock so as to improve their right-first-time measures. The three service providers for

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Portsmouth City Council all measured the time spent collecting parts and found an average of 1.8 hours per day, per tradesman.

As a result, one of the company's directors decided to set up their own rapid response parts supplier company. Parts are sourced and delivered directly to the site of a repair. This means that the skilled tradesman does not have to leave the site to collect additional parts, causing inconvenience to the resident. Before the intervention, end to end times averaged 13 days with an upper control limit of 59.1 days. Post-intervention, these figures have fallen to an average of 2.8 days, with an upper control limit of 9.4 days. Figure 28 shows how, as a result of making a first time fix (reduction of visits per job from 2.9 down to 1.9) the average repair cost per job fell from £258 in April 2009 to £114 in October 2009.

Figure 29: Monthly average repair cost 2009-10
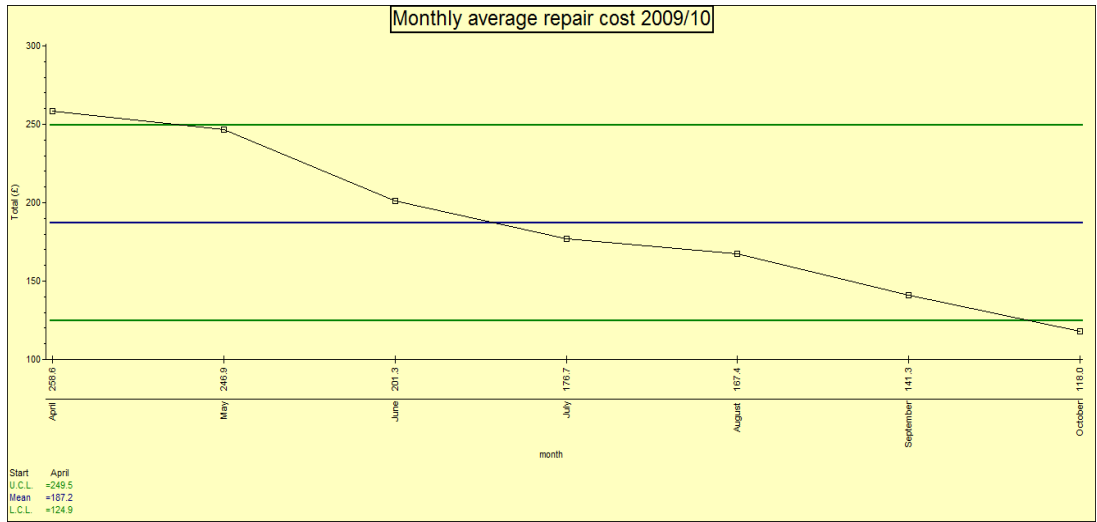
Another set of measures from this contractor showed that failure demand was now running at 9.4 per cent, when it was at 25.6 per cent before, meaning that the Council is better able to respond to customer repair requests.

Other Interventions: Choice Based Lettings

Portsmouth City Council's Housing Management service has not adopted the Government's choice-based lettings (CBL) model. CBL is being pushed centrally but in Portsmouth's customer demand analysis, the need for web-based property advertising and bidding process was not found. It was decided that CBL was not suitable for Portsmouth's customers' needs and would force it to build in wasteful processes that would increase costs. Nationally the trend is for housing registers to increase in size when they are part of a CBL system. Typically these lists can be filled with customers who do not have a realistic chance of securing social housing.

Portsmouth's housing register has been carefully reduced from nearly 11,000 to less than 3,800 so that customers have a realistic chance of finding suitable accommodation. The Council's

Housing Management service has identified people with the greatest needs and has contacted those who were unlikely to be re-housed to help with alternative options. The size of the register continues to reduce, bucking the national trend and tailoring itself over time to suit the amount of available housing.

Portsmouth's alternative to CBL has created a customer-focused housing allocation scheme where 'choice' is built into each key stage without incorporating inefficiencies. Customers can choose when their tenancy will end and when their new tenancy will start.   It provides a consistent way of allocating the limited vacancies in council and registered social landlord property. Its void process complements the allocation scheme to ensure homes are allocated taking into account customers' needs. The Council's Housing Management service undertakes face-to-face interviews with applicants who do not have to complete application forms or use web-based technologies – this ensures the most vulnerable or underprivileged are not alienated. Once circumstances are established, customers are advised about how long it might take to house them providing them with the opportunity for an informed decision from the outset. Over the last six months, customer satisfaction for the voids service has been recorded at an average of 9.0 out of 10.

Green and Clean – the cleaning and grounds maintenance service

One of the interventions which has had the most surprising impact has been the work with the 'Green and Clean' service. Although the Green and Clean service does not inform the Audit Commission's judgement of the Housing Service, the service offered is of great importance to local tenants, ensuring the estates are well maintained and presentable. The purpose of the service was to 'keep the local area clean and tidy', and there was particular concern that bulk refuse would be removed quickly.

Some results achieved included 15,390 bulk refuse pickups over the period January to May 2007 where the team found that they could now respond to requests in average of two hours 20 minutes (the average time from first report to removed from the estate), an average score of 9.4 out of 10 for the service (2,209 resident scores). Hampshire Fire and Rescue have subsequently written to the Council saying that they had noticed a dramatic reduction in fires on estates in the city, and did not know what Portsmouth City Council had done, but that it was working!

Anecdotally, officers report greater community engagement as the service has improved: residents say that now they know things will be fixed, they feel encouraged to report problems when they occur.

Conclusions – the achievement of effective local service delivery

Portsmouth City Council's approach has had a dramatic impact on the provision of housing services. Customers are experiencing the benefits, as is shown by the customer satisfaction data collected after a repair has been made. The service continues to learn by listening to customer demands and ploughing information back into its services. The process has required the support

and commitment of staff across the organisation, as well as residents, councillors and service providers.

In Portsmouth's experience, centrally controlled housing policy dictates the quality of service provision. Regulations and incentives, of either additional funding, targets or corporate assessments, work to the detriment of the customer. They also hinder individuality, stifle progress and prevent local housing authorities from allocating resources to those most in need. In Portsmouth's opinion, local housing authorities have the capability and local knowledge to provide the best service to customers and should be empowered to do so.

Conclusions & Discussion from the Research

There are four themes which emerge from the analysis of these case studies:

1. how Systems Thinking provides a framework for change;
2. the impact of current targets and measures;
3. wider system implications; and
4. sustainability of improvements.

## How Systems Thinking provides a framework for change

All three of these cases followed the same systems thinking methodology. In doing so, the methodology gave a framework for understanding the true nature of their current performance and thus current problems (which in each case was different to that which had been perceived). In contrast with many other change methodologies, there was no toolkit to be applied to managers' problems, or no training course for managers to attend. Instead, participants were required to continue to follow the method and to ensure that they were engaged in the study of their service in a systematic way.

A key feature of the systems thinking approach studied in this report is its emphasis on effectiveness thinking as opposed to efficiency thinking. All of the authorities studied were thus refocused into concentrating on delivering against the central purpose of their service and were able to redesign their system in accordance with systems principles. In all three cases the systems thinking intervention involved conscientious study of the demand in a 'longer than usual' process which proved to be very valuable for the redesign. Becoming intimately familiar with the customers and demand is at the heart of the approach.

Another feature of the approach was that workers themselves were responsible for the redesign of the system in which they worked – a powerful way of creating the engagement of the workers. In this approach to change, Seddon (2005) refers to Argyris and Schön's (1974) theory of double-loop learning. Distinguishing between single and double-loop learning, Argyris (1999) explains that: "*Single-loop learning occurs when matches are created, or when mismatches are corrected by changing actions. Double-loop learning occurs when mismatches are corrected by first examining and altering the governing variables and then the actions*".

For Argyris and Schön (1974), single-loop learning involves improving incrementally through learning new skills and capabilities, doing something better without challenging the underlying beliefs and assumptions. Double-loop learning goes further than single-loop learning by reshaping the patterns of thinking and behaviour which govern why actions are taken (see Figure 30).

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Figure 30: Single- and double-loop learning
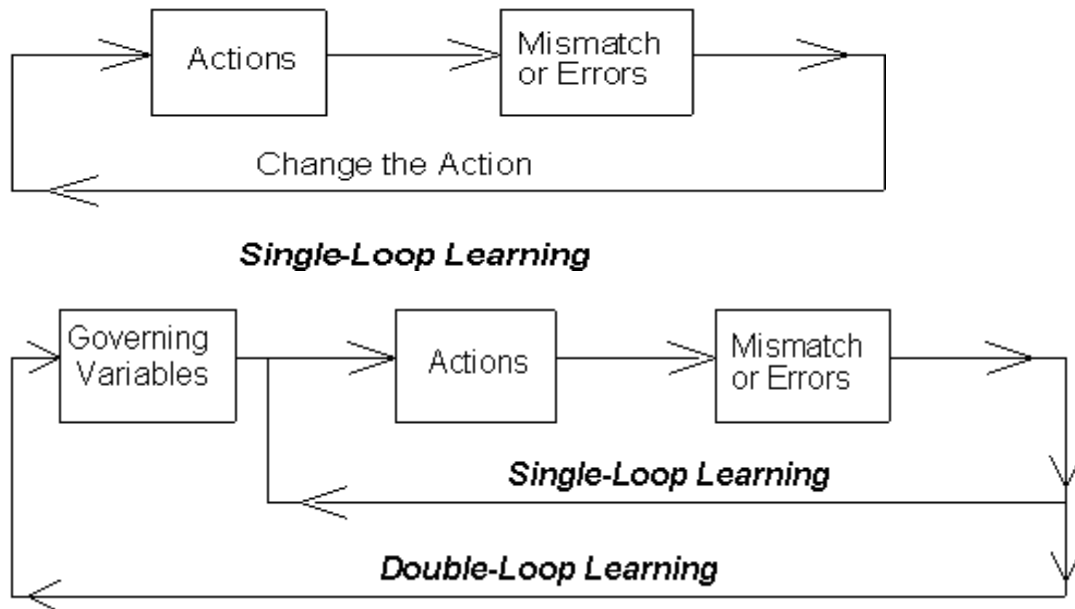
Source: (Argyris 1990 p. 94)

Argyris and Schön credit Ashby's (1952) use of the metaphor of a household thermostat to give an example. When the temperature oscillates around a single point with the heating unit turning on and off in reaction to temperature changes, this could be characterised as single-loop learning: the feedback system reacts in a straightforward way to fluctuations in the environment. When the householder intervenes and alters the thermostat, this can be seen as the equivalent of double-loop learning: the human feedback loop here connects the household temperature not only with the heating unit, but with the thermostat settings around which the temperature will oscillate. "*Double-loop learning changes the governing variables (the 'settings') of one's programs and causes ripples of change to fan out over one's whole system of theories-in-use*" (Argyris and Schön 1974)*.*

By recognising that there is a system of interaction which underpins one's actions, it is possible to change and in the process become more open and self-aware. Seddon (2005) describes this as the need to 'unlearn' before one can 'learn' the new way that a system should work, in an 'emergent, adaptive' approach to change.

"*Systems thinking is only truly learned by doing, by action learning: it is only by doing that managers can unlearn, can find out for themselves where their current beliefs about the design and management of work are flawed, in order to put into place something that works systematically better, and can systemically be further improved*" (Seddon and Caulkin 2007).

Embracing the emergent approach to change is positioned firmly in the systems thinking tradition: "*The idea of emergent properties is the single most fundamental systems idea and to*

use this (and other) systems ideas in a conscious organised way is to do some systems thinking" (Checkland 1997, cited in Chapman 2002).

Chin and Benne (1969) called this form of action learning 'normative re-educative', whereby people are taken through their work to surface their underlying non-conscious values and then to change them, using what they call 'temporary systems' as a medium of re-education. Argyris (1999, p.90) suggests that *"it is possible to help individuals learn new theories-in-use and to create new learning systems. The intervention requires the creation of a dialectical learning process where the participants can continually compare their theories-in-use, and the learning system in which they are embedded, with alternative models. This requires that interventionists make available alternative models with significantly different governing values and behavioural strategies"*.

In all three cases a normative re-educative intervention took place which helped staff contrasts command-and-control against systems thinking (Figure 1), enabled people to test their theories-in-use against the real performance and requirements of the service.

The Impact of Current Targets and Measures

In each of the cases, the current measures and targets were raised as system conditions which were driving the wrong behaviours after going through the 'Check' process. All three found examples of the unintended consequences of managing by targets which were causing poorer service to local residents in the form of longer end-to-end times and unnecessary extra work for the local authorities. The targets were preventing the staff from being able to act in response to what mattered to the customer/resident and disrupting the flow of work.

For example, in the Neath Port Talbot example, the end of year deadlines were driving behaviour where it was being ensured that money was spent, but often at the worst, most inconvenient time of the year for the residents involved. At Portsmouth, tenants were being 'carded' for being out when contractors came to make a repair, so that the authority did not spoil its 'emergency' performance figures, when in fact these times were inconvenient for the resident and caused the authority to have to make several repeat visits in order to get the job done.

The work in the redesigned systems was based on measures derived from the customer's point of view. It was necessary for managers to see the implications of managing by the targets for themselves so that they could authorise the changes required in order to improve performance. Data has identified in all cases that early intervention by skilled staff has reduced costs and further calls on the service, thus reducing waste.

Some organisations have already begun a dialogue with their inspectorate/audit body to explain why the old targets have been discarded and why new measures have been adopted instead. One of the authorities involved suggested that their auditors should themselves become involved in some 'normative' change by being involved in the 'check' process. In this way, the inspectors may be able to see the role of arbitrary measures on performance.

Wider System Implications

By redesigning their systems, the authorities were able to realise that the boundaries of the systems which they were operating stretched further than the domain in which their service had control. For example, in the Neath Port Talbot case, it was discovered that improvements in the DFG system had knock-on effects onto the health and residential care systems: if a DFG was installed, people were being saved from having to move into residential care and adding approximately three years to their average life expectancy.

In Blaenau Gwent, it was believed that the improved council tax benefits system was leading to fewer cases having to visit the Citizen's Advice Bureau, a finding supported by the work of umbrella advice body Advice UK (Advice UK, 2009). At Portsmouth, there was a more positive unintended consequence arising from the redesign of the 'green and clean' service: the local fire service reported that there had been a dramatic reduction in the number of fires on the estates where the service had been redesigned. Cumulatively, this evidence suggests that the benefits that can be achieved from systems thinking interventions can be even greater than expected when seen at the level of higher system interactions.

Sustainability of Improvements

The three case studies had been using systems thinking methods for different periods of time. At Portsmouth, the whole department had become organised using systems thinking methods since the first work took place in 2006. This shows a certain degree of sustainability in that the principles were embedded across all of the services. The involvement of staff at all levels in the Portsmouth intervention also bodes well against the literature on sustainability: "*Long term sustainable change cannot be achieved on the basis of remote expert diagnosis by consultants and recommendations endorsed only by higher management. Participation at all levels is essential*" (Jackson 2003)*.

Another key factor in terms of the sustainability of the improvements, is the avoidance of 'dumbed-down systemisation' or the principle of Jidoka through involvement of both the frontline staff and managers in analysis and redesign in all three case studies.

Nonetheless, the limited scope of these studies means that it would be unreasonable to make grand claims for the sustainability of the systems thinking improvements cannot be made on the basis of these findings. Further research would be necessary, perhaps in the form of a broader study like the International Motor Vehicle Programme which informed Womack, Jones and Roos' 'The Machine that Changed the World' in 1990 and led to popularisation of lean thinking ideas.

Limitations and Recommendations for Further Research

This research only covered three organisations which were selected in a purposive sample to investigate the efficacy of systems thinking in public services. Therefore the results of the study are not statistically generalisable. However, the findings could be analytically generalised given the in-depth level of investigation in each case. A wider study of various improvement approaches in the public sector in Wales could help identify the strengths and weaknesses of each. Moreover, it can be suggested that integration of various other approaches and concepts such as capacity management could potentially enhance the benefits of the systems thinking methods investigated in this report.

Another key recommendation is to understand the types of services where systems thinking principles and methods are most successfully deployed. This will again require deployment of a larger sample of organisations as well as in-depth study of a few.

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