A soft systems methodology approach to the improvement of a housing association's defects management and learning systems

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A SOFT SYSTEMS METHODOLOGY APPROACH TO THE IMPROVEMENT OF A HOUSING ASSOCIATION'S DEFECTS MANAGEMENT AND LEARNING SYSTEMS

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Rapid growth in the production of new homes in the United Kingdom (UK) is putting build quality under pressure as evidenced by rising numbers of defects. Housing Associations (HAs) contribute approximately 20% to the UK's housing supply. HAs are experiencing challenges of central government funding cuts and rental revenue reductions. Maximising the benefit of learning from defects is recognised as being a key opportunity for HAs to help meet these challenges. This paper explores how a HA is introducing change to improve the way they learn from past defects in an effort to reduce the prevalence of defects in future new homes. Soft systems methodology was used to assist a HA who were intent on making such change, but were unable to identify a clear improvement opportunity. The findings identify a significant mismatch between what the HA's system should be doing to enable the HA to manage and learn from defects and the current situation. The mismatch has revealed to the HA that a modification to their information system is necessary to improve performance and enhance learning via live data analysis and reporting. This research is ongoing and the HA is currently in the 'taking action' stage.

Keywords: defects, housing associations, new-build housing, soft systems methodology

INTRODUCTION

In the UK there is a shortage of homes (Holmans, 2013). In order to reduce the shortage of homes, the UK house building sector is rapidly upscaling production, with a 16% increase in new housing completions for 2015 compared to 2013 volumes (HM Government, 2015). The current upsurge in housing completions is impacting build quality as evidenced by an increase in new housing defects. The Home Builders Federation survey (HBF, 2016) shows that in 2016, 62% of home owners reported over five defects in their new-build house, an increase of 3% compared to 2015.

Housing associations (HAs) contributed circa 20% of the UK's housing supply in 2014 (HM Government, 2015). Despite the HAs' important housing contribution, in recent years they have experienced declining funding from the UK Government (Jefferys *et al.*, 2014) and as of April 2016 were also required to reduce social housing rents by 1% each year until 2020 (HM Treasury, 2015). HAs remain committed to helping ease the UK's housing shortage but fear that the funding and rental reductions

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will limit their ability to develop new homes (NHF, 2015). Therefore, HAs are seeking to reduce costs to maximise surplus revenue to help finance future builds (Inside housing, 2016). Due to high volumes of defects, repairing defects is the largest expense for most HAs (HouseMark, 2012) and improving how they learn from defects is seen by the HAs as crucial to meet their challenges. This paper explores how UK HAs are seeking to improve how they learn from past defects.

EMPIRICAL SETTING

Learning from defects has often been argued as a means for reducing defects in the literature. Egan (1998), for example, recommends that construction organisations should methodically assess completed projects, to feed the knowledge gained back into development processes to improve. More importantly, learning from defects in house building has been viewed as a means of reducing repair costs. It is argued that auditing defect repair costs and implementing appropriate process improvement strategies has potential to eliminate the costs associated with repairing defects (Love, 2002). The benefits of learning from defects are consistent and improving the way HAs learn from defects is seen by the HAs as a key opportunity to reduce defects and maximize surplus revenue. For example, continuously studying past performance and improving future practice based upon the knowledge gained has been seen by HAs as a means of reducing response repairs (repairing defects) (Coastline, 2015).

Similarly, continuously monitoring previous expenditure (including repair expenditure resulting from defects) and improving performance based upon the understating gained from that monitoring is viewed by HAs as a means of reducing costs (e.g. Arcon, 2015). Guided by organisational learning theory, Hopkin *et al.* (2016) found that HAs begun their learning and defect reduction efforts by analysing their post-completion defect data. The data was recorded by a number of actors/actor groups who were involved as part of the HAs' defects management processes: call centres, the aftercare teams, and clerk of works. Based upon the HA's analysis and the gained understanding of what was going wrong within their properties, they could (if feasible) implement change that may result, and has been indicated to result in a reduction in the targeted defects. The HAs were found to be restricting their learning to a short-term solution of reducing defects through product and system adaptations.

The work by Hopkin *et al.* (2016) further indicates that focusing on product and systems adaptations alone supresses HA's abilities to reduce defects in the future. Whilst the previous studies have offered insights on how HAs learn from defects, and proposed potential areas of improvement, and HAs have outlined their desire to improve their learning, there is limited research to explore what changes HAs are actually making to improve their learning from defects practice in an effort to remain viable businesses in the face of their current challenges.

RESEARCH METHODOLOGY

Case study context

The HA presented in this research are a provider of around 1,000 new affordable homes per year in the south of England and have a build stock of over 20,000 homes. The HA are committed to helping ease the UK's housing shortage by developing new homes to rent, as well as for sale via shared and private ownership schemes. The HA have 'a development arm' responsible for building new homes and 'an asset management arm' responsible for managing the build stock (including defects). The HA can use any surplus revenue they make from rental income (including service charges) and the sale of homes to maintain existing homes and help finance new ones. The HA have a desire to reduce defects in their new homes and the associated repair costs to maximise surplus revenue to increase their production of new homes and believe that improving the way they learn from defects can achieve this. The HA are unable to find a clear improvement opportunity but are intent on taking action.

Methodological lens

Soft systems methodology (SSM) was deemed suitable for this research as it is well suited to ill-structured real world problems (in this case improving how the HA manages and learns from defects with no clear improvement opportunity) (Khisty, 1995). SSM is defined as "an organised, flexible process for dealing with situations someone sees as problematical, situations which call for action to be taken to improve them, to make them more acceptable, less full of tensions and unanswered questions" (Checkland and Poulter, 2006:4). Problematical situations contain people who are trying to act purposefully, with intention (in this case managing and learning from defects). The use of SSM as an approach to assist stakeholders to achieve a common understanding of the problematical situation in construction have been demonstrated in Green's work (1999) that suggests SSM has potential to improve value management practice in the early stages of a construction project.

SSM aims at bringing around an end to the "problem" through accommodations to enable action to be taken to improve the situation with a focus on implementing change. SSM provides a set of principles which can be both adopted and adapted (in any way which suits the specific nature of each situation in which it is used) for use in any real-world situation in which people are intent on taking action to improve it (as is the case with the HA presented in this research) (Checkland and Poulter, 2006). The drawbacks of SSM are that it requires large input and participation from those involved over a sustained period of time. Moreover, when applying the SSM, the researcher needs to acknowledge himself/herself as an active part of the problematical situation and not a neutral observer (Green, 1999). SSM, in its idealised form, is designed as logical sequences of four stages (Checkland, 2000). (1) Finding out about a problematical situation: the key tasks are to undertake exploratory discussions with people in the situation to identify the main stakeholders and the situation (and potential issues) at present. (2) Formulating a relevant purposeful activity model: a purposeful activity model is a model of the activities which fulfil the respective stakeholders' worldviews and form an ideal system state (Ramage and Shipp, 2009). To build a purposeful activity model, a clear definition of the purposeful activity is required, in SSM known as "root definitions" (Checkland, 2000). Root definitions develop each stakeholder's view as a sentence (Paul *et al*., 2013). The differences between these definitions can be compared to identify where they overlap and where they are in conflict with each other, which can lead to the development of a consensus model which can be used to explore possible improvements to the current situation (Paul *et al*., 2013). The primary aim of purposeful activity models are to stimulate cogent questions in debate about the current situation and the desirable changes to it. (3) Debating the situation: the starting point of debating the situation is to compare the purposeful activity model (i.e. the ideal system state) to the current situation. The differences between the models and the current situation provide a fruitful arena to discuss conceivable changes to the problematical situation (Khisky, 1995), e.g. what change is needed; why it is needed; how it can be achieved; what action is required; and, who will take the action. The aim of the debate is to identify changes which would improve the situation and are regard as both desirable and feasible which respective stakeholders can live with (Checkland, 2000), and accommodate between conflicting interests which will enable action-to-improve to be taken. (4) Taking action: when stakeholders accept changes to be systemically desirable and culturally feasible (Khisky, 1995) the final activity is taking action to improve the situation.

Data collection and analysis

To-date, data collection consisted of one semi-structured interview, one focus group and a review of relevant organisational documentation. The data collection methods and participants who participated within SSM's four stages are described below.

(1) Finding out about a problematical situation: the problematical situation was entered in June 2015 as part of research that sought to explore how HAs learnt from defects. The HA were one of twelve self-selected HA case studies. The interviewees were selected for their expert knowledge of, and involvement in, the defects management process, and introducing change within their HA. The participants were: the Head Clerk of Works, the Aftercare Administrator, the Quality Manager and the Asset Manager. The interview questions asked to gain insight into the HA's defect management and learning processes are listed as follows: Q1: Do you record post-completion defect data?; Q2: At what level of detail is the data captured?; Q3: Do you analyse defect data?; Q4: How frequently is the analysis undertaken?; Q5: Why do you analyse defect data?; Q6: How do you decide that the findings present a need for a change?; Q7: If a change is needed, how do you identify adaptation options?; Q8: How are adaptation options decided and selected, and by who?; Q9: Once selected, how are the new processes communicated around the organisation?; and, Q10: When implemented, how do you monitor the new processes to ensure they are viable? During the interview field notes were taken. Upon completion of the interview the field notes were typed up and sent to the participants to verify and update as necessary. In addition, further data were obtained by analysing the HA's defects management procedures and defect records. The data was thematically analysed.

(2) Formulating a relevant purposeful activity model; and, (3) debating the situation: a focus group took place in October 2015 with three participants from the HA's asset management arm: the Head Clerk of Works, the Aftercare Administrator, and the Asset Manager. The aim of the focus group was to explore the situation the stakeholders identified as problematical to understand the HA's issues in order to bring about change. During the focus group, the participants were asked two questions: Q1: What is your current system supposed to enable you to do?; and, Q2: What activities would be required in order to achieve the described system? During the focus group field notes were taken as audio recording was not permitted.

(4) Taking action: shortly after the focus group a follow-up email was sent to the participants which reiterated the areas for improvement identified and potential options that the HA may want to consider as a means of achieving those improvements. After the initial email regular follow-up communication was maintained with the participants to check on progress. The taking action is on-going and next step is a follow-up interview with the participants to evaluate if the HA's defect management practice (the problematical situation) is improved after the action has been taken (the application of a defects assessment information system).

KEY RESULTS

This section is structured using the four stages of the SSM model.

Finding out about a problematical situation

The key results indicate that the HA's defect management and learning process (current situation) can be generally grouped into two phases: the defects management phase (interview questions 1 and 2) and the learning phase (interview questions 4 to 10). Each phase, the key stakeholders involved are described below.

The defects management phase, undertaken by HA's asset management arm includes eight key activities (from 1 to 8). First, the home occupant contacts the HA's call centre to report a defect. Second, the call centre refers the request to the Aftercare Administrator via an email, who records the provided information in their spreadsheet. The Administrator typically records three themes: the date the defect was reported; the property details (address, property completion date, associated scheme ID, contractor responsible for the build, type of construction, and any associated warranty policy details); and, the details of the person reporting a defect. Third, the Aftercare Administrator contacts the home occupant to discuss the defect further to gain additional information regarding the nature of the defect and then records this information within a free-text field in the spreadsheet. Fourth, the Administrator contacts a clerk of works to arrange an investigation on the case. Fifth, the Clerk of Works investigates the defect. Sixth, the Clerk of Works reports the investigation findings back to the Administrator who updates the details within the free-text description field within the spreadsheet. Seventh, based upon the findings of the investigation, the aftercare team (the Head Clerk of Works or Administrator) then arranges for remediation of the defect (either through a contractor or the warranty provider if there is a warranty in place). Finally, once the remediation arrangement is made, the aftercare team will monitor until completion, at every stage recording: the status of the repair (i.e. ongoing, completed), the repair cost, any cost savings; and, any changes to the scope of the repair or defect identified.

The learning process includes four key activities and is heavily reliant on analysing the data captured during the defects management phase. First, on a weekly basis the HA's asset management arm (the Asset Manager, Head Clerk of Works and Aftercare Administrator) manually analyse the defects spreadsheet together to monitor contractor and product and system performance, in order to identify improvement opportunities to reduce defects (typically high volume defects). Second, the Asset Manager (the asset management arm) and the Quality Manager (the development arm) discuss the problem areas during bi-monthly meetings. In cases where the problem areas are deemed significant enough (a perceived level of value by the individuals) to warrant a change to the HA, the Quality Manager tends to seek solutions.

The HA's focus at this point is primarily to design out defects through product and system changes, and these changes are typically identified by either reviewing schemes that are generally performing well in the given problem area, or through internal and external people being invited to offer solutions to the given problem. Third, when a viable solution to the given problem has been identified the proposal is put forward to a review panel consisting of a leadership group (HA's senior management). The leadership group then review the proposal. If the proposal is deemed suitable for the HA, the HA's 'employers requirements' (the specification to be used for all builds) are updated and used for subsequent projects. The HA use data analysis to identify both improvement opportunities and monitor whether a change has been successful. Finally, in addition to the specification updates, networking (informal internal communication) is undertaken by way of the Head Clerk of Works (who focusses on defects post-completion) feeding back the problem areas to site teams (the clerk of works, who the Head Clerk of Works manages and investigate new builds and post-completion defects) as 'areas to watch' on future builds.

It became clear that three key stakeholders within the HA desired to improve their learning and defects management practices. They, however, could not identify a clear improvement opportunity, but were intent on making changes. A focus group was arranged to further explore the perceived systems of concern as described below.

Formulating a relevant purposeful activity model

The focus group started with the facilitator (the first author) outlining his understanding of the HA's current situation (based upon stage 1 above) to ensure it was accurate. The individual participants were then asked to explicitly outline what their defects management and learning system was meant to enable them to do (their world views) (focus group question 1). It was found that there were two contrasting views among the three participants. The Aftercare Administrator had a short-term view pertaining solely to the repair process and suggested that the system is in place to provide the home occupants with a good repair service by stating that "the current spreadsheet in place was started from a blank canvas and developed based upon the experience of the job role. The system exists to help us [the housing association] to manage the defects process and record detailed defect data to enable us in providing the customers with a good repair service, that they can be satisfied with". In contrast, the Head Clerk of Works and Asset Manager had a long-term view of defect and repair cost reduction when they advised that "the system should provide us [the housing association] with an informed view of what is going wrong in homes, so I can feed this back to my site teams to make them aware of problematic areas of work, which should help us to reduce defects moving forward" and "the system in place should provide real time information and knowledge of specific defects in homes to develop solutions to help us [the housing association] achieve long-term cost savings and defect reduction through identified improvement opportunities" respectively.

After identifying the individual stakeholder's world views a purposeful activity model was developed to depict what the HA's defect management and learning system was meant to enable them to do. Theoretically, SSM would seek to develop a purposeful activity model for each of the three key stakeholder's worldviews for discussion due to different interests, expectations and interpretations of the defect management system. However, after outlining their individual worldviews in the focus group, a discussion among the three key stakeholders took place and a level of consensus was reached in regards to what the system of concern is and what it should (ideally) do.

From this consensus the following clear definition of the purposeful activity was developed: "The defects management system is owned by the Asset Manager, who together with the Aftercare Administrator and Head Clerk of Works, captures post-completion defect data from the home occupants in order to manage the defects remediation process to a satisfactory completion, and provides real-time information as the basis of the learning process to help identify improvement opportunities for future projects; and, by doing so, to satisfy customers, reduce targeted defects and reduce long-term repair costs associated with new homes". Developing the consensus model (figure 1) involved asking the collective stakeholders to clearly outline what activities would be required (step-by-step) for the described system to work (focus group question 2). The consensus model of the HA's defects management system consists of the following nine activities.

First, a report of a defect is received by the aftercare team and logged within the HA's defects management system. Second, the site environment is entered and the defect is investigated and detailed defect data captured. Third, based upon those detailed investigations the scope of work is established and the repair scheduled. Fourth, from the repair schedule the necessary materials, contractors and equipment are procured. Fifth, the repair is undertaken. Sixth, acceptable performance measures such as estimated repair durations and agreed costs are predefined. Seventh, whilst activities 2, 3 and 5 are being undertaken in the site environment, these three activities are monitored by the aftercare team (business environment) against predefined performance measures (activity 6). Eighth, if the acceptable measures are exceeded then action is taken by the aftercare team to get the site work back on track. The final activity, also 'a new activity', is that upon completion of the repair, the aftercare team have discussions with the home occupant and identify their level of satisfaction with both the repair and service quality.

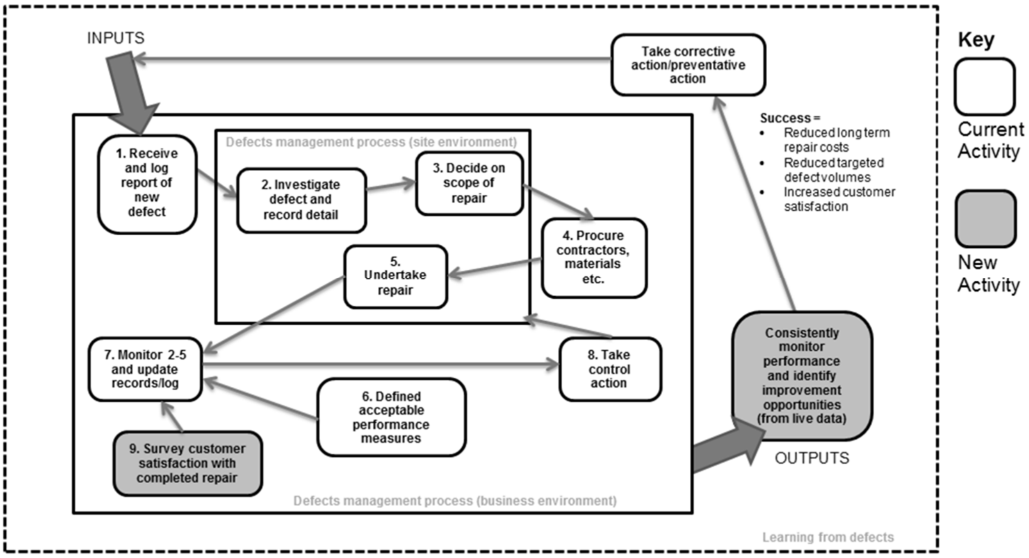

Figure 1: Consensus model of the HA's defects management system - the ideal system state

During the learning process, the Asset Manager will monitor performance and identify potential improvements by extracting live data reports from the defects management information system (a new activity). The data extraction is then used as the catalyst for corrective and preventative action (taken forward with other actors in the process) to reduce the prevalence of defects in future homes, decrease the long-term cost of repairing defects in the HA's build stock; and, increase the home occupants satisfaction with the repair service.

The consensus model identifies two new activities: surveying customer satisfaction, and live data analysis.

Debating the situation

The consensus model (figure 1) was used to explore possible improvements to the current situation, by comparing the ideal system state with the current situation. It was found that there is a clear mismatch between what the current system should be doing to enable the HA to manage and learn from defects, and reality (the current situation). The HA's Asset Manager asserted that they can no longer go on using their current system due to its disadvantages, and confirmed that he will take action. The primary disadvantages of the current system are: a) the laborious data analysis procedures associated with manually reviewing long free-text descriptions; and, b) the inability for the HA to track the home occupant's satisfaction with the repair service (the two new activities outlined in the consensus model). a) The HA's current defects management system is centred around a standard spreadsheet which is reliant on manual text input for recording all details of the defects reported and the subsequent repair processes. At present the HA's sole way of capturing details of defects reported is through the use of a free-text field within that spreadsheet, which typically contains a long string of text outlining various details pertaining to the defect, with no simplified description or category (such as building area) to aid trend identification.

The HA's current defect analysis approach is in stark contrast to the live data analysis capabilities outlined for the ideal system state. The HA identified a strong desire to develop a bespoke defects management information system that allows the HA to look-up property records for their existing build stock. After identifying the property where a defect occurs, the HA would like to be able to: create a new defect record (including a category by building area); input customer details; arrange an investigation; arrange for the defect to be remedied; and, document and track progress along the way. Based upon the data held within the system, the HA also desire to have the capability to undertake live data analysis and reporting to track cost and trends of specific defects, displayed via a dashboard. b) The HA do not have any mechanism in practice to record the home occupants level of satisfaction with repairs and therefore cannot analyse customer satisfaction. The HA wish to bring in a new process of surveying the home occupants satisfaction with repairs.

Taking action

Building upon the desired changes identified when debating the situation, a number of potential options were proposed to the HA by the researcher. These options were identified from other HA's working practices discussed in previous literature (Hopkin *et al.*, 2016), including: (1) categorising defects by building area to enable the HA to identify specific areas of focus and to facilitate live reporting; (2) recording the details of the contractor responsible for the original build along with the number of plots they produced to aid the HA in distinguishing the number of defects per unit built and a true representation of contractor defect related performance; (3) recording the scheme region to help the HA develop an understanding of any particular regional trends, so that the HA can tailor specific guidance to the site-based teams in that area; (4) recording the priority of the repair (e.g. urgent, routine), to assist the aftercare team in managing the repair process; (5) recording whether a complaint had been made during the repair process to assist the HA in gauging the home occupants level of satisfaction with the service provided (in addition to the proposed satisfaction survey); and, (6) analyse defects by their individual impacts (a proposed new weighting system). Among these six options, the development of a new weighting system for defects (option 6) was the only option rejected by the HA. The remaining five options were further converted by the HA into two actions. The first action was undertaking an immediate short-term solution of updating their spreadsheet and processes to categorise defects, record repair priority, record complaints and introduce a customer satisfaction survey. The second action was to introduce a long-term solution of developing a bespoke defects management system with live data dashboard: this action is currently being developed by the HA's IT department.

DISCUSSION

The HA presented in this research were intent on taking action to improve their defects management and learning practices to adapt to the current pressures of increased defects in new homes and reduced funding, however, with no clear improvement opportunity identified. The review of the HA's defects management and learning processes found that they used data captured by their defects management system and analysis of that data as the basis of their learning and improvement. The HA's current system was not doing what the participants believed it was doing. Each participant had an individual view of what the system should enable them to achieve, however through discussion a level of consensus was agreed. Two new activities were found to be required in order to bring the system in line with the HA's expectations which were: the development of a bespoke defects management system with live data reporting, and the introduction of a satisfaction survey (for repairs).

This research started with the researcher (the first author) as an outsider who was aiming to better understand HAs learning processes. From the initial interaction to the research presented in this paper, the researcher's role moved from an outsider to an active part in one HA's change. When becoming actively involved in the research, it's vital to acknowledge that involvement and the effect it may have. The principles of SSM allowed the researcher to maintain a level of neutrality until the HA had identified desirable and feasible changes. However, by discussing other HAs practices with this HA and making recommendations, the researcher is likely to have influenced the HA's view of what action they should take.

CONCLUSION

This paper contributes to our understanding of the HA's quest for improvement by reporting one HA's efforts to identify new opportunities to advance their defects management and learning practices. The HA in this case were keen to improve to meet their current challenges but could not identify a clear improvement opportunity - this may be the case with many HAs at present. The HA was found to be reliant on their defects management system (and analysing data captured from that system) as the starting point to trigger their learning processes. However, the HA's current defect management system is not doing what it is intended to do. The HA believed that a system modification was necessary to improve their management of defects and enhance their learning via live data analysis/reporting. The adoption of SSM in this research has made it possible for the HA to explore the situation the stakeholders identified as problematical (facilitated by the researcher) to understand their issues.

More importantly, the flexibility of the SSM (the ability for the study to commence at any point) allowed the principles to be adapted to suit the specific situation, as the study first adopted the SSM principles after previously finding out about a problematical situation (where people were intent on taking action to improve and had asked the researcher to assist). The flexibility of SSM shown in this research further supports Winter's (2006) argument that the SSM principles can be converted into a situation-specific approach. Further, due to its flexibility, SSM, primarily through the structured discussion in the focus group surrounding what the system should be doing and the reality of the situation, made the deficiencies of the HA's current system apparent to them and enabled them to recognise desirable and feasible changes.

The identified modifications have the potential to bring about positive change in the HA in both their learning and the way in which they approach the repair process. Whilst the researchers have suggested potential changes that the HA may find useful as a means of assisting the HA in achieving their aims, it is the HA who will decide on which options are desirable and feasible to them and what changes they will make. In a practical sense, the findings show that the principles of SSM can aid any HA who is seeking to improve (to meet challenges) but have no clear improvement opportunities.

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