

INITIAL USE OF AN IDEA CAPTURE APP IN A UK CONSTRUCTION ORGANISATION

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We report some results from an ongoing action research project to improve creativity, innovation diffusion and knowledge transfer in a large UK construction organisation and its supply-chain. Our focus is on the use of an interactive mobile and desktop app that enabled employees to submit, share, discuss and develop innovative ideas. We use longitudinal system data to determine: how many users register on the system, how many ideas are submitted, how many users actively contribute ideas, and where in the organisation ideators are based. The paper describes the background and organisational context of a company-wide initiative to promote an ‘innovation culture’ and to implement innovation management systems and processes. We describe the development and specifications of the app, associated innovation portfolio management processes, and the communication and change management activities that accompanied its launch and rollout. We discuss this analysis in terms of existing models of employee creativity and voice and previous research on suggestion schemes, ideas capture and innovation competitions in construction and other industries.

Keywords: innovation, ideas, suggestions, app.

INTRODUCTION

Attempts to improve the United Kingdom (UK) construction sector have placed considerable emphasis on innovation both as a critique of the previous position and as a mechanism for change (Construction Task Force, 1998; Gann and Salter, 2000; Winch, 1998). Sector initiatives since these publications can be seen as a response to an apparent consensus that, “*The industry needs to embrace a complete technology and innovation culture change so that research and development is seen as the core value for the future of construction and essential to business success*” (DTI, 2001). At the sector level these efforts included leveraging the government's role as a client, the establishment of innovation networks and the dissemination of demonstration projects (Constructing Excellence, 2003). Official reviews of these efforts concluded that progress had been disappointing (Wolstenholme, 2009).

Arguably, the 2008 recession has created a difficult context for innovation: on the one hand, increased competition may provide a spur to innovation (Wolstenholme, 2009). On the other, lack of slack resources and project opportunities to implement innovations may reduce innovation capacity (Sexton and Barrett, 2003). Recent UK industry transformation efforts have focussed on the development and adoption of building information modelling technologies (BIM) and related process (e.g. Bew, 2014). BIM implementation, while seen as having a role in transforming construction

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to an innovative 'high-tech' industry, also risks using the absorptive capacity of leading firms. The environment within which the organisation described in the current study operates is one in which much of the current construction growth is in the form of large civil infrastructure programmes that are typically procured on high-value, long-term collaborative framework agreements. Successfully competing for such work requires bidders to demonstrate the ability and motivation to work innovatively. And the resulting work arrangement is one that is seen to support innovation via, time, resources, and shared benefits but that also *requires* ongoing innovation.

It is in this context that construction organisations currently seek to improve and demonstrate their capacity for innovation. The research reported in this paper is part of an ongoing action research project to develop and implement systems, tools and processes to manage innovation within a large UK construction and engineering contracting organisation.

This paper has three broad aims:

1. To describe the development and launch of an 'ideas capture app'
2. To research initial use of the app using longitudinal system data to provide benchmark data on usage, specifically:
 - a. how many users register on the system,
 - b. how many ideas are submitted,
 - c. how many users actively contribute ideas, and
 - d. where in the organisation ideators are based.
3. To discuss whether the system data suggests that the implementation has been successful compared to rate of suggestion achieved in other schemes and to further consider the findings in the light of the literature on innovation in construction project firms.

INNOVATION IN CONSTRUCTION AND PROJECTS

Official and practitioner criticisms of the industry with respect to innovation are reflected in the academic literature. This has documented features such as low rate of innovation (Winch, 1998) and attributed this to structural features of the industry such as its organisation as a project-based complex product system with separate and conflicting systems integrators. Peansuapp and Walker (2006) identified numerous barriers to innovation highlighting among others lack of management support and some construction workers' personal learning capability. Further, much of the innovation that does occur happens locally on delivery projects as construction workers make numerous un-document, un-patented, problem-based changes and on-site adaptations to processes, materials and proprietary products (Slaughter; 1993, 2000). To overcome these challenges requires an innovation infrastructure – particularly to enable the parent organisation to capture the learning on projects and embed it into established practice (Gann and Salter, 2000).

Construction shares innovation challenges with other organisations that adopt a project-based mode of delivery. Project-based firms are used to managing delivery projects that operate in a complex but stable environment. In contrast, innovative development projects, while less complex, have greater uncertainty and unclear targets (Blindenbach-Driessen and van den Ende, 2006). Studies of innovation in project-based firms in multiple industries have shown that the engineering tradition of such

organisations value precision and accuracy, control of work to time/cost/quality constraints and a strong emphasis on predictability and safety. Managers in such organisations: do not typically value innovation; view slack resources as tolerable only in exceptional circumstances; believe the innovation is costly, disruptive, must be managed and is usually justifiable only when responding to externally driven changes (Keegan and Turner, 2002).

IDEAS CAPTURE SCHEMES

Ideas capture schemes include; suggestion schemes, quality circles, and innovation competitions. They are intended to ‘capture’ and ‘land’ employees’ ideas – to support the generation, sharing, capture and evaluation of those ideas (van Dijk and van den Ende, 2002). Although ideas capture schemes can have the objective of generating new ideas, those introducing such schemes generally assume that there is an existing reservoir of ideas that will otherwise remain dormant and consequently the organisation will neither benefit from them nor exploit the potential of its workers (Leach *et al*, 2006).

Frese *et al* (1999) classify ideas capture schemes into four types: Centralised suggestion schemes: a single scheme for all employees of an organisation – generally open and accepts ideas on any issue at any time. Decentralised suggestion schemes: multiple, independently run schemes within an organisation – generally open and accepts ideas on any issue at any time. Work-based systems: ‘closed’ schemes with a specific objective of solving a defined problem or issue often by a set time such as quality circles or new product development teams. Informal schemes; a system where there is no method for capture but there is a procedure for evaluating ideas.

More recently, organisations have adopted models of open innovation; crowdsourcing ideas from employees, supply-chain members, customers and the public in open ideas competitions which share characteristics with both centralised suggestion schemes and work-based systems (Majchrzaj and Malhotra, 2013). Open crowdsourcing is particularly associated with, and enabled by, distributed technology solutions incorporating the network and software for sharing ideas. These technologies are also applicable to more bounded organisation schemes although Majchrzaj and Malhotra (2013) identify three inherent tensions in suggestion schemes implemented within a crowdsourcing paradigm, namely: that such schemes simultaneously encourage collaboration and competition; that idea evolution takes time but crowd member spend little time; and creative conflict requires good relationships but members of the crowd are strangers.

Research into the operation and implementation of suggestion schemes has identified a number of factors that contribute to their effectiveness. These include: timely and sufficient feedback to those submitting ideas; reward for suggestions; commitment from managers at all levels; clear responsibility for management of the scheme and sufficient resources to do so; opportunity for employees to educate themselves to further improvements; careful planning of implementation; ensuring perception of a ‘fair’ process of evaluation; publicity and communication of the scheme and its operation (Leach *et al*, 2006; Rapp and Eklund, 2002).

CASE DESCRIPTION

This paper considers the initial use of an ideas capture system within a UK construction and engineering contracting organisation with recent annual turnovers in the region of £1 billion. It employs approximately 4,000 employees throughout the

UK on site offices, regional offices and a head office in the south-east of England. The organisation is formed from a number of relatively autonomous business units defined by product area and support functions.

Before the project that is the focus of this research, the organisation had employed a manager responsible for innovation and established a network of innovation representatives in the business units and support functions. An engineer who had been seconded to the innovation function was tasked with investigating what innovative activity was being conducted around the business and over three months, identified around forty distinct and exploitable ideas. The innovation manager, innovation representatives, and academic and other consultants used the results of this internal research to identify the requirement for a system that would allow for easier and ongoing capture of ideas. It was also recognised that such a system could form part of the wider innovation strategy for the organisation. A pilot ideas capture mobile app was developed by an external consultancy and trialled successfully within one of the support functions following which approval and funding was secured for the project form which the data in this research is taken. As with other schemes, it was assumed that a reservoir of existing ideas existed in the business units and projects – it was because of the dispersion of employees that a mobile app was adopted as the technical solution.

The broader ideas capture system consists of three main sub-systems:

- A network of innovation representatives to support the development and rollout of the system
- A mobile and desktop app that allows employees to submit, comment on and vote for ideas and to browse and search for ideas submitted by others,
- An idea implementation process in which the managers of the system provide initial feedback and allocate the idea to an innovation representative for more detailed evaluation and possible implementation.

The major events and activities in the project are summarised in Table 1.

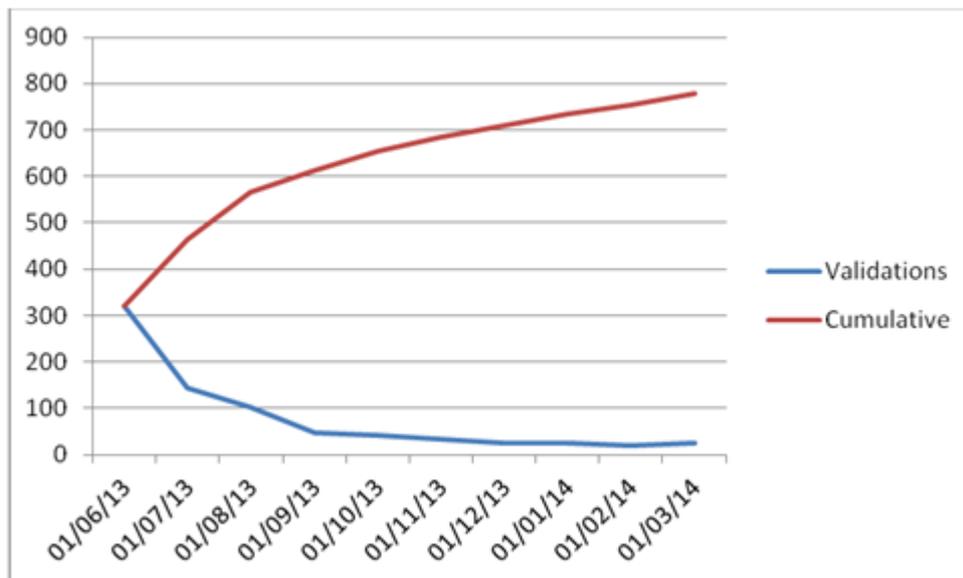
Table 1: Ideas capture app - project Timeline	
Jun 2012	Project approval secured
Oct 2012	Project Manager recruited
Nov 2012	Ongoing development and expansion of project network
Jan 2013	Beta release of ideas capture app
Feb 2013	App testing and trial App development brought in-house
Mar 2013	First collaboration with utilities framework agreement App re-design following trail
Apr 2013	Communication planning for business launch On-going meetings with innovation representatives and potential users Presentations to innovation forum, global research & development function, bid teams and management teams Development and approval of national innovation processes
May 2013	Design of branding and internal communications approvals Produce publicity materials – posters, screensavers, stickers, intranet
Jun 2013	Release 1.0 of app (submit, comment, like, search) All-staff email, intranet story, exhibition stand in reception Push of app to company i-phones UK board themed innovation day Innovation exhibition at head office including ideas capture stand
Jul 2013	Design communication workshops
Aug 2013	Legacy business unit innovation competition migrated to app Selection and implementation planning for initial ideas Development of portfolio management tools
Sep 2013	Design of release 2 of app
Oct 2013	Start implementation of selected ideas
Jan 2014	Communication workshop programme start
Feb 2104	Release 2.0 of app (idea status icons, photo/file attachments)

RESULTS: INITIAL USE OF THE IDEAS CAPTURE APP

How many users registered on the system?

During the first ten months of operation a total of 779 users were ‘validated’ on the system. This meant a user who installed the app, registered a user name and passwords and confirmed their identity by responding to a confirmation email. This represents approximately 17% of the employees of the organisation. Published benchmarks for this figure are not available but his compares unfavourably with, for example, typical response rates for organisational survey research of 50% (Baruch and Holtom, 2008). More than half of the validations were completed in the first six weeks of operation following the launch, push of the app and attendant publicity and communication activity (see Figure 1). This pattern of take-up, though anticipated, supports Leach *et al*'s (2006) conclusion that frequency of publicity is a significant factor in scheme success and suggests that significant extra effort will be necessary to achieve near-universal adoption.

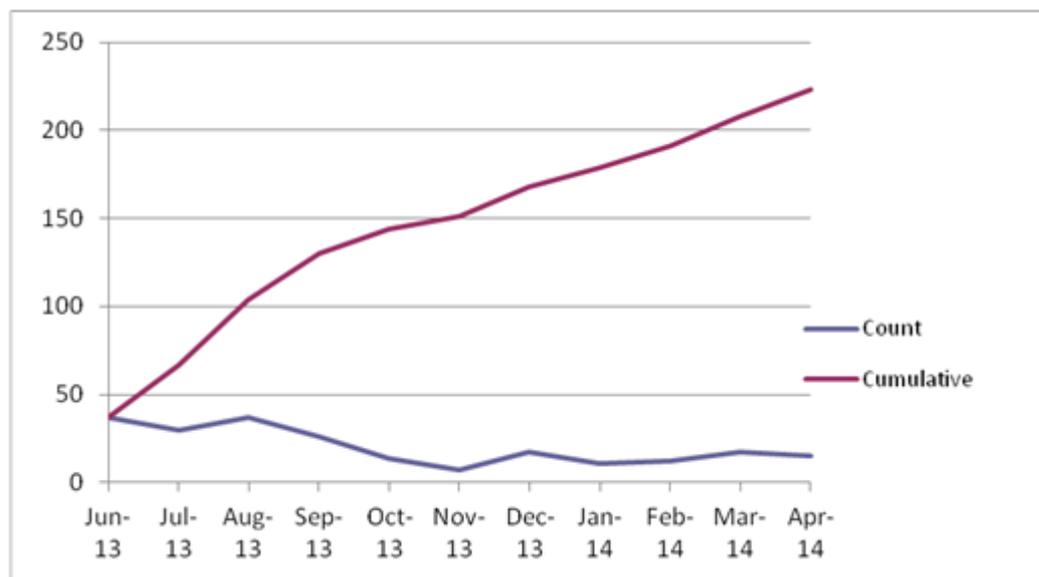
Figure 1: Monthly count and cumulative total of users validated on the system



How many ideas were submitted?

During the first ten months of operation a total of 219 ideas were submitted (see Figure 2). The cumulative total of ideas submitted appears more linear than the curve for validations. This may be explained by users submitting multiple ideas as described in the following section.

Figure 2: Monthly count and cumulative total of ideas submitted



Leach *et al* (2006) conducted a survey of 182 UK organisations that ran suggestion schemes and found a median rate of suggestions of 0.13 per employee for schemes that had operated for a median of five years. For the organisation in our research, this corresponds to an expected 100 to 130 ideas per year. Against this the figure of 219 ideas submitted in less than 10 months is a strong performance. A more conservative comparison can be made by discounting the initial surge of ideas and considering the last 6 months average which equates to 158 ideas per year. In fact in only one month

has the number of ideas submitted fallen below the rate required for the scheme to perform below the average of established schemes in other industries.

How many users actively contribute ideas?

Data was analysed further to establish how many users had contributed one of more of the 219 ideas submitted. The results of this analysis is in Table 2 which shows that 34% of those submitting ideas only submitted one and that two users submitted more than ten each.

Table 2: Number of ideas submitted per person

No of ideas submitted	Frequency	Percent
1	74	34%
2	23	21%
3	7	10%
4	8	15%
5	1	2%
6	2	5%
7	1	3%
10	1	5%
12	1	5%
219	118	100%

The figures in Table 2 are equivalent to approximately 15% of validated users having submitted ideas. This pattern is consistent with rates of participation in similar systems – e.g. Ebner at al (2009) found that in online knowledge production communities 70% of registered users never submit an idea or comment.

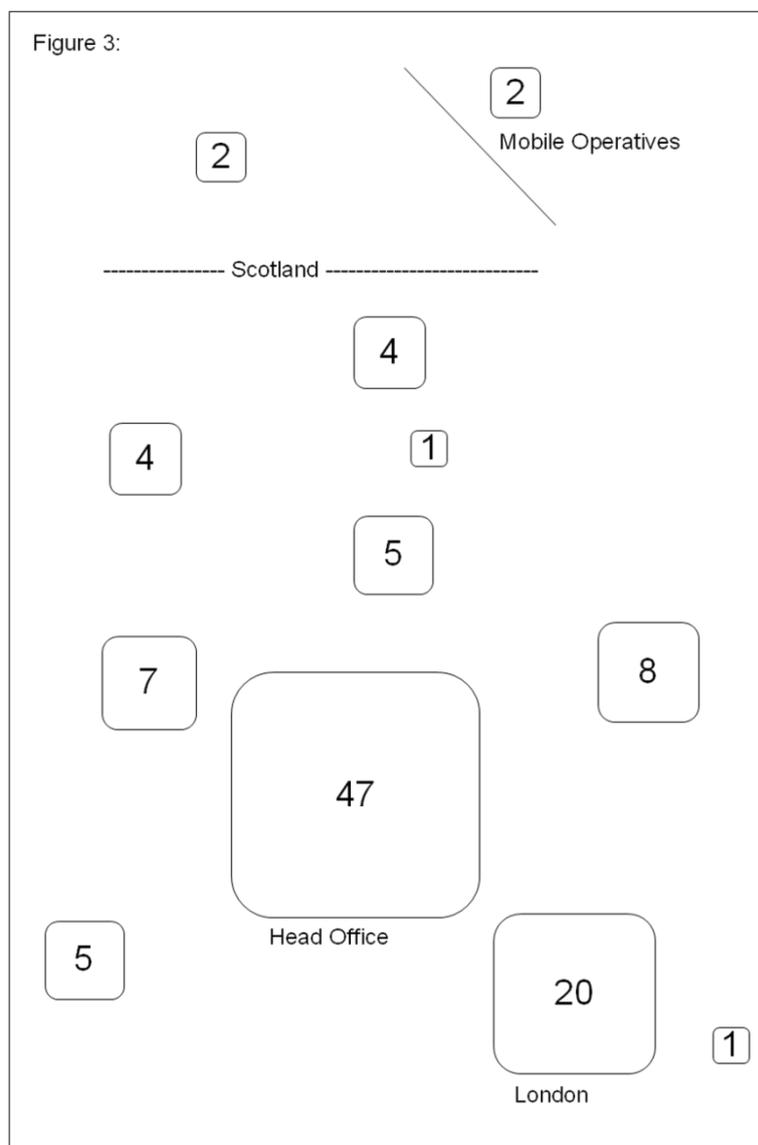
Where in the organisation are ideators based?

This question was considered from two perspectives: position in the organisational structure based on membership of business unit or support function; geographical location based on location from HR data. We acknowledge that ‘base location’ is a complex concept for construction employees and this will be the subject of further future research and analysis. Organisational position of those submitting ideas is shown in Table 3. Differences between column totals between Tables 2 and 3 are due to mismatches between ideas app and HR data sets.

Figure 3 represents the geographic dispersal of those submitting ideas. The size of the squares within the figure correspond to the number of ideators based mainly in each location. The configuration of the shapes represent the approximate geographic arrangement. Other than head office, most locations shown reflect more than one site or property.

Table 3: Organisational unit of ideators

Unit:	Frequency	Percent
Civils & groundwork	25	23%
Corporate/Support	22	20%
Utilities	21	19%
Highways/Infrastructure	12	11%
Facilities Management	12	11%
Building: Public	7	6%
Building: Private	6	6%
M&E Contacting	4	4%



The functions that had the most people submitting ideas were: civils and groundwork; corporate/support; and utilities. Future research will investigate the reasons for this. Feedback from research partners suggest that relative workload, higher proportion of directly employed workers and a stronger innovation culture than building and property could all be factors. Consideration of Figure 3 shows most clearly the

preponderance of head office employees who have submitted ideas so far. Possible reasons for this are the higher proportion of office-based and management staff, the location of the innovation managers in head office, and the centralised nature of the scheme. The latter seems significantly important for the development of the system. The ideas capture app is effectively a 'centralised suggestion scheme'. Leach *et al* (2003) found overall that decentralised schemes were more effective than centralised schemes. Tentatively, one could hypothesise that this pattern of engagement reflects findings from construction innovation research that the parent organisation adopts innovation and then implements them on projects (e.g. Gann and Salter, 2000). Further research will use evidence from the types of ideas submitted to consider whether in its initial use the scheme was interpreted by employees predominantly as a centralised head office suggestion scheme.

CONCLUSIONS AND RECCOMENDATIONS

Although not the analytical focus of this paper, Table 1 demonstrates the significant effort required to implement a suggestion scheme in a large construction organisation. Organisations considering such a scheme should ensure that the resources are in place to implement and support the system. Significantly, this includes the resources to register, evaluate and implement selected ideas.

The system data suggests that the implementation has been successful by the criteria of the number of suggestions submitted as the ideas capture app has generated above the predicted rate of suggestions in established schemes in other industries. The reduction and levelling-off of the rate of ideas has suggested a need to maintain momentum and a programme of further communications and other enhancements have been planned to facilitate this which will be the subject of further research.

Although the rate of suggestion is consistent with previous research, we are interpreting other measures of engagement as relatively low. This includes the proportion of potential users that had registered on the system, the percentage of users who had contributed and the apparent concentration of that engagement in the head office. The literature suggests that decentralised schemes can be more successful by these criteria; something that is supported by anecdotal feedback from ongoing activity to encourage the adoption and use of the system. The implementation has suggested that innovation managers need to strike a balance between maximising response rate and maintaining the benefits of centralised schemes such as administrative efficiency and cross-unit knowledge sharing.

Further research will continue to monitor the system usage data reported in this paper along with further data about views, likes and comments. Additional analysis will consider the content, quality, and characteristics of the ideas submitted.

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