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# CARE: AN INTEGRATED FRAMEWORK TO SUPPORT CONTINUOUS, ADAPTABLE, REFLECTIVE EVALUATION OF EGOVERNMENT SYSTEMS: A RESEARCH NOTE

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## Abstract

*This is an eGISE network paper. It is motivated by a concern to develop a better approach to learning from the experience of an eGovernment project and applying that knowledge in future projects. The proposed project is based on previous work in the construction industry that developed COLA, a Cross Organisational Learning Approach. Developing a similar strategy for Knowledge Management is likely to be effective because the 'silo' culture of local government organisations has parallels with the segmented organisational structures within the construction industry.*

## 1 INTRODUCTION

The study and practice of Knowledge Management (KM) incorporates all phases of knowledge creation, capture, sharing, dissemination, and application. The Network for eGovernment Integration and Systems Evaluation (eGISE) has identified KM as a particular interest within its area because the evaluation of Information Systems (IS) – including e-government systems – is a knowledge intensive task (Irani, et al, 2005b). In this context KM aims to provide decision-makers with the opportunity for reflective learning rather than a process that stigmatises the causes of failure (Irani and Love, 2001a).

CARE is a KM project that aims to develop, implement and evaluate a rigorous, holistic yet flexible framework for e-government systems evaluation. This framework will be supported by the development of a web-based information system to facilitate the knowledge capture and dissemination process.

## 2 BACKGROUND

eGovernment is the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners, and employees. It has the power to create a new mode of public service where all public organisations deliver a modernised, integrated, and seamless service for their citizens' (Silcock, 2001). However, there is evidence that such systems are not effectively evaluated. Indeed 'the real costs of the benefits attained by eGovernment services, have rarely been evaluated and a number of publications have called for improvements in this area' (Foley, 2005 p.4). Most evaluation processes are either neglected, inefficient or ineffective due to the many difficulties encountered in measuring the benefits and costs of such systems (Irani and Love, 2001a). Although,

there are many individual evaluation techniques and tools available for eGovernment systems, each one tends to have either a 'hard' or 'soft' orientation and address only one particular aspect of evaluation. The 'hard' approach typically assesses tangible benefits based on accounting or financial instruments such as Return on Investment, Net Present Value, and Cost Benefit Analysis, etc. (Farbey et al, 1995). On the other hand, the 'soft' approach evaluates the organisational, social, political, or cultural impact of the system. To date there are few evaluation frameworks which bring 'hard' and 'soft' approaches together. Consequently, this research aims to develop, test, and disseminate a holistic approach that integrates both 'hard' and 'soft' aspects of evaluation. An integrated approach is particularly important for public sector IT initiatives where 'non-cashable gains' are not easily quantifiable.

Undeniably, local authorities and government agencies need to evaluate eGovernment systems due to the hefty investment Government has put into them. In a 2002 review the Committee of Public Accounts (CPA, 2002) identified 100 major IT projects with a total value of £10 billion. This investment is part of the Government's strategy to provide high quality and a full range of public services for all, shaped by individuals and communities to meet their needs, delivering value for money and visible results (ODPM, 2006). Also, it is intended to enable departments to improve their operational efficiency by replacing labour intensive processes with eGovernment systems (CPA, 2002). The Gershon Report (2004) identifies several areas (e.g. procurement, support services, productive time, transactions) of potential efficiency gains in the central government departments. The 2004 Spending Review (HM Treasury, 2004) translates this into an annual efficiency target of 2.5% for the next three financial years– a saving of at least £6.45 billion per annum by 2007/08 (ODPM, 2004). In the ODPM guides (2005a and 2005b), efficiency gains are categorised into cashable (e.g. reduction of costs) and non-cashable gains (e.g. improved outputs or quality of services) which are both expressed in Pounds Sterling. It is a statutory requirement that all local authorities self-assess their efficiency gains, and each April, electronically submit a copy of an Annual Efficiency Statement to the ODPM (I&DeA, 2006).

The quantitative measures to be used for the calculation of efficiency gains from eGovernment systems are specified in central government guidance notes (ODPM, 2005a). Such mandated techniques fall into the 'hard' category by typically assessing tangible benefits based on accounting or financial instruments. The UK central government is not alone in taking this stance, see for example studies conducted by the Australian Government Information Management Office (AGIMO 2004a, 2004b, 2004c). In order to determine the actual benefits or success of an eGovernment system, it is essential to have a holistic evaluation of the system in its operational setting which takes into consideration the impact of the 'soft' contextual factors (Burke, 2005).

## **2.1 Knowledge Management and Evaluation**

Much of the resistance to the adoption of new technology can be attributed to the legacy of failed intra- and inter-organisational IS (Irani and Love, 2001b; Sumner, 1999). Such failure is often evident through the inability of the new IS to deliver the business benefits that were used to justify its adoption in the first place. To undo this negative cycle we require sound post implementation evaluation and the application of the lessons learnt in subsequent projects. This is not just a question of finding the 'right' evaluation technique but a knowledge management problem of ensuring that the knowledge gained is disseminated and used.

The 'silo' culture of government agencies mitigates against the transfer of knowledge between one part of a local authority and another (Irani, et al., 2005a). There is a clear belief that the problems of one area, such as Social Services, are unique and unrelated to the needs of another, for example Housing.

The proposed research will draw upon lessons learnt from developing COLA, a Cross Organisational Learning Approach (the product of a previous EPSRC funded project, B-Hive – Building a High Value Construction Environment, grant no: EPSRC GR/L02654/01(P). Further details of this approach

can be found in Orange et al, 1998, 1999a, 1999b, 2000; or at <http://csrc.lse.ac.uk/b-hive/default.htm>. This approach aims to engage the organisation in rigorous and continuous evaluative reflective practice that will result in organisational learning which can be generalised and transferred to other contexts and at the same time provide the essential flexibility to cope with changes in a dynamic environment.

However, in addition to the parallels, there are significant differences between the construction industry and local government:

- In construction the governance of each organisational units is independent and they come together voluntarily to take part in a project with a common goal.
- In local government there is common governance of the organisational units and their association is mandated by statute. However, they have independent goals.

Thus the COLA methods cannot simply be transplanted into the eGovernment sector and new research will be necessary to devise a suitable KM approach within the public sector context.

A potential weakness in the B-Hive project was that the framework developed was based purely upon manual structures and procedures. Given the fluid context of the construction industry with independent organisations and independent IT infrastructures the implementation of any online support structure would have raised complex organisational problems. In the local government context the stakeholders already share significant common IT infrastructure and there is the potential to leverage this in support of the proposed KM objectives.

### **3 AIMS AND OBJECTIVES**

The primary aim of this proposed research is to develop, implement, and evaluate a rigorous, holistic yet flexible framework for e-government systems evaluation. This evaluation framework will be supported by comprehensive guidance and appropriate use of ICT to facilitate feedback and organisational learning through reflective practice, thus ensuring that the outcomes of evaluation are available to other eGovernment projects. In particular the objectives of the CARE project are:

1. To create a profile of eGovernment project structures, their stakeholders and evaluation needs; and in particular to identify the structural, social and cultural barriers to reflective and cross-departmental learning in relation to IT projects within the UK local authority context.
2. To re-evaluate the KM Life Cycle and concepts behind COLA within the UK local authority context; and devise an equivalent evaluation framework for reflective learning applicable to these authorities. In particular this framework will:
  - Support the full Knowledge Management Life Cycle from initial knowledge capture through to appropriate dissemination throughout the organisation.
  - Include guidance on the use of a comprehensive range of paradigms, techniques and criteria relevant to the evaluation framework.
  - Mechanisms or procedures to implement an evaluative reflective inquiry cycle, to deliver an audit trail of evaluative thinking and to promote organisational learning.
3. Design and implement a web-based repository to support the above framework.
4. Evaluate the proposed framework within at least one ongoing eGovernment project.
5. Promote awareness and dissemination of the proposed framework.

### 3.1 The CARE framework

The key deliverable from this project will be the CARE framework and its supporting software tools, with the potential to support UK agencies in the evaluation of eGovernment systems at various stages in their lifecycle.

At its heart the CARE framework will be a collaborative inquiry methodology where project stakeholders (users and system developers) will assume joint responsibility for the appraisal of an eGovernment System as co-evaluation partners. The framework will focus mechanisms for learning from experiences, both positive and negative (EC, 2005). It will also be supported by a knowledge base using database and inference rules, web and other appropriate technologies to ensure access to and dissemination of evaluation outcomes.

The novelty of our approach lies in the potential to add rigour and coherence to the evaluation life cycle without prescribing a narrow set of tools and techniques that must be employed. The portfolio of techniques available will include both 'hard' approaches – to address financial and technical issues – and 'soft' approaches – to address social, political, cultural, and organisational issues. This will provide flexibility and consistency across projects and social contexts.

Some of the key underlying principles to achieving a successful CARE framework are:

- sound data collection and analyses methods,
- an evaluative reflective practice approach – that is one which entails a complete process of identification and analysis of strengths and problems
- rigorous follow up to implement revised solutions.

Such a cycle encourages organisational learning and promotes continuous improvement to both the framework and system. Additionally, it aims to cultivate an organisational culture that supports evaluation through reflection, continuous learning, and pro-active knowledge management.

Developing this framework will give rise to the challenge of interweaving several areas of know-how; namely Information Systems (IS) which includes Soft Systems Methodology (SSM), and Hard Systems Methodology (HSM); Knowledge Management (KM), and Organisational Learning (OL). There will be the need to combine more traditional business system modelling (Avison and Fitzgerald, 2003) and financial modelling (e.g. NPV, DCF, ROI) techniques. Although there is an extensive literature on evaluation techniques (Irani and Love, 2001b) creating the proposed integrated framework will have the side effect of presenting several of them within an easy to use and standardized context.

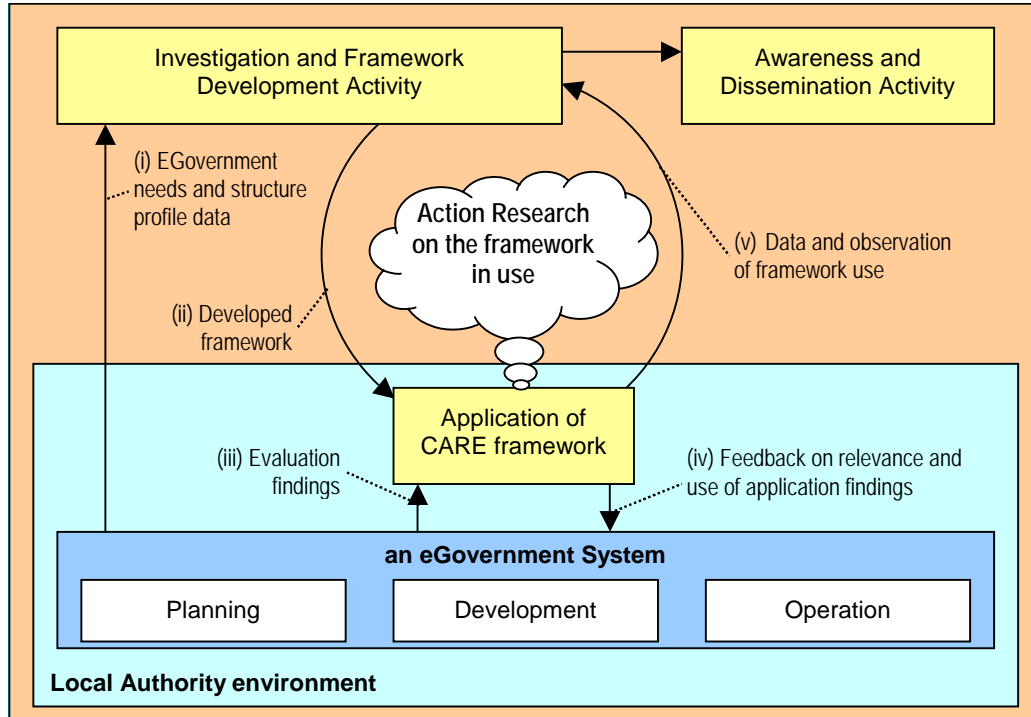
## 4 RESEARCH METHODOLOGY

To address the issues, the research will progress through a number of phases. A preliminary analysis will be conducted to establish the evaluation needs. This will be based on the existing Government's efficiency guidance notes, the esd-toolkit (2006), local agencies and consultation with multiple stakeholders (including politicians, staff, public, project managers, design developers, other government agencies, etc.). Also, through reverse engineering, the components in a typical eGovernment system(s) are identified followed by establishing the relationships amongst and creating representations of the system(s) in a higher level of abstraction.

In the second phase the outcome of this analysis phase will be used to develop the proposed CARE framework and software tools as described above. This activity contains three interwoven strands:

- Developing and articulating the overall process, philosophy and guidance.
- Developing and articulating the portfolio of evaluation techniques and criteria relevant to the eGovernment context.
- Developing the supporting software tools.

Finally the project itself must evaluate the CARE framework. In this last phase the framework will be applied to at least one live eGovernment System project as a test of the framework. This process will strengthen the framework by identify potential refinements, creating examples of good practice and developing materials for promoting awareness and dissemination of CARE.



**Figure 1:** Detailed Methodology for the CARE project  
(The roman numerals indicate the order of events)

Figure 1 (above) outlines the activities within the project and the relationships between them. Two critical issues in this research design are the choice of data collection and analysis methods, the work programme and the profile of the research team.

#### 4.1 Data Collection and Analysis

Flows (i) and (v) and also to some extent (ii) within the figure above represent the collection of research data from within the eGovernment context. We are not just interested in the technology and financial data but most critically in how the stakeholders use and react to both the system and the framework itself. It is therefore important to adopt methods that uncover sufficiently rich data to explain human behaviour where they use technology and participate in the evaluation process. Because it focuses on an intensive study of real world instances of eGovernment phenomena CARE will adopt an interpretivist approach in the evaluation of eGovernment information systems (Walsham, 1993), and in the evaluation of its proposed framework.

There will be two phases of data collection and analysis. The first of these is in the initial analysis phase (flow (i) in Figure 1) where the concern is with gaining a richer understanding of the eGovernment systems context where the CARE framework is to be employed. The second is at the end when the CARE framework is applied to an eGovernment system (flow (v) in Figure 1) and here the concern is understand the effectiveness of the proposed framework.

The ethnographic research method, where the researcher is a participant within the research process, can gain access to rich data on the organisational culture, the informal social interactions that occur,

and the way people react to the technology (see for example Elliman and Hayman, 1999). Usually, the participant observer assumes a non-influential technical or clerical role within the project so that they observe the activity at first hand but do not modify the social structure and hence, create a different phenomenon. The disadvantages are that this approach is time consuming, dependant upon the opportunity to place the observer in the team and requires significant research skill. CARE will therefore adopt the more common external observer role (Yin, 1994) using document acquisition, interviews and focus groups to acquire relevant data for the initial phase.

However, it is worth noting that within the framework (flow (ii) in Figure 1) an approach based on ethnographic principles is more appropriate. Here instead of placing an outside researcher in the eGovernment project team the framework will give selected 'non-influential' members of the team a dual role as part of the evaluation process. They will need appropriate training and guidance as part of the framework.

In the final phase of the project, when the framework is applied to a project, it will become more difficult to maintain the stance of a neutral observer. The framework is not wholly mechanistic and the involvement of the CARE project members in training and providing guidance on its application will influence the outcome for the eGovernment system. The CARE project will acknowledge this inevitable bias and use action research methods (Baskerville and Wood-Harper, 2002) to ensure validity of the data collection and analysis. With these methods rather than just trying to study human activity, the researcher seeks to change it for the better **and in the process** acquires the data to demonstrate the extent to which this has been achieved. Since change is a critical factor in the eGovernment agenda this proposed research strategy is seen as particularly relevant.

Data relating to the 'hard' aspects of the system under scrutiny will be analysed using quantitative and statistical methods (e.g. Cost Effectiveness Analysis, Return on Investment, etc.) to assess the performance, efficiency, and effectiveness of the system. CARE will also use problem-structuring techniques (e.g. functional analysis, Causal mapping, etc.) to describe the system and provide a visual holistic overview.

Data relating to 'soft' aspects of the system will be analysed utilising social research paradigms. In particular the qualitative data collected will be coded using open, axial, and selective coding methods. Some of the data analysis will also be based on Grounded Theory (Strauss and Corbin, 1990) where general features of data will be abstracted inductively from the data. This technique will extract process-oriented descriptions (concepts, classes, propositions or relationships) as explanations for the phenomena observed in the execution or evaluation of eGovernment system projects.

## 4.2 Work programme

The project is planned for 2 years with 2 full-time research staff and a research student. To achieve the objectives above the work is divided into five work packages:

- Analysis of eGovernment context, structure and evaluation needs.
- Development of the proposed CARE evaluation framework
- Development of the technical infrastructure to support the framework
- Application and assessment of the CARE evaluation framework
- Promotion of awareness and dissemination of CARE

## 4.3 Research Participants

From the academic side the research will be undertaken by two academic institutions, Leeds Metropolitan University and Brunel University who between have appropriate methodological knowledge and expertise IS development and both systems and modelling skills.

The research methodology shown above calls for the framework to be developed from the needs of the eGovernment context and for it to be evaluated in use. To these ends two local authorities, Sheffield

and Leeds, will provide case projects for evaluation and eGovernment systems, organisational and management expertise.

It also calls, and for wider promotion and awareness of the framework's effectiveness and the project will collaborate with Cap Gemini Ernst and Young who also bring KM and OL expertise and 'hard' systems modelling skills with them.

## 5 CONCLUSION

We have established a clear need for a better framework for learning through experience and continuous improvement in the eGovernment sector. This is not addressed by existing research, although the B-Hive project (Orange et al. 1999a, 1999b and 2000) gives some pointers to the way forward. The proposed CARE project will develop an appropriate KM framework, with IT support, to fill this need within the public sector.

### 5.1 Community benefits

In the first instance the local authorities participating in the research will gain an immediate benefit by improved evaluation of their selected eGovernment systems. They will also have gained knowledge and expertise to improve their evaluation of other eGovernment initiatives. In the longer term, through dissemination activities, the evaluation framework will be available to other local authorities and government agencies in general. Even if not directly transferable to national level or across Europe the project will have produced a foundation of knowledge that can be adapted to these wider public sector contexts.

The current central government thinking on the future of ICT in the public sector is looking to establish an "IT Profession in Government" (Cabinet Office, 2005). How this will be realised is still emerging but a good understanding of eGovernment evaluation and the underpinning theory upon which it rests has a place in the thinking and training of such people. The CARE project will deliver such an understanding and it can be incorporated into relevant undergraduate, postgraduate and continuing professional courses.

The private sector provides consultancy, training and outsourced ICT to the public sector. The results of this project benefit these private sector ventures in two ways. First, they enable consultancy support and outsourced eGovernment provisions to be improved. Second they provide an opportunity to create new revenue streams providing training and support for public sector staff charged with conducting evaluation activities.

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