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Steve Jones
Conwy County Borough Council

Zahir Irani
Brunel University

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IS EVALUATION IN THE UK PUBLIC SECTOR: EMERGING RESEARCH THEMES AND ISSUES

Steve Jones
Conwy County Borough Council
Bodlondeb, Conwy
steve.jones@conwy.gov.uk

Zahir Irani
Information Systems Evaluation and
Integration Network Group
Brunel University
Zahir.Irani@brunel.ac.uk

Abstract

The concern that investment in Information Systems (IS) is not delivering anticipated value and benefits is compounded by the difficulty in demonstrating IS value using traditional mechanistic evaluation methods. This is currently an important issue in the UK pubic sector, where the audit commission is employing traditional IS evaluation approaches in external inspections. Using the current literature on IS evaluation, together with both previous and new case material to gain insight into IS evaluation practice, the authors argue that IS evaluation in the public sector is very different from the private sector, and that traditional IS evaluation approaches based upon economic factors are largely inappropriate in this domain and indeed can be ritualistic. The paper calls for UK public sector organisations and external audit bodies to review their IS evaluation practice and seek alternative approaches. Finally, the paper argues for a research agenda, which explores alternative, complementary interpretive IS evaluation approaches to help public sector organisations and external audit bodies understand and gauge the impact of IS.

Keywords: Interpretive IS evaluation, public sector, best value

Introduction

As worldwide expenditure on information systems (IS) is expected to grow, industry professionals are encouraging customers to regard IS as strategic investments rather than costs. By taking this approach, organisations are faced with a dilemma, that is, *how* to evaluate the effectiveness and impact of IS investments. Current research indicates that the significant global expenditure on IS is increasing (Willcocks and Lester, 1999). However, against this trend, there is widespread concern that investment in IS does not always deliver value and that many IS projects do not meet business objectives (Walsham, 1999). This phenomenon has been labelled the *'IS productivity paradox'* (Brynjolfsson, 1993). Furthermore, research highlights that many IS investments appear to go ahead without the use of formal investment appraisal techniques, which results in organisations having difficulty in understanding both the impact and implications of any IS implementation (Remenyi *et al.,* 2000). When methods are used, there is disagreement over their usefulness and over which technique to adopt, if any (Hirschheim and Smithson, 1999).

Traditional investment appraisal methods are claimed to have worked reasonably well when IS was used to improve productivity and reduce cost. However, in today's competitive and ever changing environment such traditional methods are no longer considered effective. Despite this, research published by Ballantine and Stray (1999) suggests that such techniques remain in widespread use within both the public and private sector. Lycett and Giaglis (2000) suggest that most IS investment decisions use quantitative or financial based IS evaluation methods. Such methods usually have a limited definition of stakeholders, typically target direct tangible costs and benefits, and are based on accounting and financial instruments such as Net Present Value and Internal Rate of Return (Farbey *et al.,* 1995). However, there is evidence to suggest that IS investment decision-making frequently results from interpretive perspectives, such as 'gut feel' or 'acts of faith', which ignore the use of any traditional IS evaluation methods (Kaplan, 1984). Clearly, there is need for much work to explore the boundaries associated with using such subjective and interpretive methods and the role that their application can play within any robust evaluation process.

The authors of this paper start with a comprehensive summary of the normative literature in the area of IS evaluation. The paper continues with a discussion of IS evaluation in the public sector, which is often ignored in favour of private sector analysis. By synthesising the findings from two in-depth interpretive case studies, the authors identify common issues and highlight shortfalls in existing mechanistic IS evaluation methods in the public sector domain. Research themes are then elicited by drawing on these shortcomings to offer insight. This leads to a research agenda, which embraces interpretive approaches to IS evaluation. The paper concludes with a call for public sector organisations and external audit bodies charged with public sector inspections to review their current evaluation processes, especially in the light of new central government initiatives that seek to rejuvenate the status quo in UK public sector organisations.

Evaluation: Scope and Boundaries

Land (2001) defines evaluation as '*a process to examine notions of value and worth'.* This leads to the conclusion that evaluation is a subjective process, which is undertaken to assess the value of an object or the merit of a situation. According to House (1993), evaluation is a central issue in western societies, and has become an intrinsic part of human thought. Many authors (Minzberg, 1976; Kaplan and Norton, 1992; Introna, 1997) maintain that evaluation is an integral part of management practice in organisations, and that both intuitive and explicit evaluations support management decisions. Evaluation should be central to any activity to correctly allocate resources to areas to help to maintain or improve performance.

Smithson and Hirschheim (1998) define IS evaluation as '*the assessment or appraisal of the value, worth or usefulness of an information system'.* However, the traditional view of IS evaluation is somewhat different, in that the focus is upon assessing the cost and benefits of introducing IS. Such an approach is myopic in nature because the impact and wider implications of IS may often go unexplored. For example, issues such as *type* and *level* of benefits, costs and risk are often neglected (Irani *et al.,* 1997; Remenyi and Heafield, 1995). Furthermore, the more widely recognized social, human and organisational factors that surround the successful implementation of IS are often not explored or discussed.

Many authors have highlighted the importance of IS investment appraisal and evaluation (Ginzberg and Zmud, 1988; Angell and Smithson, 1991). Indeed, throughout IS literature and IS practice, there is an acknowledgement that there is a need for IS to be evaluated. IS monitoring, review and evaluation processes are an important factor, as Turner (1998) notes:

> *"IS evaluation necessarily forms part of any overall project to enable problems and issues to be raised and documented, and remedial action taken to address and improve the situation where necessary"* (Turner, 1998, p. 72).

Hawgood and Land (1987) point out that IS evaluation serves a number of different objectives that include:

- A mechanism to financially justify a proposed system or new infrastructure. It is necessary that evaluation during this stage provides the organisation with informed information on the outcomes of maintaining or installing a system. Clearly, such outcomes need to be achieved in terms of the organisations' interest;

- To act as a framework that allows the comparison of competing projects for scarce organisational funds. Using a common IS evaluation framework such as those economic approaches identified by Irani and Love (2002) it is possible to select among different types of projects, the most suitable one that best fits organisational requirements. However, it must be noted that the same set of financial data used by different appraisal methods can produce conflicting results;

- A control mechanism to support senior management in the management of resources through benchmarking and improved project management. Therefore, an evaluation can provide a set of measures needed by the organisation to exercise control over the project;

- To act as a mechanism for organisational learning and improvement. Performance indicators and measures can act as comparisons of the actual achievements realised. It can also provide a feedback for the organisation in the sense of a learning experience for future system building capabilities.

Willcocks and Lester (1999) maintain that the size of IS expenditure, its pervasiveness in everyday organisational life, and the uncertainty of its value, has led to growing concern, especially amongst senior executives, about the casual approach to extremely high levels of IS investment and the inability to find appropriate means to evaluate its effect. The prevailing scenario in

organisational practice has led some authors (Ballantine and Stray, 1999; Walsham, 1999; Wilson and Howcroft, 2000; Irani and Love, 2001; Jones and Hughes, 2001) to argue for increased and improved IS evaluation in organisations.

Farbey *et al.,* (1999) conclude that IS evaluation practice is now a key area for effectively managing IS resources. IS evaluation, as a management process, provides the benchmarks for what is to be achieved in economic, operational or organisational terms, from the investment in IS. The evaluation provides the benchmarks as a driving force for the implementation of successful strategic IS.

Despite the seemingly obvious need for increased and improved IS evaluation in organisations, authors such as Hirschheim and Smithson (1999), Remenyi *et al.,* (2000) and Irani and Love (2001) contend that it is difficult to formally justify IS investments. This is because reliable estimates of IS costs and benefits are not always available or easy to obtain. This is due to the complex nature of the impact of IS in organisations, which frequently leads to a portfolio of tangible and intangible benefits.

Many methods have been developed to measure IS efficiency and effectiveness, which attempt to define what is required (Remenyi *et al.,* 2000). Irani (1998) has classified over 50 IS evaluation methods that aim to assist with this process. Land (2001) contends that there are now over 60 methods available. However, there seems to be little consensus among researchers and practitioners as to which method is appropriate for IS evaluation. Walsham (1999) highlights the difficulty with IS evaluation and maintains that:

> *"there is continuing disagreement as to the factors and metrics to include in any formal, quantitative approach to IS evaluation, together with inherent difficulties associated with quantifying estimates and the subsequent analysis"* (Walsham, 1999, p. 221).

Furthermore, much research highlights that many organisations have no processes to evaluate IS. This leads to the conclusion that IS evaluation has not been given a high level of importance in practice, and indeed is often overlooked. This scenario makes it difficult to assess the impact of IS and its contribution. This is particularly true of the UK public sector, where IS evaluation has traditionally been neglected (Farbey *et al.,* 1999; Bannister, 2001; Khalifa *et al.,* 2001) and where the central government's recent Best Value (BV) and Corporate Improvement (CI) initiatives are rapidly raising the profile and importance of IS evaluation.

The rationale underpinning BV is that all local authorities and other public sector organisations, such as the police and fire services, must ensure that their functions are performing well and that they are delivered in a cost effective and efficient way to ensure that best value is being obtained. Benchmarking, evaluation and comparison between local government organisational and service delivery performance forms a key component of BV. IS benchmarking and evaluation therefore, must now be considered by public sector organisations. Furthermore, the Audit Commission, an independent body that audits the public sector, has been charged with undertaking and publishing the results from BV inspections of all public sector service delivery areas. In addition to IS departments being inspected, IS also has an important role to play in almost all aspects of public sector service. The predominant approach to IS evaluation currently employed is formal mechanistic evaluation methods.

Formal IS Evaluation Methods

Where organisations have evaluated IS, attention has been given to formal, overt, quantitative methods that attempt to define and measure IS investment costs and benefits. These mechanistic approaches are mainly concerned with the monetary costs and benefits, and are based upon economics. Commonly used indices based on economic performance include cost-benefit analysis (CBA), return on investment (ROI), return on shareholders equity (ROE), return on assets (ROA), discounted cash flow (DCF), net present value (NPV) and Payback. These formal methods are used to plan, calculate, manage and monitor IS, in an attempt to identify costs and demonstrate that cost benefit is obtained from the investment.

It would appear that formal evaluation approaches based on quantification and technical criteria have considerable legitimacy. A recent addition includes the IT Balanced Scorecard (Willcocks *et al.,* 1998), which is based upon the Balanced Scorecard model (Kaplan and Norton, 1992). However, formal approaches have met with limited success in practice and the degree to which these methods are useful is cause for much current debate (Strassman, 1997; Farbey *et al.*, 1999; Walsham, 1999; Serafeimidis and Smithson, 2000). None has found universal favour. Furthermore, these processes are often not undertaken rigorously or not undertaken at all (Willcocks and Lester, 1999). Stakeholders have cited various reasons, including it is too difficult, too time-consuming, too costly and not necessary (Jones and Hughes, 2001). The lack of use of traditional methods by organisations demonstrates that these approaches do not command a high level of confidence with practitioners.

Progressive methods, such as the Benefits Management approach (Ward, 1990) and the Active Benefits Realisation (ABR) approach (Remenyi *et al.,* 1998) which outline comprehensive benefits management frameworks for IS developments and include both quantitative and qualitative evaluation factors, have also had limited adoption in practice (Walsham, 1999). This has mainly been due to their large scope and complexity.

Formal IS Evaluation as a Ritual

Introna (1997) contends that IS evaluation is more likely to be a symbolic expression of objective management, to perpetuate an image of the rational manager, rather than an accurate method to aid decision-making. Wilson and Howcroft (2000) support this view and further argue that power relations play an important part in IS evaluation:

> *"no matter what the claims to so-called objective methods are made, the evaluation process is skewed by those with the power to legitimise views of the system"* (Wilson and Howcroft, 2000, p. 42).

Formal evaluation therefore would appear to be ritualistic rather than substantive, and is employed to support management decision-making. Serafeimidis and Smithson (2000) argue that an explanation for this can be found in terms of Giddens' structuration theory (Giddens, 1984), whereby existing practices constantly reinforce existing structures, which serve to reinforce the practice. This results in no change in action and no questioning of underlying values and beliefs, and a situation where existing power relations strongly influence decision-making. A further explanation can be found in actor network theory (Latour, 1991), which endeavours to provide a description of power relations. Kumar's (1990) research concluded that the main reason for undertaking post-implementation IS evaluation was to disengage the IS department from the IS project. This further illustrates that IS evaluation can be ritualistic.

Irani *et al.,* (2001) further contend that technology management policies and procedures based on the use of traditional appraisal techniques have worked well for decisions concerning manufacturing capital equipment replacement, but are myopic for the appraisal of complex IS. These complex IS could include those deployed in the public sector. Introna (1997) further argues that internal politics, where control of IS is a key form of power and influence, is more dominant in the public sector and therefore has greater implications in IS evaluation.

Information Systems Evaluation in the Public Sector

Bannister (2001) argues that there are many differences between the public and private sector including cultural, structural and resource differences. Bannister (2001) contends that the public sector is characterised by bureaucracy, which according to Weber (1919) includes factors such as authority, hierarchy, written rules, limited discretion, impersonality and a technically based career structure. The tradition within the public sector is one of risk aversion (Joyce, 1985). Traditionally, the public sector has been concerned with issues associated with cost savings and productivity. However, in recent years central government has sought to modernise the culture of the public sector (Heeks, 1999). In the last decade, three main themes of efficiency, effectiveness and economy have emerged as key issues. New concepts and initiatives, such as quality of public service, performance management, BV and CI have emerged (National Assembly for Wales, 2000).

Willcocks (1994) predicted that IS investment in the public sector would continue to cost more, but still deliver no more tangible benefits. Some authors (Heeks, 1999; Bannister, 2001) have shown this prediction to be accurate. Indeed, the UK local government sector IS expenditure in 1998/99 was over £1.7bn (Kable, 2000). Looking to the future, UK central government has published ambitious targets in the public sector modernisation agenda for delivering government services electronically to the general public by 2008. This will be mainly achieved by implementing on-line services via the Internet. This will require significant additional public sector IS investment. However, many E-commerce initiatives in the private sector have not delivered increased profits, added value or benefit to service delivery. This will further place the public sector IS practitioner under scrutiny with regard to IS evaluation issues.

Heeks (1999) maintains that the large size and breadth of the range of public sector services impact upon IS evaluation issues. Bannister (2001) also concludes that IS projects are usually large, which are often implemented as a result of a statutory regulation or in response to political direction. Where there is IS failure, extra resources can usually be engaged to address the issue, rather than admitting mistakes. Bannister (2001) highlights the difficulties and notes that:

> *"defining appropriate measures where the principal objectives of the organisation are to serve the public or formulation of policy, is difficult. For example, how does one evaluate the value of information systems used to support policy making?"* (Bannister, 2001, p. 72).

Some authors (Hochstrasser, 1990; Willcocks, 1996) argue that there are categories of IS projects that do not aim to improve the efficiency or effectiveness of an organisation, and therefore, traditional IS evaluation methods are inappropriate. For example, mandatory IS solutions due to legislation, where there is no option but to proceed. The authors maintain that a special form of IS evaluation is required but do not suggest what this form should be.

There are also strong political and hierarchical pressures to provide short-term IS solutions to immediate problems with a political dimension. A recent example was the speedy implementation of IS in UK local authorities to assist with Foot and Mouth compensation payments to the farming community in 2002. Bannister (2001) supports this view and notes that:

> *"public administration IS are frequently implemented due to a current political need ... which can override the most thorough of long-term strategic IT plans"* Bannister (2001, p. 73).

According to Heeks (1999), the relevance of formal methods in the public sector is open to question. The reason for this is that economic factors such as productivity, payback, and return on investment are largely irrelevant in the public sector. There are also flawed assumptions in the mechanistic models, including that IS value can be measured and that IS contribution is constant. In practice, however, the value and impact of any IS will change over time. Heeks (1999) provides an insight into the difficulties associated with formal IS evaluation methods, when he contends that to understand IS evaluation in public sector organisations, understanding the '*wetware*' between ears is more relevant than evaluating hardware and software costs. Thus highlighting the importance of stakeholder opinion and thought processes rather than metrics in the IS evaluation process.

Within public sector organisations, IS value is increasingly being recognised as an 'improvement in performance'. It does not have to have a direct financial gain for the organisation. That is to say, that IS may be deployed to gain an improvement, such as improved customer service, reduced workload or management information to help improve decision-making.

Case Studies

The authors have recently undertaken empirical work with regard to IS evaluation practice in the UK public sector, in the form of two interpretive in-depth case studies. Grounded Theory (Glaser and Strauss, 1967) was used in an interpretive paradigm as the method of data collection and analysis of the data obtained from semi-structured interviews. The main objective was to explore and understand IS evaluation in the context of the case study organisations. One case study, together with the research methodology, is presented elsewhere (Jones and Hughes, 2001). The other case study is still to be reported and is not presented in detail here. However, this paper draws upon the major themes that are common to both cases. The two interpretive cases have been used illustratively and therefore any conclusions that are drawn are not generalisable. However, they may be generally useful (Walsham, 1995a). The critical aspect of this paper is that key issues from the literature and key common issues that have been elicited from both case studies are summarised, synthesised and analysed in this section with the aim of providing insight and identifying emerging themes which contribute to a research agenda with regard to IS evaluation in the public sector.

Both case study organisations do not undertake formal IS evaluation. Mechanistic evaluation methods are not employed because these methods are regarded as inappropriate. However, both organisations recognise that the public sector is coming under pressure to adopt IS evaluation measurement and metrics. This situation is of major concern to the case study organisations, as prescriptive mechanistic methods are currently consistent with the BV benchmarking approach to IS evaluation (National Assembly for Wales, 2000) and these methods are being employed by BV inspectors. In theory, this prescriptive approach should help benchmark and quantify IS value and benefits. However, both organisations are unconvinced of the appropriateness of the approach and are doubtful of the ability of these IS evaluation methods to demonstrate IS value or gauge impact. Nevertheless, the high expenditure on IS, together with the lack of appropriate IS evaluation measures, has resulted in senior executives in both organisations raising questions about how IS can be evaluated.

IS investment is largely intuitive and political in both organisations. The power of hierarchical and management structures and the politics of management persuasion is a major factor in influencing IS investment decisions. After an IS investment decision is made there is rarely any subsequent evaluation. There is therefore, no science to IS investment decisions in the case studies and

this is common in the public sector domain (Heeks, 1999). The lack of any IS evaluation process results in both organisations being unable to gauge the impact, implications, success or otherwise of IS deployment.

Interestingly, both case study organisations recognise that there is a need to evaluate IS and acknowledge that evaluation is becoming a statutory responsibility on the part of public sector organisations. However, they are uncomfortable with mechanistic methods and consider that IS evaluation is complex and cannot be well undertaken via the employment of existing quantitative methods. This is because IS stakeholders in the case studies are not concerned with the detailed metrics, measurement formulae, evaluation concepts or cost benefit justification techniques. Rather, stakeholders are concerned with the success, effectiveness or otherwise of the operation of IS in practice. Importantly, the organisations are concerned with the issues and implications that arise from the impact of IS deployment, especially those that need to be addressed to ensure the organisation obtains value from the IS implementation. This leads to the conclusion that the multiple experiences of IS stakeholders using IS could assist with any IS evaluation approach. This experience is grounded in the tacit knowledge of IS users and could provide important insight into IS deployment to help understand impact.

In spite of the numbers of methods and techniques available for organisations to undertake IS evaluation, the prevailing situation is one where economic factors dominate. The BV inspectorate using these approaches illustrates this scenario. These mechanistic IS evaluation methods contain little or no organisational or user perspectives as to the usefulness and impact of IS. This is an important omission because user perspectives on IS evaluation are of value. This is particularly an issue in the public sector where economic factors have little meaning and are therefore largely inappropriate. Additionally, the empirical work illustrates that in practice the prevailing scenario is one of non-use of these methods. Furthermore, the case study organisations recognise that the multi-perspectives of IS stakeholders are important. Therefore, in order to understand IS impact from an organisational context user opinion should be considered.

In recent years, several authors (Walsham, 1999; Hirschheim and Smithson, 1999; Serafeimidis and Smithson, 2000; Irani and Love, 2001) have argued that IS evaluation would be improved by using an interpretive epistemology. The emerging view from this paradigm is that IS evaluation is a socially embedded process, in which social actors within the specific organisational context undertake informal assessments. This leads to the view that these actors are in the best position to assess IS and offer opinion to senior executives with regard to IS impact. This fits well with the dilemma facing public sector organisations.

Discussion – An Emerging Research Agenda

An interpretive approach is concerned with understanding the social actions and meanings of actors in a social setting and appreciates the value of qualitative and subjective data for evaluation purposes. Remenyi *et al.,* (2000) contend that IS evaluation '*needs to include an assessment of human needs and values'*. Recent case study research undertaken by Irani and Love (2001) highlights the importance of interpretive IS evaluation approaches when they conclude:

> *"the case study points to the significance of human and organisational factors, and exemplifies the need to take account of such issues within any robust evaluation criteria"* (Irani and Love, 2001, p. 173).

Wilson and Howcroft (2000) also argue for a paradigm shift and suggest that interpretive approaches would improve the situation. They argue that a move towards a more interpretive approach is an advance because *'it highly values users' own evaluations'*. Wilson and Howcroft (2000) further argue that there is a context to all evaluation processes and that personal and subjective evaluation is the *'de facto decision-making'* in practice. This resonates with the work of Minzberg (1994) who concludes that the most effective managers rely on very soft forms of interpretive information, including gossip, hearsay, and various other intangible scraps of information from various sources.

Introna (1997) maintains that in practice, people tend to evaluate and manage without formal management information. These evaluation and management processes are immensely complex, which involve the most sophisticated, subtle and, at times, subconscious elements of human thinking. Introna (1997) contends that office work in organisations is guided by both explicit rules and tacit rules. By evaluating IS in the traditional mechanistic way, it is not possible to take tacit rules into account. Recent case study research by Wilson and Howcroft (2000) on IS evaluation also highlights this issue and notes that:

> *"whilst an interpretive stance was taken, the case study illustrates that we cannot simply and non-problematically take users' accounts at face value. Motives should be questioned as there are many different reasons as to why people tell us the stories that they do"* (Wilson and Howcroft, 2000, p. 47).

The interpretive approach aims to understand information systems from the point of view of the participants who are directly involved with IS. It explicitly includes the context of the system. The approach assumes that human participants are able to influence their immediate surroundings, including other people. Participants are also assumed to construct their own 'real-world' realities, which are based upon their personal beliefs and experiences, and which in turn are externalised in the form of behaviour, attitudes and individual perceptions. The intention of this approach to IS evaluation is to gauge output, not measure inputs, within the overall organisational context. The output is the new circumstances created by IS after it has been successfully implemented. It is the outcomes of the system when used appropriately by the users of the IS which generate benefits or otherwise to an organisation.

Interestingly, both case study organisations reported that interpretive approaches have very recently been posited as a valid alternative approach from the BV inspectorate. This is because the inspectorate is beginning to recognise that the early emphasis on quantitative data collection and analysis omitted important situated and contextual information. This information is vital to an organisation if it is to understand and improve performance. A simple example would be a quantitative study, which aims to evaluate IS help desk calls. This may highlight that 100 out of 100 calls were resolved within the agreed resolution timeframe. This appears an excellent result. However, a qualitative study of clients may result in a poor score, perhaps because the clients were dissatisfied with the help desk service, or the way it was provided, even though the problem was resolved. Consequently, qualitative questionnaires and focus groups have recently been emerging from the BV inspectors and forming part of BV inspections to provide valuable qualitative and interpretive data for the BV inspection process.

Serafeimidis and Smithson (2000) contend that IS evaluation via actor perception can play an important interpretive role, which can provide deep insight into understanding IS impact. The authors' early empirical work resonates with this view. The authors argue that applying an interpretive approach to IS evaluation can address some of the difficulties of IS evaluation in the public sector, which is different to the private sector. The authors call for further research in this area. In particular, the research agenda would include research into the practical application of interpretive approaches and the tools that could help facilitate such an approach in public sector IS evaluation practice.

Concluding Comments

The authors of this paper have discussed IS evaluation and highlighted that investment decisions are motivated by different factors in the public and private sector. A summary of the common themes from two interpretive in-depth case studies have been presented, which illustrates the difficulty with IS evaluation in the public sector in practice. This is because mechanistic methods based upon quantification and economic factors such as return on investment, whilst useful in the private sector, have little meaning or value with regard to public sector IS investment. Furthermore, assessment aspects such as context and stakeholder perspectives which offer insight into IS deployment in action are valuable to public sector organisations, but are an important omission in mechanistic methods.

The empirical work leads to the conclusion that formal and mechanistic IS evaluation approaches are largely inappropriate in the public sector domain. This is of concern, because BV inspectors are currently employing these approaches in BV inspections. However, the audit commission is beginning to recognise that there are deficiencies with these formal methods and is slowly acknowledging that interpretive methods of data collection and analysis are a valid approach to judge public services, including the contribution and impact of IS. This leads to a research agenda in which interpretive IS evaluation methods need to be further explored via stronger research, especially in public sector organisational practice.

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