DIFFERENT ROLES OF EVALUATION
IN INFORMATION SYSTEMS RESEARCH

Goldkuhl, Göran, Department of Management and Engineering, Linköping University, Sweden, goran.goldkuhl@liu.se

Lagsten, Jenny, School of Business, Örebro University & Department of Management and Engineering, Linköping University, Sweden, jenny.lagsten@oru.se

Abstract

Evaluation of information systems (IS) has come to be an important topic for study as well as practice. IS scholars perform studies of how to evaluate IS and different IS related phenomena, like e.g. methods and strategies. Evaluation is also used as a research approach in many IS research studies. However, the use and interest of evaluation seem to be rather fragmented and diversified in the IS field. The purpose of this paper is to bring more structure to evaluation in IS research. Based on a review of literature on evaluation in IS research and on evaluation research in general a conceptualisation of evaluation in IS is presented. This consists of 1) a conceptual practice model of evaluation (including generic questions for the design of evaluation) and 2) a classification of different roles of IS evaluation research. This classification consists of three main research types: 1) research about evaluation, 2) research through evaluation and 3) research about evaluation research. The second research type has been divided into three sub-classes: 2a) research through evaluation as main strategy, 2b) research through evaluation as companion strategy and 2c) research through evaluation as re-use strategy. The different research types have been characterized and exemplified.

Keywords: Information system, evaluation, IS evaluation, evaluation research, method, criteria, action research, design research.

1   Introduction

1.1   Background

Information systems (IS) scholars have great interests in evaluation. Such kind of interest may take different forms and have different focus. How to evaluate information systems is one major concern. Different approaches, methods and knowledge interests can govern IS evaluation. There exist controversies about different ways to evaluate IS; e.g. debates concerning economic vs. interpretive ways of evaluation (Hirschheim and Smithson, 1999). Evaluation (as a noun) may designate both the process of evaluation (the activity: to evaluate) and the product from evaluation (knowledge as result from evaluation process). From this follows a possible differentiation of knowledge interests to the evaluation process or to evaluation results, their uses and impact. Not only information systems are evaluated in our empirical domain of interest. There exist evaluation of methods, models, frameworks and all other possible knowledge artefacts of conceptual and prescriptive character that exist within the IS field (e.g. Siau and Rossi, 2011).

The practical conduct of evaluation is thus a field of interest. This includes also the supportive knowledge (approaches, methods etc) for such evaluation processes and the results and uses from evaluation. Not all IS scholars who engage in evaluation issues have a direct interest for the empirical phenomena of evaluation as mentioned above. Many scholars use evaluation as part of their research-methodological tool-box. Evaluation of an information system is a way to conduct research in IS. Knowledge about information systems and other related artefacts in the empirical field can thus be generated through evaluative research. Evaluation is an instrument for producing scholarly knowledge. A typical case study within IS can contain an evaluation of an information system and its implementation and use (e.g. Bussen and Myers, 1997). It is also interesting to see that evaluation has places in other broader research approaches within IS. Action research (AR) is nowadays an established research approach in IS (e.g. Baskerville and Myers et al, 2004). A canonical approach to AR within IS has been presented by Davison et al. (2004). This contains the well-known cyclical procedure of Susman and Evered (1978). In this model, evaluation has a distinct place as the fourth phase out of the five phases; i.e. when evaluating the performed interventions. However, evaluation takes also place under the label of diagnosis as the first phase in AR. In diagnosis a problem definition and an evaluation of the current situation are performed. This means that evaluation has important functions in AR for evaluating the original state as well as the changed state.

Another research approach with a growing interest in IS is design science research (e.g. March and Smith, 1995; Hevner et al, 2004). The main idea of design science research (DSR) is knowledge production through the generation of artefacts. This is done through a two-phase cycle of build and evaluate. Evaluation within DSR can be performed in a number of ways (ibid; Venable et al, 2012).

1.2 Purpose and structure of paper

What has been sketched above shows a diversified interest and use of evaluation within IS. We claim that it is time to give a coherent conceptualisation about evaluation in IS research. A more coherent account and proper conceptualisation of evaluation can help IS scholars to better navigate and chose how to focus and how to approach and use evaluation in research. In order to produce such a conceptual model of evaluation in IS research we will, besides a study of evaluation in IS, also study the general discipline of evaluation. IS is by many scholars considered to be a discipline that relies heavily on several reference disciplines (Baskerville and Myers, 2002). It is a bit amazing that the general discipline of evaluation have had so little impact on IS evaluation issues. In building up a knowledge base for conceptualising evaluation in IS we will both study evaluation in general (section 2) and evaluation in IS research (section 3). The main purpose of this paper is thus to present a conceptualisation of evaluation in IS research. This will be done in two steps (sections 4-5). As a first step we will present a conceptual practice model of evaluation (section 4). This is needed in order to get a clear view of what we mean by evaluation. We will then present a classification of different types of IS evaluation research in section 5. We will end the paper with conclusions (section 6).

1.3 Research approach: A conceptual inquiry

This knowledge development has been conducted through a conceptual inquiry. We have started from a situation of a diversified use of evaluation in IS research. This is a conceptually unsettled situation which we aim to move to a settled situation through creation of conceptual models which bring the different uses of evaluation in IS into a coherent whole. We do not claim that it is problematic that it exist many different uses of evaluation in IS or that some uses should be avoided. What we claim is that the diversified situation is conceptually unclear and that there is a need to create more conceptual order to it. It is this challenge of diversification and this conceptual need for clarification that has driven our conceptual inquiry.

2   Evaluation research in general

Evaluation research has developed as a field from the need of evaluating public programs of social change (within schools, health-care, and welfare enterprises) in order to show if services and improvement efforts were succeeding (Stufflebeam, 2001). Several journals as "Evaluation", "The American Journal of Evaluation" and "New Directions for Evaluation" as well as associations on national or international levels (for example "American Evaluation Association" and "European Evaluation Society") cultivate the research and discussions about the methods, theory, ethics, politics, and practice of evaluation.

Since late 1950s several evaluation movements is recognized as consequences of evaluators and researchers working to solve problems of their time. A first science-driven wave developed methods in support for establishing more rational public decision-making bodies (Vedung, 2010). With a scientific orientation evaluation is neutral, objective research fitting a goal based model of evaluation finding the most efficient means to reach externally set goals. Towards late 1970s faith in experimental evaluation faded and the understanding for including information elicited from users, operators, managers and other stakeholders brought about a more democratic or dialog oriented model for evaluation (Vedung, 2010). Vedung concludes that the ongoing movement is the evidence wave producing systematic reviews of evidence-based lessons learned which some scholars argue involves the return of science-based evaluation. Alkin and Christie (2004) organize the field of evaluation research within three main branches; use, methods, and valuing, according to the established approaches and models proposed by theorists in the field. They mean that that all prescriptive theories of evaluation must consider issues related to: (1) the methods used in an evaluation, including the study design, (2) the manner in which data are to be judged and valued and by whom, and the underlying values used to accomplish this and (3) the use of the evaluation effort.

It seems to be generally agreed upon that a definition of evaluation must cover a broad range of systematic thinking. According to Guba and Lincoln (2001) evaluation is one form of disciplined inquiry; evaluation focus some evaluand (evaluation object) and results in "merit" or "worth" constructions, i.e. judgements, about it. They clarify that judgement of merits consider intrinsic qualities of the object irrespectively the application setting and worth regards extrinsic usefulness in a concrete setting. Guba and Lincoln (2001 p 1) have also made definitions of the concept pair formative vs. summative evaluation: "Evaluation of a proposed or developing evaluand is termed 'formative', while evaluation of some developed evaluand is termed 'summative'".

In order to closer examine the concept of evaluation we choose to use the definition of evaluation by House (1980) who starts by saying "at its simplest, evaluation leads to a settled opinion that something is the case". House continues to define evaluation by addressing the comparative nature of the evaluative process - the mechanism of evaluating; "in its essence, evaluation entails adopting a set of standards, defining the standards, specifying the class of comparison, and deducing the degree to which the object meets the standards" (House, 1980 p. 19). House offers a taxonomy of evaluation approaches based on subjectivist ethics where the major elements in understanding the approaches are their ethics, their epistemology and their political ramifications. The taxonomy could be summarised into four basic models of evaluation termed as goal based, goal free, professional and participative, table 1.

In the goal based model the quality of the evaluation object is comprehended in terms of how well the object meets the initial goals. The standard for comparison is the initially set goals. The typical purpose of a goal based evaluation is to form judgements on efficiency or productivity and the major audience for evaluation results are economists and managers. In the goal free model the quality of the evaluation object is comprehended in terms of how well the object meet consumer needs; consumer (user) needs are the standard for comparison The purpose of a goal free evaluation is typically to investigate social utility and the results are of interest for consumers or users with intentions make an informed choice. In the professional model the quality of the evaluation object is comprehended in

terms of how well the object meets some professionally accepted standard. The purpose here could be professional acceptance and the audience is professionals or connoisseurs of the subject matter. In the participative model the quality of the evaluation object is comprehended in terms participants/stakeholders concerns. The standard for comparison with the evaluation object is generated and negotiated by the way of the evaluation process. The purpose of this type of evaluation is typically to understand diversity and the reference group is practitioners or stakeholders.

Model	Standards, criteria	Overall purpose	Major audience or reference groups	Epistemology
Goal based	Prespecified objectives, quantified variables	Efficiency, productivity, quality control	Economists, managers, decision-makers	Quantitative objectivity (Objectivist epistemology/ explicit knowledge)
Goal free	Consumer needs, use values	Consumer choice, social utility	Consumers	Qualitative objectivity (Objectivist epistemology)
Professional	Heuristics, standards of experts	Professional acceptance	Professionals, connoisseurs	Expertise through experience (Subjectivist epistemology)
Participative	Negotiated criteria	Understanding diversity	Practitioners, stakeholders	Personal situated knowledge (Subjectivist epistemology)

Table 1.   Four basic models of evaluation (elaborated from House, 1980).

3   Evaluation in information systems research

Evaluation of information systems has come to be an important topic for study as well as practice (Irani et al. 2005). One topic that indicated the importance of evaluation is the "IT productivity paradox". In the early 1990s the debate on the IT productivity paradox (Brynjolfsson, 1993) questioned the connection between investments in IT and the output productivity at firm level. The question of value for IT money concerns inadequate evaluation in two ways. Firstly poor evaluations could be a base for poor statistics and therefore question the existence of the reported paradox. Secondly poor evaluation practices could lead to wrong decisions when choosing IT projects for implementation resulting in low productivity (Farbey et al. 1999b). Anyhow a lively discussion followed in the IS field. Many scholars were criticising functionalistic evaluation methods and suggesting an *interpretive evaluation* approach (Symons and Walsham, 1988; Avgerou, 1995; Farbey et al. 1999a) to complement *the traditional cost-benefit approach* (Willcocks, 1992) for evaluating implementations of information systems.

The interpretative evaluation approach is argued to have important practical advantages such as stakeholder commitment and learning opportunities (Symons, 1991; Hirschheim and Smithson, 1999; Walsham, 1999). Interpretive IS evaluation could be recognised as a complex social process that emphasizes the situatedness of social action and knowledge where social interaction and actor perception plays important roles that should be obtained and valued in the evaluation process (Jones and Hughes, 2001). Such an approach builds basically on Guba and Lincolns (1989) work on constructivist evaluation where the main characteristics are: elicitation and articulation of stakeholder concerns, participative process, context dependent criteria, understanding and learning. Scholars have suggested that evaluation could be understood in the perspective of *organisational change* (Serafeimidis and Smithson, 2000) where the elements of evaluation, the content, context and process (CCP), and their interactions is analysed for a thorough understanding (Symons, 1991). The framework of content, context and process has been used in different case studies examining evaluation processes in practice.

Another line of work regarding evaluation concerns what *qualities* of the information system that assure successful implementation and use. There are several approaches and models for investigation and clarification of IS qualities. The technology acceptance model (TAM) aims at explanation and prediction of user acceptance of technology at work and has been used by numerous scholars investigating usage intentions and behaviour (Venkatesh and Davies, 2000). Stockdale and Standing (2006) propose a detailed extension of the CCP framework in order to provide a more sufficient generic framework yet detailed enough to offer effective guidance. To add flesh to the bones of CCP the use of recognised success measures could help evaluators examine what to be measured (Stockdale and Standing, 2006), they propose that the metrics in IS Success Model (D&M model) (DeLone and McLean, 2003) support evaluators to identify factors of success when using CCP. Where the D&M and TAM models provide explanation of interdependent dimensions and metrics for measurement of acceptance or effectiveness of the IS on a system level, the traditional HCI perspective of *evaluating usability* (Cronholm and Vince, 2009) provide metrics for analysis of the interaction between the user and the graphical user interface. Usability is one measure in the D&M model. Numerous studies have applied the D&M model for evaluation of IS success as well as for reasons of validation. There are as well several criteria lists (e.g. Nielsen, 1993; Shneiderman, 1998) and methods for evaluating usability that extensively been used and discussed for evaluative reasons in the field. Hartson et al. (2001) make a distinction in usability evaluation following the concept pair of formative vs. summative. There may exist usability evaluations during design which clearly has a formative purpose to guide the design process. Summative evaluations assess the usability of the final design. Hartson et al. (2001) also make a distinction about evaluating intrinsic properties of user-interfaces and the evaluation of these in use-situations. Cf. also a similar distinction made by Cronholm and Goldkuhl (2003) about evaluating systems as such vs. systems in use.

Research methods are related to evaluation methods as they concern techniques, and the rigor and relevance thereof, for knowledge development through data collection and analysis. IS evaluation approaches are, as well as research methods, anchored in different philosophical epistemologies and perspectives. Scholars have begun to recognise the need for grounding evaluation approaches and studies in the ontology and epistemology of relevant paradigms. Different research perspectives have been proposed as bases for evaluation approaches: political/social constructivist perspective (Wilson and Howcroft, 2005), critical theory (Klecun and Cornford, 2005), situated practice/interpretative approach (Jones and Hughes, 2001), systems-based approach/biology (Jokela et al. 2008), critical realist perspective (Carlsson, 2003).

As well as a main strategy for investigation and research, evaluation can play a companion role within an established research strategy. This is the case in both *action research* (AR) and *design science research* (DSR). DSR is defined to consist of two types of activities that work iteratively; build and evaluate (March and Smith, 1995). Evaluation is the phase in DSR where the artefact performance is compared to criteria (ibid). Different evaluation methods (observational, analytical, experimental, testing, and descriptive) can be used for evaluation but need to be matched appropriately with the designed artefact and the selected evaluation metrics (Hevner et al. 2004). In AR evaluation is considered as the fourth phase in the cyclical research process (Susman and Evered, 1978). Explicit evaluation measures for each project objective should be specified (Davison et al. 2004). Evaluation includes the determination of whether the planned effects of the action taken were realized, and whether these effects relieved the problems (Baskerville and Pries-Heje, 1999). However, the first phase of the cyclical AR model is labelled diagnosing and it is considered to be a kind of evaluation of problems in the current situation. Research discussions among scholars (Venable et al. 2012; Iivari and Venable, 2009) demonstrate that the questions of what and how to evaluate in AR and DSR and the rationale for evaluation decisions are still unsettled.

Most studies in the field of information systems evaluation are fragmented in their approach i.e. they look at a single issue from a single angle (Lubbe and Remenyi, 1999). Berghout and Remenyi (2005) summarizes the research in The European Conference on IT Evaluation (ECITE) (now ECIME) since its start. They find that a plethora of systems, artifacts and strategies has been evaluated such as

enterprise systems, intranets, EDI, development tools, workflows, outsourcing initiatives and the more (Berghout and Remenyi, 2005). Different perspectives and theoretical bases have been suggested, application areas such as healthcare and public sector has been investigated. The literature shows that the use and research on evaluation is fragmented and diversified in the IS field.

4 A conceptual practice model of evaluation

In order to identify the different roles that evaluation can play in IS research, we need a basic conceptualisation of evaluation. With inspiration from general evaluation theory (briefly referenced in section 2 above) we present a conceptual model of evaluation including a set of fundamental questions to pose when preparing and planning an evaluation. We call it a conceptual practice model (figure 1) since it is focused around evaluation as activity. Evaluation is a practice and as such it is a temporary practice. A practice of evaluation is enacted when some people decide that more knowledge is required concerning some object. Evaluation is conceived as a purposeful study of some evaluation object (evaluand) comprising 1) the generation of data of and from this object, 2) the selection and formulation of appropriate criteria to be used as yardsticks and 3) the matching of data and criteria in order to formulate evaluative statements and conclusions about the evaluation object. The results from evaluation can be used in different utilisation activities.
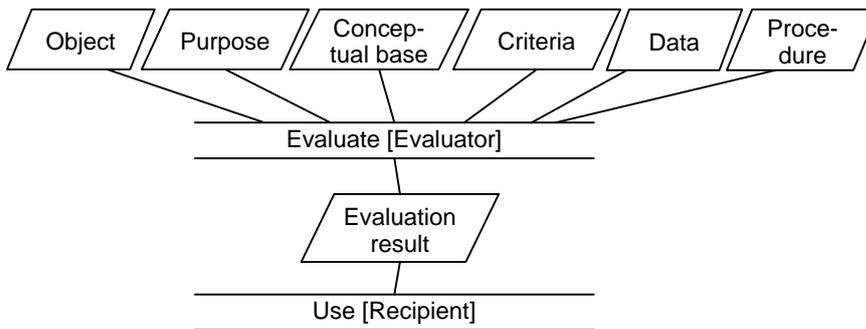

Figure 1.   A conceptual practice model of evaluation

The conceptual practice evaluation model (CPME) comprises six principal types of input to the evaluation process. There must be something to inquire: an identified evaluation object. When we talk about an evaluation object this may comprise both entities/artefacts, human subjects and activities/practices. The notion of evaluation object should not be misinterpreted as just objectified and stable elements of the world. It should neither be misinterpreted as something pre-fixed and given before the planning and conduct of the evaluation. Reflection, articulation and demarcation of what should be the evaluation object is a primary task in the planning process. The evaluation object is *what* you study and state something *about* through the evaluation. The general aim of evaluations is to produce some knowledge about evaluation objects. There is some cognitive interest concerning the evaluation object. Often evaluation purposes should be seen as practical-cognitive interests; i.e. the demanded knowledge is intended to be useful for certain practical reasons. The evaluation can for example be part of a practical interest to make some informed improvements of the evaluation object. An evaluation purpose comprises a statement concerning intended possible uses of the evaluation results. The articulation of an evaluation object should be accompanied by clarifying the character of the evaluation object. What kinds of phenomena comprise the evaluation object? Ontological assumptions concerning the evaluation object and its context are stated in a conceptual base for the evaluation. This conceptual base functions as a pre-understanding when entering into the evaluation activity.

To evaluate is to state some value. The evaluator (seen as a generic role) formulates some knowledge about the evaluation object by assigning some value to it. The value does not only come from the

6

object itself. It arises from an assessment of the object by the use of some standard; or what is called criteria in the conceptual model. The criteria are thus used in order to formulate evaluative statements. As seen from section 2, criteria do not initially need to be stated explicitly. They might continually emerge in the evaluation process. The case of goal-free evaluation comprises an intentional avoidance of pre-defined criteria. Instead, implicit use-values direct the evaluation process. An evaluation must be based on data of the evaluation object. Such data can be generated in many different ways and can be of diverse kinds. Evaluation is conducted according to some procedure; planned in advance and emergent during the process. From an evaluation-theoretic perspective no kind of data (e.g. quantitative vs. qualitative) should be given preference a priori. The character of the evaluation object, the purpose of the evaluation and the type of criteria used direct the types of data required.

These six types of input can partly exist before the evaluation activity and partly be modified and generated during the evaluation process. There should exist a stated and demarcated evaluation object before the evaluation process. An evaluation purpose should also be stated in advance. However, the evaluation process can through emergent insights give rise to modifications in both object and purpose. This can also be the case with pre-stated conceptual base, criteria and procedure. New insights from the evaluation process can engender such modifications or additions. One main part of the evaluation process is to generate appropriate data about the evaluation object. There might of course exist some data (e.g. archival data) before the evaluation starts.

From this evaluation model a number of fundamental evaluation design questions can be stated. There are questions about artefacts, actors and activities in order to design a proper evaluation:

- What should be evaluated? What should we say something about? (the evaluation object)
- Why should this evaluation be conducted? For what reasons do we evaluate? What do we aim for? How should the evaluation results be used? (the purpose and intended uses)
- What are the characters of the evaluation object and its context? How should we define the conceptual base for the evaluation? (ontological assumptions and definitions)
- With what shall we evaluate? What are the evaluation grounds? (the criteria)
- How shall we select and formulate evaluation criteria? (the generation of criteria)
- From whom shall we gather criteria? (the originators of criteria)
- Of what shall we evaluate? What kind of knowledge about the evaluation object shall be generated? (data about the evaluation object)
- How shall data be collected or generated in other ways? (the generation of data)
- From whom shall we generate data? (the originators of data)
- Who should conduct and participate in the evaluation process? (the evaluators)
- What kind of activities shall be conducted in the evaluation? (the evaluation procedure)
- How should the evaluation result be structured and presented? (the evaluation result)
- To whom should we address the evaluation? (the evaluation recipients)

The six inputs to evaluation (in CPME) are necessary in order to conduct an evaluation. There might of course be other types of input as well. The model should not be interpreted as a way to disregard certain aspects from the evaluation process. It is also important to note that are other inputs necessary for the preparation and design of evaluation. In order to state purposes, to select type of criteria, to specify types of data needed, to design ways of generation of data and to decide on ways for stakeholders to interact during and after the evaluation process, it is necessary to ground these decisions in foundational assumptions and positions. These decisions need to be founded in paradigmatic assumptions of ontological, epistemological, methodological and ethical characters (Lagsten and Karlsson, 2006).

The main purpose of the presented conceptual practice model of evaluation in this paper is to clarify what is meant by evaluation. We will below in next section present a classification model of different roles of evaluation in IS research. It was not possible to perform an informed analysis and structuration of different evaluation types in IS research without a clear view of what evaluation is. In this way CPME has been instrumental for the generation and grounding of the classification model.

However, we consider CPME to have a value that goes beyond simply being instrumental for the classification model. It can be used as an instrument for planning and structuring evaluation activities. This is further commented in section 6 below.

5 Different roles of evaluation in IS research

In section 1 and 3 above we have presented overviews of evaluation in IS research. One main conclusion from this review is a rather diversified and fragmented research landscape. A main purpose of this paper is to bring more structure to this diversification, however not restricting a needed diversification. In this section we present a classification of different roles of evaluation in IS research. This classification is based on the research overview (in section 3), which then function as generative data for this formulation of a classification. The conceptual model of evaluation (from section 4 above) has several influences in this classificatory formulation. Mainly it is a way to demarcate evaluation, but the CPME model can also be used as a guide for the different evaluation roles (table 3). Five types (roles) of evaluation research in IS have been identified. Evaluation plays varying roles in these different research types. Fundamental in the classification is if evaluation is considered as a *research object* or a *research means*.

5.1 Evaluation as research object

Evaluation can be a *research object* in IS research. This means that scholars want to develop knowledge *about* how *evaluation* is conducted or can/should be conducted in practice. This means research about evaluation. The research object is evaluation in a broad sense in IS practice. This type of study can comprise strategies, models, methods, criteria and metrics for evaluation and politics and motives for evaluation. It also comprises the process of evaluation including its planning/preparation, actors in and affected by evaluation, evaluation results (structure, contents) and the different uses and impact of evaluation. A main interest in this type of research is how to evaluate information systems, but many other types of evaluation objects can occur in IS practice; e.g. IS management practices, IS development practices, IT service practices, different strategies and methods for these different types of practices. In summary: It is research about evaluation on some IS related phenomena.

Research on evaluation can be conducted with a pure cognitive interest aiming for a better understanding of how evaluation is performed in practice. This is to state something *about* evaluation. Research on evaluation can also be conducted with an aim of improving evaluation practices. This can include the development of frameworks, methods and criteria. This is not only to state something about evaluation practices (as a cognitive interest), but also to state something *for* evaluation practices (as an integrated cognitive-practical interest); see Goldkuhl (2012) for a discussion on this different types of knowledge interests founded in interpretivism and pragmatism.

5.2 Evaluation as research means

Evaluation is also a *research means* in IS. The meaning of this is that the research is conducted *through evaluation*. Evaluation is the means to create knowledge. The scientific study of some IS phenomena is done through evaluations. Three different alternatives have been identified that are described below.

The first alternative is *research through evaluation as main strategy*. This means that evaluation is the chosen/designed main strategy for data collection and data analysis. The main way to characterise the chosen research approach is that it is an evaluation study. The second alternative is *research through evaluation as companion strategy*. This means that evaluation is conducted but it is part of some other research strategy (e.g. action research, design research, case study). Evaluation is thus one part in a broader overall strategy and the conducted evaluation has the role (as a means) to produce knowledge

of some part of the studied phenomena. This evaluative knowledge can be used as input to other research activities. Evaluation has in DSR the function of creating knowledge about the designed artefact. Evaluation can in AR be used in initial problem diagnosis and in assessment of implemented changes. The third alternative is *research through evaluation as re-use strategy.* This means a scientific re-use of evaluations already conducted for other purposes. Knowledge that is created through an evaluation can be re-used for research purposes if the evaluation is conducted in a proper way. This is a situation where researchers or other inquirers conduct evaluations based on assignments from some stakeholders and the evaluation process and its results are considered valid also for research purposes. What was learnt from the evaluation constitute data for further analysis, abstraction and conclusion.

5.3   Evaluation research as research object

Evaluation research in IS can thus be conducted in different ways. Four types of evaluation research have been identified above. It is possible to conduct research on these types of research, i.e. *research about evaluation research.* This means knowledge created about evaluation research in IS; as the study of one or more of these different types of evaluation research in IS. This kind of research can comprise the study of different strategies and methods for evaluation research in IS. If this type of research is conducted in an evaluative fashion, it can be labelled meta-evaluation. This type of research belongs to research methodology studies within IS.

5.4   Five types in a classification

From the diversified evaluation research landscape in IS (cf. section 3 above) three main research types have been identified above: 1) research about evaluation, 2) research through evaluation and 3) research about evaluation research. The second research type has been divided into three sub-classes: 2a) research through evaluation as main strategy, 2b) research through evaluation as companion strategy and 2c) research through evaluation as re-use strategy. These five research types have been further characterised in table 2 and 3 below. In table 2 characterisations are made to research object, research purpose and research process. The characterisations of the research processes are done in relation to the inclusion of evaluation as some part of them.

Research type	Research object	Purpose	Research process
1. Research about evaluation	Evaluation in IS practice	More knowledge about evaluation practices	Not necessarily evaluation
2a. Research through evaluation as main strategy	Any relevant IS phenomena	More knowledge about the studied IS phenomena	Evaluation
2b. Research through evaluation as companion strategy	Any relevant IS phenomena	Evaluative knowledge as a means to create knowledge about some IS phenomena	Evaluation as a supportive strategy conducted in concert with other approaches
2c. Research through evaluation as re-use strategy	Any IS phenomena studied through evaluation	Primary purpose in evaluation is to create practical evaluative knowledge for some stakeholders; Research purpose is to create knowledge based on conducted evaluation	Evaluation and evaluation re-use
3. Research about evaluation research	Evaluation research in IS	To create knowledge about a set of research approaches in IS	Meta-evaluation or not necessarily evaluation

Table 2.   Different roles of evaluation in IS research (1)

In table 3 the research interest is contrasted to the evaluation interest. The use of a generic evaluation model (as e.g. CPME) is described. In table 3 examples are given with references to works that apply the different research types.

Research type	Research interest vs. evaluation interest	Use of CPME	Examples
1. Research about evaluation	Research interest on practical evaluations including their interests	A guide to structure the research object	Nielsen (1993); Jayaratna (1994); Avgerou (1995); Barrow and Mayhew (2000); Serafeimidis and Smithson (2000); Jones and Hughes (2001); Cronholm and Goldkuhl (2003); Lagsten and Goldkuhl (2008)
2a. Research through evaluation as main strategy	Research and evaluation interests coincide	A guide to structure the research process	Lee and Lai (1992); Bussen and Myers (1997); Melin and Axelsson (2009)
2b. Research through evaluation as companion strategy	Evaluation interest part of research interest	A guide to structure part of the research process	Lindgren et al. (2004); Lee et al. (2008)
2c. Research through evaluation as re-use strategy	a) A practical evaluation interest, b) a research interest based on practical evaluation and its interest	A guide to structure the evaluation process and to structure the research process through evaluation re-use	Barnes and Vidgen (2003); Goldkuhl (2009)
3. Research about evaluation research	Research interest on evaluation research approaches and their interests (research and/or practical interests)	A guide to structure the research object and possibly also to structure the research process	Hirschheim and Smithson (1999); Farbey et al. (1999b); Hartson et al. (2001); Introna and Whittaker (2002); DeLone and McLean (2003); Lagsten and Karlsson (2006); Venable et al. (2012)

Table 3   Different roles of evaluation in IS research (2)

6   Conclusions

This paper has contributed with a conceptualisation of evaluation in IS research. This conceptualisation consists of two parts: a conceptual practice model of evaluation and a classification of research types concerning evaluation in IS research. This conceptualisation is a response to an identified diversification and fragmentation of IS evaluation research. The purpose has been to bring more structure and order concerning the roles of evaluation in IS research. Both the conceptual practice model and the classification provide conceptual clarity of the evaluation concept and comprehensiveness of the use of evaluation in IS research. These two knowledge contributions should improve the awareness among IS scholars of roles of evaluation in IS research and fundamental prerequisites for conducting evaluation and/or evaluation research. We think that these structures can assist scholars in achieving rigor and relevance when planning and performing evaluations and research containing an evaluation component.

We still need to develop better principles for what qualities that guides evaluations in our field, what quality criteria distinguish a rigorous evaluation is an important question and in this matter we should learn from evaluation theory. Different models of evaluation adhere to different sets of quality standards rooted in the epistemology of the evaluation model and the methods used. This is a question that will be elaborated in future research.

Based on the review of literature on IS evaluation research (section 3) three main types of IS evaluation research has been stated. One of the research types (evaluation as research means) has been divided into three sub-classes, which has resulted in five research types as total. These research types can be considered to be ideal-types. In a practical research setting it might be possible to combine research types. For example, a comparative study of different methods for IS evaluation (research object) can be performed through an evaluation with the use of different criteria (research means). This means a combination of 1 and 2a. Another example is an action research study, where the initial diagnosis of problems has showed to be interesting besides the primary intervention study. The results from the problem diagnosis (an evaluation) are re-used in a particular study. This means a combination of 2b and 2c. The third research type (research about evaluation research) can concern one or several of the other research types. Venable et al. (2012) studies different approaches to evaluation in DSR, which is an example of 3/2b. This paper is an example of a study of all types (3/1-3). It is in itself an example of type 3.

We have presented a fairly simple model of evaluation in this paper (CPME). This model is accompanied with a set of design questions. This model and its generic questions can guide the IS scholar to structure the research process (if an evaluative approach is applied) or to pre-structure the study object (if it is a study of evaluation in practice). This model is of course influenced by the study of IS research on/through evaluation (section 3), but more important, it is influenced by the general body of knowledge concerning evaluation (section 2). We have learnt a lot from studying these sources and we advice IS scholars to scrutinize and obtain inspiration from them as well. Our claim is that the general area of evaluation should be considered a reference discipline to IS. However, we also follow the ideas of Baskerville and Myers (2002) that IS is sufficiently mature to function as a reference discipline for other disciplines as well. The kind of research presented in this paper should be seen as one such example. The CPME model and the research type classification can be exposed to other disciplines as a way to structure evaluation research in many disciplines. Future research should find ways to establish dialogues with other disciplines on evaluation research and its various types.

References

Alkin, M. and Christie, C. (2004). An Evaluation Theory Tree. In Evaluation Roots - Tracing Theorists' Views and Influences (M. Alkin). Thousand Oaks, Sage.

Avgerou, C. (1995). Evaluating Information Systems by Consultation and Negotiation. International Journal of Information Management, 15 (6), 427-436.

Barnes, S. and Vidgen, R. (2003). Interactive E-Government: Evaluating the Web Site of the UK Inland Revenue, Journal of Electronic Commerce in Organizations, 2 (1).

Barrow, P. D. M. and Mayhew, P. J. (2000). Investigating principles of stakeholder evaluation in a modern IS development approach. The Journal of Systems and Software, 52, 95-103.

Baskerville, R. and Myers, M. (2002). Information systems as a reference discipline, MIS Quarterly, 26 (1), 1-14.

Baskerville, R. and Myers, M. (2004). Special issue on action research in information systems: making IS research relevant to practice – foreword, MIS Quarterly, 28 (3), 329-335.

Baskerville, R. and Pries-Heje, J. (1999). Grounded action research: a method for understanding IT in practice. Accounting Management & Information Technology, 9, 1-23.

Berghout, E. W. and Remenyi, D. (2005). The Eleven Years of European Conference on IT Evaluation: Retrospectives and perspectives for possible future research. The Electronic Journal of Information Systems Evaluation, 8 (2), 81-98.

Brynjolfsson, E. (1993). The Productivity Paradox of Information Technology. Communications of the ACM, 36 (12), 67-77.

Bussen, W. and Myers, M. (1997). Executive information system failure: a New Zealand case study, Journal of Information Technology, 12, 145-153

Carlsson, S. A. (2003). Advancing Information Systems Evaluation (Research): A Critical Realist Approach. European Conference on Information Technology Evaluation (ECITE-2003), Madrid.

Cronholm, S. and Goldkuhl, G. (2003). Strategies for Information Systems Evaluation – Six Generic Types, Electronic Journal of Information Systems Evaluation, 6 (2)

Cronholm, S. and Vince, B. (2009). Usability of IT-systems is more than interaction quality - the need of communication and business process criteria. 17th European Conference on Information Systems, Verona.

Davison, R. M., M. G. Martinsons and Kock, N. (2004). Principles of canonical action research. Information Systems Journal, 14, 65-68.

DeLone, W. and McLean, E. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. Journal of Management Information Systems, 19 (4), 9-30.

Farbey, B., Land, F. and Targett, D. (1999a). The moving staircase. Problems of appraisal and evaluation in a turbulent environment. Information Technology & People, 12 (3), 238-252.

Farbey, B., Land, F. and Targett D. (1999b). Moving IS evaluation forward: learning themes and research issues. Journal of Strategic Information Systems, 8, 189-207.

Farbey, B., Targett, D. and Land, F. (1992). Evaluating investments in IT. Journal of Information Technology, 7, 109-122.

Goldkuhl, G. (2009). Socio-instrumental service modelling: An inquiry on e-services for tax declarations, In PoEM 2009, LNBIP 39 (Persson, A., Stirna, J. Eds.), pp. 207–221, Springer, Berlin

Goldkuhl G (2012) Pragmatism vs. interpretivism in qualitative information systems research, European Journal of Information Systems, Vol 21 (2), p 135-146

Guba, E. G. and Lincoln, Y. (2001). Guidelines and Checklist for Constuctivist (a.k.a. Fourth Generation) Evaluation. Retrieved 2003-02-06, from www.wmich.edu/evalctr/checklists.

Hartson, R., Andre, T. and Williges, R. (2001). Criteria for evaluating usability evaluation methods, International Journal of Human–Computer Interaction, 13 (4), 373–410

Hevner, A., March, S., Park, J. and Ram S (2004). Design science in information systems research. MIS Quarterly, 28 (1), 75-105.

Hirschheim, R. and Smithson, S. (1999). Evaluation of Information Systems: a Critical Assessment. In Beyond the IT Productivity Paradox. (Willcocks and Lester, Eds.). Chichester, John Wiley & Sons.

House, E. R. (1980). Evaluating with Validity. Beverly Hills, SAGE.

Iivari, J. and Venable J. (2009). Action Research and Design Science Research – Seemingly similar but decisively dissimilar. In Proceedings of the 17th European Conference on Information Systems

Introna, L. D. and Whittaker, L. (2002). The phenomenology of information systems evaluation: Overcoming the subject/object dualism. In Global and Organizational Discourse about Information Technology, IFIP TC8/ WG 8.2, Barcelona.

Irani, Z., Sharif, A. M. and Love P. E. D. (2005). Linking knowledge transformation to Information Systems Evaluation. European Journal of Information Systems, 14, 213-228.

Jayaratna, N. (1994). Understanding and Evaluating Methodologies: NIMSAD - A Systemic Framework. Berkshire, McGraw-Hill.

Jokela, P., Karlsudd, P. and Östlund M. (2008). Theory, Method and Tools for Evaluation Using a Systems-based approach. The Electronic Journal of Information Systems Evaluation, 11 (3), 197-212.

Jones, S. and Hughes, J. (2001). Understanding IS evaluation as a complex social process: a case study of a UK local authority. European Journal of Information Systems, 10, 189-203.

Klecun, E. and Cornford, T. (2005). A Critical Approach to Evaluation. European Journal of Information Systems, 14, 229-243.

Lagsten, J. and Goldkuhl G. (2008). Interpretive IS Evaluation: Results and Uses. Electronic Journal of Information Systems Evaluation, 11 (2), 97-108.

Lagsten, J., and Karlsson, F. (2006). Multiparadigm analysis – clarity of information systems evaluation, In Proceedings of 13th European Conference on Information Technology Evaluation, University of Genoa, MCIL.

Lee, J. and Lai, K-Y. (1992). A comparative analysis of Design Rationale representations, Working paper #84-92, Massachusetts Institute of Technology, Cambridge.

Lee, J., Wyner, G. and Pentland, B. (2008). Process grammar as a tool for business process design, MIS Quarterly, 32 (4), 757-778.

Lindgren, R., Henfridsson, O. and Schultze, U. (2004). Design principles for competence management systems: a synthesis of an action research study, MIS Quarterly, 28 (3), 435-472

Lubbe S and Remenyi D (1999) Management of Information Technology - the Development of a Managerial Thesis, Logistics Information Management, Vol 12 (1/2),pp 145-156

March, S. and Smith, G. (1995). Design and natural science research on information technology. Decision Support systems, 15, 251-266.

Melin, U. and Axelsson, K. (2009). Managing e-service development – comparing two e-government case studies, Transforming Government: People, Process and Policy, 3 (3), 248-270.

Nielsen, J. (1993). Usability Engineering, Academic Press, London.

Serafeimidis, V. and Smithson, S. (2000). Information systems evaluation in practice: A case study of organizational change. Journal of Information Technology, 15, 93-105.

Shneiderman, B. (1998). Designing the User Interface, Addison-Wesley.

Siau, K. and Rossi M. (2011). Evaluation techniques for systems analysis and design modelling methods – a review and comparative analysis, Information Systems Journal, 21, 249–268

Stockdale, R. and Standing C. (2006). An interpretive approach to evaluating information systems. European journal of operational research, 173, 1090-1102.

Stufflebeam, D. (2001). Evaluation Models. New Directions for Evaluation, 89, 7-98.

Susman, G. and Evered, R. (1978). An assessment of the Scientific Merits of Action Research. Administrative Science Quarterly, 23(4), 582-603.

Symons, V. (1991). A review of information systems evaluation: content, context, process. European Journal of Information Systems, 1 (3), 205-212.

Symons, V. and Walsham G. (1988). The evaluation of information systems: a critique. Journal of Applied Systems Analysis, 15.

Walsham, G. (1999). Interpretive Evaluation Design for Information Systems. In Beyond the IT Productivity Paradox. (Willcocks and Lester, Eds.). Chichester, John Wiley & Sons.

Vedung, E. (2010). Four Waves of Evaluation Diffusion. Evaluation, 16 (3), 263-277.

Venable J, Pries-Heje J, Baskerville R (2012) A Comprehensive Framework for Evaluation in Design Science Research, in Peffers K, Rothenberger M, and Kuechler B (Eds. 2012) DESRIST 2012, LNCS 7286, pp. 423–438, Springer-Verlag, Berlin

Venkatesh, V. and Davies, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46 (2), 186-204.

Willcocks, L. (1992). Evaluating Information Technology investments: research findings and reappraisal. Journal of Information Systems, 2, 243-268.

Wilson, M. and D. Howcroft (2005). Power, politics and persuasion in IS evaluation: a focus on 'relevant social groups', Journal of Strategic Information Systems, 14 (1), 17-43.