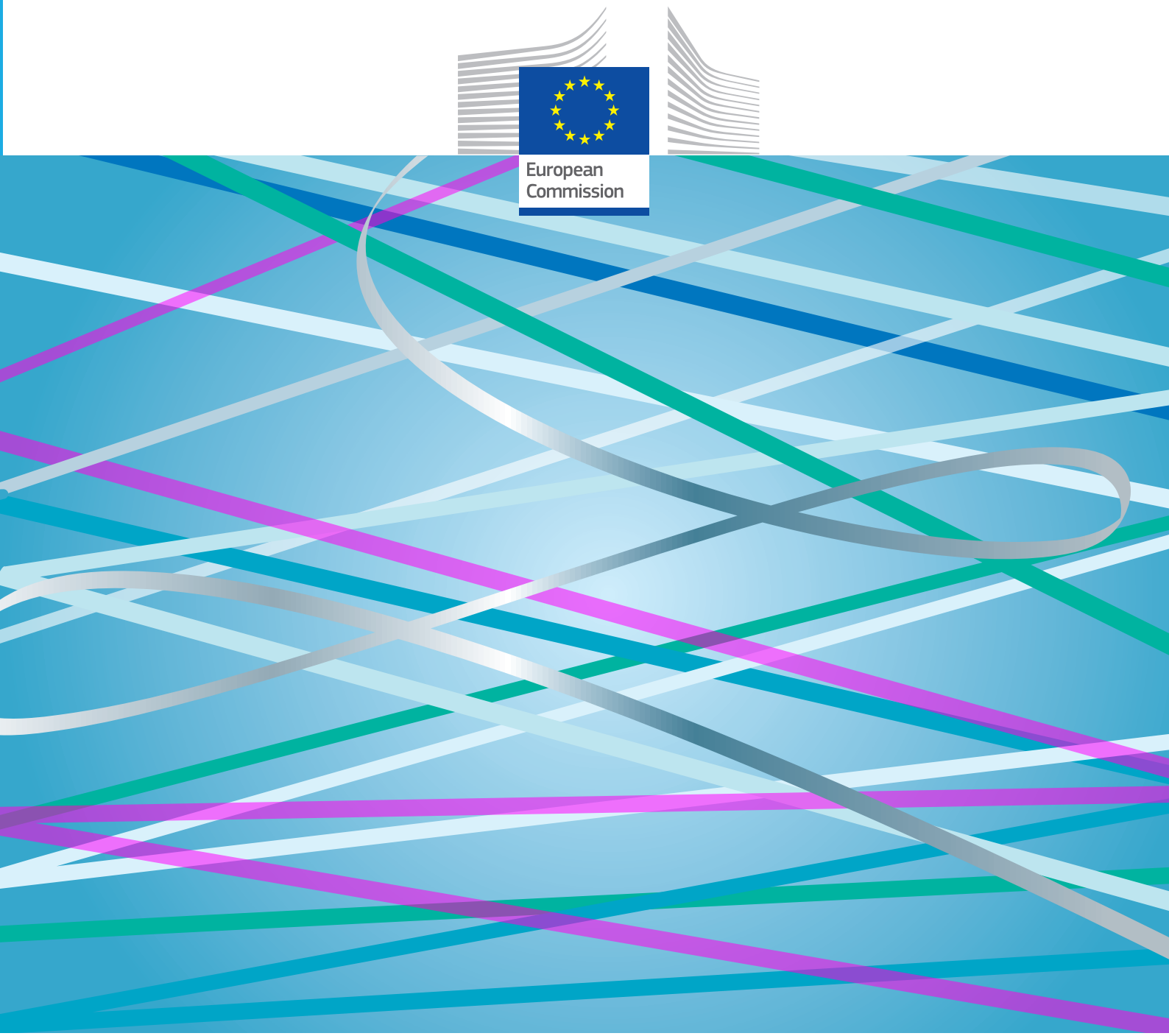

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3.5 The application of Open Innovation 2.0, engaged scholarship and design science research in the Innovation Value Institute

Introduction

The discipline of information systems (IS) has been considered to have certain failings in its effort to impact on practice [1]. Additionally, Sambamurthy and Zmud noted that there is a growing gap between scholarly research and the need for practitioners [2]. There have been numerous research studies identifying failures in IS in its attempts to achieve desired outcomes and disappointments in assessments of return on investment [3] [4]. The analyses in these studies often yield recommendations that operate at a high level of abstraction and lack the detail and specificity to lead to action-oriented solutions. Such findings, while offered in a constructive spirit of helpfulness and concern for continuous improvement, do little to advance either (i) the capability of practitioners to achieve their goals or (ii) the theoretical knowledge underpinning information system academic research. One of the requirements for a more helpful approach is a more systematic approach with greater sensitivity to the contextual complexity of the organisational problem-solving environment where IS practitioners work.

The development of the IT-CMF (the Information Technology Capability Maturity Framework) [5] [6] [7] is a response to the need for a more systematic, comprehensive approach to managing IT in a manner that meets the requirements of practicing IT professionals. In this paper, an overview of the rationale for the IT-CMF will be provided and, in particular, some of the guiding principles for its design and development will be presented.

This research is being undertaken by the Innovation Value Institute (http://www.ivi.ie) applying the principles of engaged scholarship [8] [9], Design Science Research (DSR) [10] and Open Innovation 2.0 [11]. IT Management is being investigated using a design process with defined review stages and development activities based on the DSR guidelines advocated by Hevner et al. [10]. During the design process, researchers participate together with practitioners and subject matter experts within research teams to capture the working knowledge, practices and views of key domain experts.

Engaged scholarship

Van de Ven describes engaged scholarship as a participative form of research for obtaining the views of key stakeholders to understand a complex problem. By exploiting differences between these viewpoints, he argues that engaged scholarship produces knowledge that is more penetrating and insightful than when researchers work alone. Engaged scholarship has a number of facets: a form of inquiry where researchers involve others and leverage their different perspectives to learn about a problem domain; a relationship involving negotiation, mutual respect, and collaboration to produce a learning community; and an identity of how scholars view their relationships with their communities and their subject matter. In Van de Ven's view, you can increase the likelihood of advancing knowledge for science and practice by engaging with practitioners and other stakeholders in four steps:

- ground problem/question in reality up close and from afar;
- develop alternative theories to address the question;
- collect evidence to compare models of theories; and
- communicate and apply findings to address the problem/question.

Van de Ven's conceptualisation of engaged scholarship [8, pp.10–1] has four stages in an engaged scholarship project. The stages can happen in any sequence.

1. Problem formulation — situate, ground, diagnose, and infer the research problem by determining who, what, where, when, why, and how the problem exists up close and from afar.
2. Theory building — create, elaborate, and justify a theory by abductive, deductive, and inductive reasoning.
3. Research design — develop a variance or process model for empirically examining the alternative theories.
4. Problem-solving — communicate, interpret, and apply the empirical findings on which alternative models better answer the research question about the problem.

Mathiessan and Nielsen [9] see engaged scholarship as an opportunity to address key challenges within the IS discipline in a novel and constructive way. They applied the principles of engaged scholarship to analyse Scandinavian IS research through the lens of the *Scandinavian Journal of Information Systems* (SJIS). After reviewing all the research papers published in SJIS over the past 20 years, they advocated a role for engaged scholarship in shaping the future of Scandinavian IS research and IS research and practice in general.

Figure 1 shows Van de Ven's four forms of engaged scholarship.

1. Informed basic research is undertaken to describe, explain, or predict social phenomenon.
2. Collaborative basic research entails a greater sharing of power and activities among researchers and stakeholders than informed research.
3. Design and evaluation research is undertaken to examine normative questions dealing with the design and evaluation of policies, programmes, or models for solving practical problems of a profession in question.
4. Action/intervention research takes a clinical intervention approach to diagnose and treat a problem for a specific client.

In particular, it is noteworthy that Van de Ven locates design science research within the scope of engaged scholarship [8, p. 27].

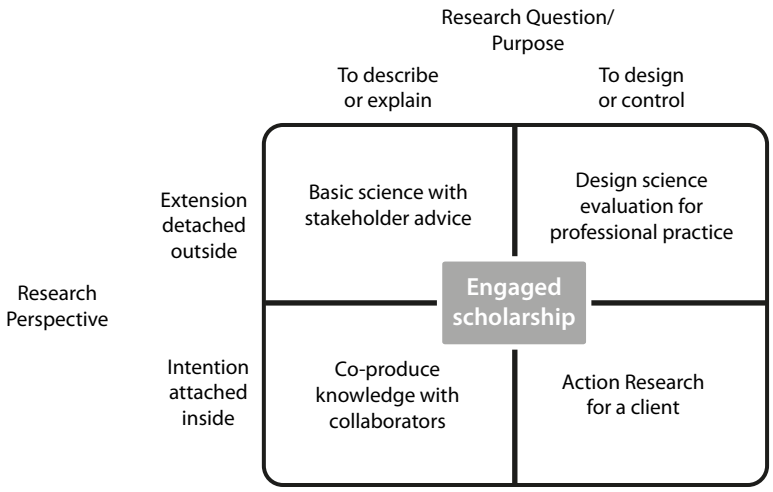
The application of design science research in the IT-CMF

Design science research can be considered as a type of Mode 2 knowledge creation [12] where knowledge is co-created in an area which is interdisciplinary, problem-focused and context-sensitive. This is typically knowledge generated by practitioners dealing with real problems in a real context as distinct from knowledge which is generated from traditional research (called Mode 1) which is academic and based within a particular discipline [13]. In developments in other social science fields such as management research, the relevance problem has been highlighted [14]. Van Aken proposed increasing the use of Mode 2 knowledge production in management research to increase the relevance and utility of the research. Additionally, Van Aken advocated a focus on output which is field tested and grounded [14].

Ilvari and Venable [15] define DSR as a research activity that invents or builds new, innovative artefacts for solving problems or achieving improvements, that is DSR creates new means for achieving some general (unsituated) goal, as its major research contributions. Such new and innovative artefacts create new reality, rather than explaining existing reality or helping to make sense of it [15]. It has been argued that while design science, or design theory, was discussed over 50 years ago by Simon [16], and further developed in the mid 1990s [17] and in the new millennium [18], it was Hevner et al.'s publication [10] that propelled design science out of its niche into the mainstream of the IS research community [19]. The central thrust of Hevner's approach was that design science research attempts to create and evaluate IT artefacts intended to solve identified relevant organisational problems and he went on to propose a set of problem-solving guidelines where the understanding of a design problem and its solution are acquired in the building and application of an artefact.

Developing innovative artefacts is a central activity in DSR [20]. Such artefacts can be in the form of constructs, models, methods or instantiations [20]. For the construction of such artefacts, two basic activities can be differentiated: build and evaluate where building 'is the process of constructing an artefact for a specific purpose' and evaluation 'is the process of determining how well the artefact performs' [20, p. 254]. The construction of an artefact is a heuristic search process [20]. Within this process, an extensive use of theoretical contributions and research methodologies stored in

Figure 1. Forms of engaged scholarship [8, p. 10–11]



the knowledge base should be made [10]. On the one hand, theoretical contributions can come from governance, value-based management, risk management, compliance management, etc., to build an artefact, that is the situational method. The IT-CMF uses the following DSR patterns proposed in [20].

- *Different perspectives:* The research problem is examined from different perspectives, for example conceptual, strategic, organisational, technical and cultural.
- *Interdisciplinary solution extrapolation:* A solution or solution approach (i.e. methods, instructions, guidelines, etc.) to a problem in one discipline can be applied in or adapted to the integrated IT CMF.
- *Building blocks:* The complex research problem of IT Management is broken into 33 critical competencies that are examined in turn.
- *Combining partial solutions:* The partial solutions from the building blocks are integrated into the overall IT CMF and the interdependencies between the building blocks are identified and highlighted. In order to rigorously demonstrate the utility of the developed artefact, different evaluation methods can be used. Amongst others, the 'informed argument' is suggested as an appropriate evaluation method [20].

Maturity models in design-oriented research are regarded as being located between models and methods in the form of state descriptions (e.g. the maturity levels) and guidelines [20]. In this sense, maturity models contain two aspects, one capturing the assessment of the current status and another guiding organisations towards higher maturity levels. In the context of design science research the first aspect can be described as a model perspective describing various maturity levels (states) of organisations whereas the second aspect describes guidelines to improve the current situation of organisations in form of method components [21]. In order to transform organisations from one maturity level to another, usually the method component is described by 'maturity curves' or 'maturity profiles'.

Open Innovation 2.0

A key goal of the development of the IT-CMF was to enable a structural change in the way companies and organisations get value from IT. A key assumption in developing the IT-CMF was that a 360 degree view of the issue and knowledge/practices used in contemporary IT management practice was necessary. Accordingly, a research community which transcended academic research and even the concept of engaged scholarship was established and nurtured to provide comprehensive views, knowledge and practices. Thus a new research ecosystem was established involving members from six different communities: technology providers, public sector IT executives, enterprise IT executives, analysts, IT professional organisations and academics. This form of research ecosystem activity is a form of Open Innovation 2.0 [11] where all the actors in an ecosystem are involved in the research and innovation activity. This is an extension of the open innovation activity defined by Chesbrough [22] which refers to capitalising on the inflows and outflows of ideas to and from a company.

Mobilising an entire ecosystem using an open innovation approach combined with engaged scholarship and design science research resulted in the development of a new set of artefacts and design patterns that are being adopted by a broad set of IT executives and organisations. The increasing adoption of the artefacts are perhaps the strongest validation of the utility and effectiveness of the approach.

Conclusion

This paper has described the development of the IT-CMF [5] [6] [7] as a response to the need for a more systematic, comprehensive approach to managing IT in a manner that meets the requirements of practicing IT professionals. A short rationale for the IT-CMF was provided and, in particular, some of the guiding principles for it design and development were presented.

The Innovation Value Institute (http:/www.ivi.ie) is applying and extending the principles of engaged scholarship [8] [9], Design Science Research (DSR) [14] and Open Innovation 2.0 [11] to create a new research ecosystem involving members from six different communities — technology providers, public sector IT executives, enterprise IT executives, analysts, IT professional organisations and academics. The validation of the utility and effectiveness of the approach can be seen through the early significant adoption of IT-CMF.

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