

CEIR REPORT

No. 01/2025

DFG Project No 285717372

Final Report

**A Sociotechnical Framework for ECS
Benefits Realisation (BECS)**

Center for Enterprise Information Research (CEIR)

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FINAL REPORT INDIVIDUAL GRANTS PROGRAMME

1 General Information

DFG reference number: WI 4661/1-(1-3)/SCHU 2572/3-(1-3)

Project number: 285717372

Project title: A Sociotechnical Framework for ECS Benefits Realisation
(Benefits of Enterprise Collaboration Systems – BECS)

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Name(s) of the cooperation partners: n/a

Reporting period (entire funding period):

2 Summary

English: The BECS project investigates the benefits arising from the adoption and use of Enterprise Collaboration Systems (ECS). ECS are large-scale collaboration technology infrastructures that provide the software functionality to enable workgroups to organise online team meetings, to create and share information, to coordinate workflows and to collaborate on joint projects, regardless of the location and timing of work activities. When ECS are introduced into organisations there are initial expectations about what can be gained from the system, e.g. improved collaboration, improved communication across silos, etc. Over time, as users gain experience using the system, ideas about what can be achieved change and the ECS become embedded into organisational work practices. However, identifying and understanding the expected benefits of ECS, how they evolve over time, and how they contribute to organisational performance is challenging due to a lack of suitable methods and tools to describe (profile), measure and monitor ECS benefits. The BECS project addresses this challenge; the primary focus is on identifying, measuring and monitoring the benefits that arise from ECS implementation and use over time. Through the development of in-depth longitudinal case studies of

ECS adoption in leading organisations in the DACH region and empirical analyses of collaboration system use, the research: i) developed practical tools and methods for the measurement of ECS benefits and benefits profiling; ii) provides greater insights into how benefits management is experienced and constituted in practice; and iii) developed a novel and integrated framework that assists researchers and practitioners to coordinate their efforts in developing, implementing and evaluating ECS benefits. The project delivered both practical and theoretical outcomes. The methods and tools developed in the BECS project have been applied in organisations and delivered useful and useable results enabling organisations to understand and monitor the evolving benefits of their ECS. Following the COVID-19 pandemic, this work became of even greater importance as new uses of ECS emerged when organisations adopted large-scale support for hybrid and remote working initiatives. The research findings also provide key theoretical concepts and analytical methods, including the MoBeC framework, Social Collaboration Analytics and Benefits Scorecards. These provide the foundation for subsequent research projects to examine transformation to digital work and the development of a new stream of research into trace analysis and collaboration analytics more broadly.

Deutsch: Fokus der Untersuchungen im BECS-Projekt ist der Nutzen (Benefit), der sich aus der Einführung und Nutzung von Enterprise Collaboration Systems (ECS) ergeben. ECS sind Infrastrukturen für die *digitale* Unterstützung der Zusammenarbeit. Sie stellen die notwendige Softwarefunktionalität bereit, die es Arbeitsgruppen ermöglicht, Teambesprechungen zu organisieren, Informationen auszutauschen, Arbeitsabläufe zu koordinieren und an gemeinsamen Projekten zu arbeiten – unabhängig von Ort und Zeitpunkt der Arbeitsaktivität. Wenn ECS in Organisationen eingeführt werden, gibt es zunächst Erwartungen darüber, was durch das System erreicht werden kann, z. B. verbesserte Zusammenarbeit oder verbesserte Kommunikation über Silos hinweg. Mit der Zeit, wenn Benutzer Erfahrungen mit dem System sammeln, ändern sich die Vorstellungen darüber, was erreicht werden kann, und die ECS werden in die Arbeitspraktiken der Organisation integriert. Die Identifizierung und das Verständnis des erwarteten Nutzens von ECS, ihrer Entwicklung über die Zeit und ihres Beitrags zur Unternehmensleistung ist jedoch schwierig, da geeignete Methoden und Werkzeuge fehlen, um die Vorteile von ECS zu beschreiben (Profilierung), zu messen und zu überwachen. Das BECS-Projekt befasst sich mit dieser Herausforderung; der Schwerpunkt liegt auf der Identifizierung, Messung und Überwachung des Nutzens, der sich im Laufe der Zeit aus der Implementierung und Nutzung von ECS ergeben. Mit Hilfe von Längsschnittfallstudien zur Einführung von ECS in führenden Organisationen in der DACH-Region und empirischen Analysen der Nutzung von Kollaborationssystemen hat die durchgeführte Forschung die folgenden Ergebnisse hervorgebracht: i) konkrete Tools und Methoden zur Messung des Nutzens von ECS und zur Erstellung

von Nutzenprofilen; ii) einen vertieften Einblick in die Art und Weise, wie Nutzenmanagement in der Praxis erfolgreich gestaltet und angewendet werden kann und iii) ein neuartiges, integriertes Rahmenwerk, das Forschende und Praktiker bei der Entwicklung, Implementierung und Bewertung von ECS-Vorteilen unterstützt. Das Projekt lieferte damit sowohl praktische als auch theoretische Ergebnisse. Die im BECS-Projekt entwickelten Methoden und Tools wurden in Organisationen angewendet und lieferten nützliche und nutzbare Ergebnisse, die es Organisationen ermöglichen, den sich ergebenden Nutzen ihres ECS zu verstehen und zu überwachen. Mit Ausbruch der COVID-19-Pandemie wurde dieses Thema noch relevanter, da ECS notwendig wurden, um die notwendige verteilte und hybride Arbeit zu unterstützen. Die Forschungsergebnisse liefern auch wichtige theoretische Konzepte und Analysemethoden, darunter das MoBeC-Framework, Social Collaboration Analytics und Benefits Scorecards. Diese bilden die Grundlage für weiterführende Forschungsprojekte zur Untersuchung der Transformation digitaler Arbeit und der Entwicklung eines neuen Forschungszweigs im Bereich der Spurenanalyse und Kollaborationsanalyse im weiteren Sinne.

3 Progress Report

Background and objectives. As outlined above, the *focus of the BECS project is on understanding the benefits of Enterprise Collaboration Systems (ECS), specifically on identifying, measuring and monitoring the benefits that arise from their implementation and use over time.* By applying and extending concepts from the field of benefits management (Peppard et al. 2007; Breese 2012; Coombs 2015; Doherty 2014) the project represents the first large-scale, longitudinal study to investigate the identification, measurement and management of the benefits of ECS. Through the development of in-depth longitudinal case studies of ECS adopting organisations in the DACH region and empirical analyses of ECS in use, the research was conducted jointly by two Professors (Williams and Schubert) and three doctoral researchers (Grams, Nitschke and Schwade). The work coordinated by Professor Schubert focuses on the development of methods for measurement and monitoring of ECS benefits and use at the system level through **Social Collaboration Analytics (SCA)**. The work coordinated by Professor Williams examines **ECS benefits and sociotechnical change** and the development and application of a framework for analysing and visualising benefits change over time.

Data collection and research methods. Data collection methods used in this project include: case studies, interviews, focus groups, company document analysis, online surveys, design research activities (e.g. scenario development) and system logfile capture. Research data is gathered from two main sources: (1) *Organisational level data* was collected from 41 medium-to-large organisations in the DACH region participating in the IndustryConnect initiative (for full

details see Williams and Schubert 2017). These organisations have committed to sharing data and experiences with the University research team and this data is collected in the form of case studies, interviews, surveys and through regular interactive research workshops. To date, in-depth case studies have been developed with a subset of 13 key IndustryConnect organisations, representing a range of company sizes and industries. Over the course of the project **21 site visits** were completed (13 base case study visits, 8 in-depth milestone visits).

(2) *Activity level data* was captured as trace data from the databases and activity logs of the Enterprise Collaboration Systems themselves. Activity level data was collected from UniConnect, an ECS hosted for academic institutions and their research partners (Schubert and Williams 2016, Grams 2017). The platform is operated by the two research groups of Professors Williams and Schubert, has over 3000 users and contains more than 13 years of data; providing a unique testbed for developing and refining the methods and metrics for measuring the benefits identifiable from ECS use. In addition, key case study companies also provided access to logfile data from their operational ECS for testing and reviewing the developed benefits measurement methods.

Research data and data handling. All research data and related materials are managed and retained in accordance with DFG and University Research Data Management Policies and stored on secure University-managed storage infrastructure. Training regarding research ethics and research data management are mandatory for all members of the project team and are part of the PhD research training programme. Data management plans are created and are stored on an internal project database and data quality and quality assurance methods are applied and documented for each study.

Project specific results and findings. The project work resulted in three successfully completed PhD dissertations, the key findings from which are discussed below.

(1) Monitoring Benefits Change (MoBeC) Framework (result from the thesis by Clara Nitschke, née Greeven) [full details of this research is published in Greeven and Williams 2017, Nitschke et al. 2019, Nitschke and Williams 2020; Nitschke 2021].

MoBeC supports organisations and researchers in capturing and monitoring how ECS outcomes and benefits change. It provides concepts and a framework to understand the evolutionary nature of ECS. MoBeC extends the Office of Government Commerce (OGC)'s *benefits realization framework* (OGC 2011) and the *benefits dependency network* (Peppard et al. 2007) to encompass a temporal flow of the expected outcomes and benefits and their relation to organisational changes and the required capabilities to deliver change. The framework incorporates insights gained from case studies, surveys and research workshops with ECS user

companies. The framework comprises six elements (Figure 1): **Outcomes** are new desired operational states, e.g. “central provision of department and area related information”. **Benefits** are the (described & measurable/observable) improvement resulting from an outcome, e.g.

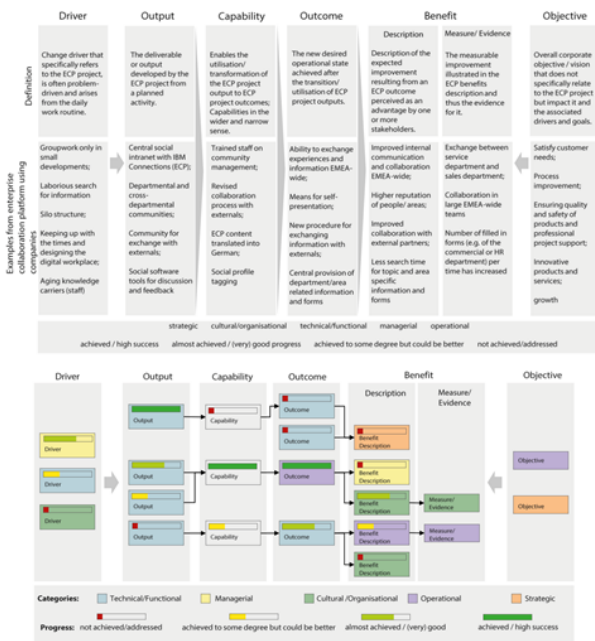


Figure 1: MoBeC framework: elements and instantiation template (Nitschke & Williams, 2020, p. 2613)

“reduced search time for department related information” (as evidenced by the increase in documents accessed per time). In order to achieve outcomes and benefits, outputs and capabilities need to be identifiable. **Capabilities** enable the new operational states by transforming **Outputs** being developed from planned activities (often technical or functional deliverables such as a specific social software component) into Outcomes. Project specific **Drivers** for the ECS (left) and enduring corporate **Objectives** (right) build the frame for the realisation of ECS outcomes and benefits. While Drivers steer the ECS implementation and may be opportunity-driven

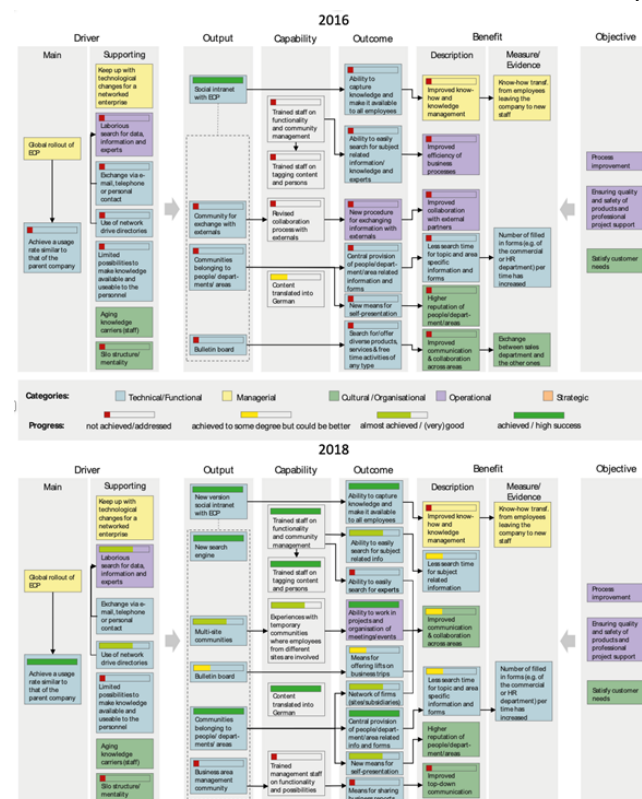


Figure 2: Monitoring outcomes & benefits change 2016-2018 at case company CMP03 (Nitschke & Williams, 2020, p. 2613)

(e.g. keeping up with the times) or problem-driven (e.g. aging knowledge carriers), Objectives often refer to the company mission and are more enduring (e.g. process improvement, innovative products). **MoBeC** provides an **instantiation template** to visualise the dependencies between the framework elements and capture over time. In order to gather the **progress of achievement** of the expected outcomes/benefits, employees with project responsibility must rate their achievement on a scale from 1 (not achieved/addressed) to 4 (achieved / high success) and provide objective evidence if available (e.g. increase in activity between employees from different depart-

ments within an online community – evidenced from data in the event database of the ECS). Since ECS evolve and are shaped over time, it is necessary to collect data at regular points in time. The MOBeC framework was applied and refined with industry case study partners and the findings used to identify benefits change over time. Figure 2 shows a completed example from data captured from case analysis company CMP03 displaying changes between 2016 and 2018.

(2) The Social Collaboration Analytics (SCA) Framework (result from the thesis authored by Florian Schwade) [Full details of this research is published in Bahles et al. 2022, Nagel and Schwade 2020, Schwade 2021, Schwade and Schubert 2017, Schwade and Schubert 2018a, Schwade and Schubert 2018b, Schwade and Schubert 2019, Schwade and Schubert 2020]

Social Collaboration Analytics (SCA) is an “approach for analysing and displaying collaboration activity of users in socially-enabled collaboration systems” (Schwade and Schubert 2017, p. 402). The **SCA Framework (SCAF)** (shown in Figure 3) was developed as a novel approach for the analysis of collaboration activities in the digital workplace as part of the Business Intelligence of organisations. The framework consists of distinct phases and guides the analysis of ECS data. It includes working steps, recommendations, and guiding questions. The framework tightly integrates the identification of business problems and questions with knowledge discovery to answer these questions. The interpretation of findings is supported by data visualisation, an aspect that is neglected in most existing frameworks. In contrast to other models, SCAF goes beyond the mere presentation of findings and emphasises identifying actions that can be taken based on the new insights. This is achieved through

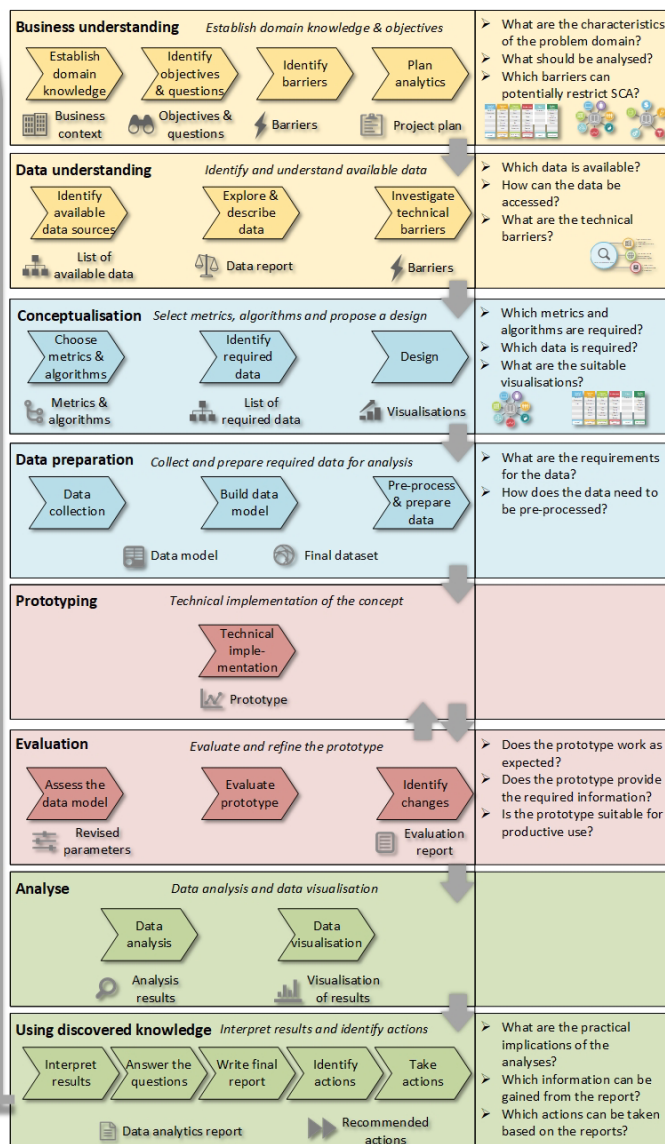


Figure 3: Social Collaboration Analytics (SCA) Framework

collaboration activity of users in socially-enabled collaboration systems” (Schwade and Schubert 2017, p. 402). The **SCA Framework (SCAF)** (shown in Figure 3) was developed as a novel approach for the analysis of collaboration activities in the digital workplace as part of the Business Intelligence of organisations. The framework consists of distinct phases and guides the analysis of ECS data. It includes working steps, recommendations, and guiding questions. The framework tightly integrates the identification of business problems and questions with knowledge discovery to answer these questions. The interpretation of findings is supported by data visualisation, an aspect that is neglected in most existing frameworks. In contrast to other models, SCAF goes beyond the mere presentation of findings and emphasises identifying actions that can be taken based on the new insights. This is achieved through

a prototyping and evaluation cycle that ensures that the identified questions can be answered. The framework was developed and tested in research workshops with practitioners who are participants of the long-term university-industry research initiative IndustryConnect (Williams and Schubert 2017).

(3) Benefits Scorecards for Collaboration Platforms in Enterprises (SCoPE)

(result from the thesis authored by Söhnke Grams) [Full details of this research is published in Grams et al. 2021 and Grams 2023]

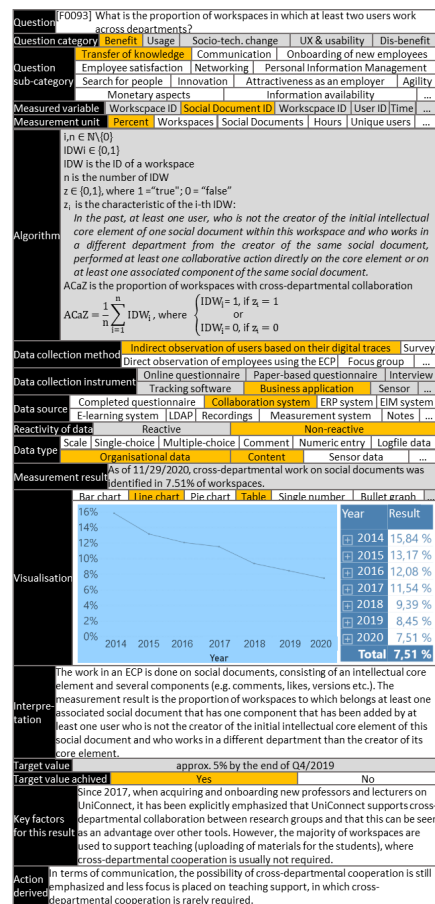


Figure 4: Example for a Benefits Scorecard

The relationships between the expected benefit, the derived questions to be answered, the KPI and the measurement process are contained in the benefits scorecard. The BSC supports the implementation of a KPI-based benefit analysis. The benefits scorecards contain multiple alternative attributes for each parameter and can be represented in a morphological box. An example is shown in Figure 4.

The objectives of the SCoPE Method are (1) to contribute to a broader understanding of the metrics-based analysis of benefits from ECS usage in organisations and (2) to use **Benefit Scorecards (BSC)** for the longitudinal monitoring of benefits derived from operational ECS. SCoPE follows the principles of **Benefits Realisation Management** and the **NASA Goal-Question-Metrics (GQM)** approach and makes use of key performance indicators (KPI).

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Project outputs

The project delivered the following outputs

- 3 completed doctoral theses
- 25 journal and conference papers (listed in section 4.1)
- 13 case study reports
- 16 Industry Research Workshops (see <https://industryconnect.de/workshops/>)

4 Published Project Results

4.1 Publications with scientific quality assurance

- Bahles, S.; Schwade, F.; Schubert, P. (2022): A Workspace Typology for Enterprise Collaboration Systems, *Procedia Computer Science*, 196, pp. 296–304.
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4.2 Other publications and published results

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Schwade, F. (2017): Social Collaboration Analytics in Enterprise Collaboration Systems, Presentation at the Doctoral Consortium, *European Conference on Enterprise Information Systems (ECIS 2017)*, Guimarães, Portugal.

4.3 Patents (applied for and granted): None

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Collaboration & Coordination in
Networks of Work

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