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An Empirical Study of Enterprise 2.0 in Context

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Abstract

As Enterprise 2.0 (E2.0) initiatives are gradually moving out of the early experimentation phase it is time to focus greater attention on examining the structures, processes and operations surrounding E2.0 projects. In this paper we present the findings of an empirical study to investigate and understand the reasons for initiating E2.0 projects and the benefits being derived from them. Our study comprises seven in-depth case studies of E2.0 implementations. We develop a classification and means of visualising the scope of E2.0 initiatives and use these methods to analyse and compare projects. Our findings indicate a wide range of motivations and combinations of technology in use and show a strong emphasis towards the content management functionality of E2.0 technologies.

Keywords: Enterprise 2.0, collaborative technologies, eXperience methodology, contexts of use, benefits, 8C model

1 Background and motivation

Increasing attention is being given to Enterprise 2.0 (E2.0) and the use of collaborative technologies to support and extend business activity (McAfee 2006, O’Riley & Batelle 2009). There are now many research and practitioner publications reporting on the affordances and capabilities of collaborative and social media technologies for improving and extending intra- and extra-organisational communication and on tools for business information integration such as newsfeeds and mashups (EIU 2007a, Bughin 2008). Notwithstanding this vast interest and growing literature, there remains considerable uncertainty about E2.0 initiatives and their contribution to business value (EIU 2007a). Recent studies have identified that practitioners are unclear about the definition of E2.0 and the scope of technologies and activities it encompasses (Frappaolo and Keldsen 2008). Businesses are also facing a complex and changing technology landscape; there is proliferation of collaboration tools being made available and it is not clear which tools are best suited for which tasks (EIU 2007b). Further, many of these tools are of-

ferred as part of externally hosted services, bringing additional questions around the way these services can be integrated into current business and technology infrastructures (Forrester 2007). There are also concerns around the management and governance of such tools and services and on the information and operating risks associated with their use (Miles 2009:16-17).

As with all emerging technologies early research has focused on the potential capabilities of E2.0 and new collaborative technologies and their perceived benefits. Their use within organisations to date has largely been exploratory and experimental. To date, less research attention has been focused on why specific E2.0 projects are being instigated and on their *contexts of use*. In line with the theme of this year's Bled conference, we argue that as E2.0 initiatives are moving out of the early experimentation phase, now is the time to focus greater attention on examining the structures, processes and operations surrounding E2.0 initiatives in order to 1) understand their contexts of use and emerging best practices; 2) ensure these initiatives are integrated into the wider business and IT infrastructures and 3) to develop sustainable solutions that contribute value to the organisation.

The work reported in this study is part of a long-term research programme to address the three areas above. In this paper we report on preliminary work to investigate organisations' motivations for implementing an E2.0 initiative and the benefits they are seeking to achieve. We conduct an in-depth investigation of the actual contexts of use of E2.0 technologies. Our goal is to develop a deeper understanding of the scope of the work/business activity that is being supported and the technologies that have been selected to support that activity in a specific context.

The paper is organised as follows. In the next section we outline the research methodology and the theoretical and analytical lens used to frame this research. We then present seven industry case studies of Enterprise 2.0 projects and provide an analysis of the motivations, contexts of use and benefits in each case. In the final section we draw insights from our findings and discuss future research directions.

2 Research aims and research design

The aim of this research study is to examine the contexts of use of E2.0/collaborative technologies by investigating the following research questions:

- RQ1 Motivations: Why are organisations initiating E2.0 projects?
- RQ2 Scope: What type of work/activity is being supported by E2.0 technologies?
- RQ3 Contribution: What benefits are organisations seeking to achieve from their E2.0 projects?

The study is based on a series of in-depth case studies and uses the 8C Framework for enterprise information management as a theoretical and analytical lens. In the following section we outline the research methodology and the steps taken to develop an analytical tool for classifying and comparing the contexts of use of E2.0 technologies.

We then provide a brief introduction to the 8C Model; our aim is not to give a full explanation of its origination (this is published elsewhere, see Williams 2011a, 2011b) but to give an overview so that its application in this study is clear to the reader.

2.1 Research Steps

The process for examining the motivations, scope and contribution of E2.0 projects is structured into three phases (**Figure 1**). The *first phase* is a preparatory phase where the literature was reviewed and analysed to motivate the research, formulate the key research questions and identify a suitable theoretical and analytical lens. The *second phase* encompasses two parallel activities, the development of the in-depth case studies and a *cyclical process*, which is performed to iteratively generate the 4C classification tool and to code the research data. The *third phase* involves the development of a method to visualise the scope of the E2.0 projects examined in each of the case studies and the consolidation of the findings.

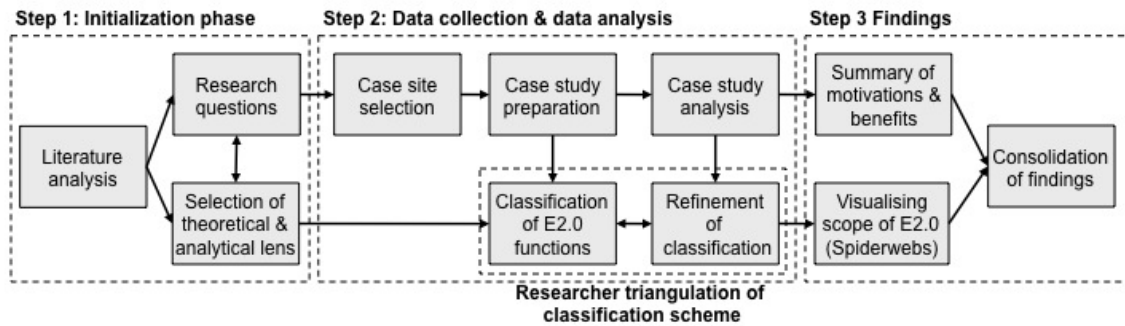


Figure 1: Research steps

2.2 Overview of the 8C Framework

The 8C Framework for Enterprise Information Management (EIM) is derived from a detailed analysis and mapping of the research and practitioner literatures to provide an integrated framework for analysing and evaluating a collaborative technology initiative as an integrated part of an organisation's information infrastructure.

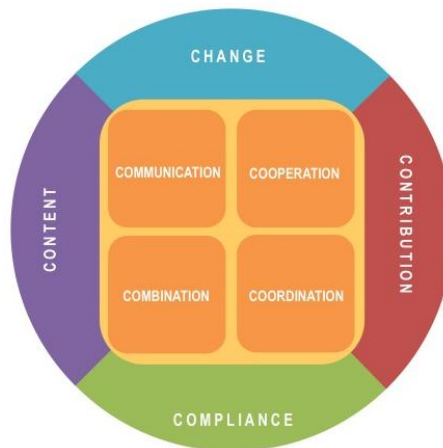


Figure 2: 8C Framework for Enterprise Information Management

The framework (**Figure 2**) comprises two zones; an inner core (activities and collaborative technologies for a specific E2.0 initiative) and an outer layer containing the proximal influences on those activities. The outer layer integrates a specific collaborative technologies project or initiative within the wider EIM context and addresses the management of digital content, business change and benefits and assuring compliance with relevant laws and regulations. **Table 1** explains the elements of the 8C Framework.

Zone	Element	Description
Activity core	Communication (people exchanging messages)	Communication involves people exchanging messages with people. This may be direct (person to person) or indirect (e.g. via a message left as a document). This area includes functions and tools capable of supporting different modes of communication (asynchronous, synchronous) different venues (remote/collocated) media (sound, video, text) and different communication relationships (1:1, 1:m, m:n) and can be uni-, bi- or multi-directional. (cf. Johansen 1988)
	Cooperation/ Collaboration (people working together)	Collaboration refers to the mutual engagement of two or more parties in the achievement of common goals. The focus is on the tools and functions that enable people to work together. Not simply exchanging messages but entering into a well-defined relationship to work together on the same task, e.g. collaboratively writing and editing a report. Cooperation is similar to collaboration, it involves people working together but their relationship may be less well-defined or there is a division of labour, for example, where each party completes their tasks independently and the collection of all tasks achieves a final goal (for example tagging a document and adding it to a wiki) (cf. Mattessich & Monsey 1992, Roschelle & Teasley 1995, Miles 2009)
	Coordination (orchestration of processes, workflows, events and tasks)	Coordination refers to the functions and activities that support the orchestration of work and tasks. Coordination supports all kinds of workflows and tasks from highly structured (e.g. automation of document flows, reminders and alerts) to semi-structured and ad-hoc processes (e.g. project tracking, case management). (cf. Carstensen & Sørensen 1996, Schmidt & Simone 1996).
	Content combination (organisation and re-use of digital content)	This area is core to most collaborative technologies as they all generate content that must in some way be managed (e.g. blog postings, emails, jointly authored documents, Tweets, log files etc.). The focus here is on the methods, tools and functions that facilitate the organization of digital information, improve information findability and support the aggregation, integration and re-use of digital content. For example metadata and tagging solutions, mashups for content integration and aggregation. (cf. AIIM 2008b, Gurram et al. 2008)
Proximal influences	Content management (management of digital content over its whole lifecycle)	Determinations must be made about the management and custodianship of information generated by collaborative technologies across its entire lifecycle. That is, from the point of creation to its final archiving or destruction. At each stage of the cycle information must be purposefully managed. This element includes design of metadata and structuring of documents, implementation of storage, retrieval and retention systems and policies, rights management and monitoring the effectiveness of search and findability of information. (cf. AIIM 2010, Gantz et al. 2008)
	Compliance (managing information risks and meeting legal requirements)	The introduction of a new collaborative technology may bring new risks or increase old risks and must be considered within the wider legal and regulatory frameworks that businesses operate within. For example, risks associated with information management (e.g. loss of information, unavailability) and new risks arising from the use of social media and end-user content creation; e-discovery readiness and records management (ensuring that the relevant output from communication, collaboration, coordination and content creation are available and retrievable for compliance purposes); privacy and data protection (ensuring that Personally Identifiable Information [PII] and business information is protected and only available to authorised entities. (cf. Miles 2009, FINRA 2010)
	Change (managing business transformation & business process change)	The introduction of a new collaborative technology can bring about transformation and change. Such change must be managed and may require alterations to existing business processes. For example, E2.0 is transforming the ways that organisations interact with their customers, bringing new channels and services. Conversely, existing business processes may shape how a particular new collaborative technology is introduced and integrated into the organisation. (cf. AIIM 2008a),
	Contribution (costs and benefits)	Contribution relates to the identification and measurement of the costs and benefits that the organisation achieves from its investments in collaborative technologies. It also places a focus on the monitoring and management of those benefits over time as initiatives become integrated into the wider enterprise information infrastructure. (cf. Bughin et al. 2009, Andriole 2010)

Table 1: Elements of the 8C framework described in the context of E2.0

The 8C's framework provides a useful theoretical and analytical lens for investigating E2.0 initiatives in context. *In this study our attention is focused on understanding the activities being supported by collaborative technologies (the 4C at the inner core of the model) and the expected benefits (contribution) from the use of the selected collaborative technologies.* The 4C are a refinement and extension of the well-known 3C collaboration model from research in groupware and collaborative work (*cf.* Ellis et al 1991, Fuks et al. 2005). The original 3C Model focuses on collaboration in terms of communication, coordination and cooperation. We extend the 3C with the addition of combination/content. All E2.0 tools and applications generate some form of digital content either as a by-product or an output of communication, collaboration and coordination (e.g. a Tweet, text message, wiki/blog posting, collaboratively authored document, tags, log files etc). Creating, managing and re-using digital content is a specific feature of E2.0 and thus a necessary extension to the communicative and collaborative aspects.

2.3 Case studies

Case	No. of employees	Products	Business	E2.0 Project requirement	Software
Capgemini	100.000	Consulting, technology, outsourcing	Service und Solutions, B2B	Expert identification and discussion	Yammer
ESG	700	Complex electronics and IT systems	Development, integration and operations, B2B	Knowledge management	Atlassian Confluence
Siemens	405.000	Integrated technology products	Consulting, development and production, B2B	Global knowledge management and expert search	Liferay
Lecos	157	IT and telecommunications solutions	Consulting and services, B2A	Team rooms, document exchange with external partners	Lotus Quickr
FRITZ & MACZIOL	700	Hardware, software, services and consulting	Consulting and system house, B2B/B2A	Knowledge gathering, transfer and expert search	Lotus Connections
Rheinmetall	20.000	Automotive parts (engines) and defence engineering (vehicle systems, arms, ammunition, anti-aircraft, etc.)	Development and production, B2B/B2A	Team room, discussions and yellow pages	IBM Lotus Collaboration Technology
Börse Berlin	26	Different kinds of securities, stocks and bonds	Securities trading, B2B	Communication exchange between Börse and private investors	Invision Powerboard

Table 2: Overview of cases

Seven case studies were conducted using the eXperience methodology and published in (Schubert and Koch 2011). The eXperience methodology (Schubert and Wölflé 2007) has been specifically designed for collection and transfer of best practice experiences in information systems projects. The methodology provides a toolset containing templates for the *writing, presentation and analysis* of case studies. A *common classification scheme* is used for all cases to record the project experiences, which make it an ideal methodology for a structured cross-case analysis. The seven cases in this study range in

size, industry and business focus. An overview of the case and E2.0 project information is provided in **Table 2**.

2.4 Data Collection and Data Analysis

The case studies are a source of very detailed data. The key task for the research team was to consolidate and reduce the data in order to analyse and interpret the findings. We performed a comprehensive and in-depth content analysis applying techniques described by Miles and Huberman (1994) and Saldaña (2009).

With the data analysis for RQ1: motivation and project initiation, we consolidated and grouped the reasons for the project in each case study; the individual/group responsible for initiating the project and the individual/group responsible for the decision to invest. This data is shown in **Table 4** below.

Data analysis for RQ2: the scope of activity and technologies being used, presented a more complex challenge. We found during the literature review that many papers provided exhaustive lists of the functionality of different technologies, however we *were interested in the functionality that is actually used rather than that which is on offer*. Further, these lists do not adequately distinguish between the 4Cs. We therefore made a determination to generate a grounded classification based on the functions that were actually used by the case study companies. This required us to identify the functions (via the coding process) and then classify them into the appropriate area: communication, cooperation, coordination, content combination. This was done through an iterative review cycle involving the authors of the papers and a third expert in the area of E2.0 technologies. Following four review cycles we identified 58 features in the area of *Content Combination*, 36 features for *Communication*, 34 for *Coordination* and 19 for *Cooperation/Collaboration*.

Table 3 shows an excerpt from the classification scheme for the area of *Cooperation/Collaboration*. If a feature on the list is used in a case study E2.0 then it is given a rating value = 1. When the scope of activity/technology in each of the 4C areas was completed for each case study project we then visualised the results using spiderweb diagrams (cf. **Table 3**).

A	B	C	D	E	F	G	H	I	J
			TOOLS						
			Capgemini (Yan)	Siemens (Lifera)	ESG (Atlasian)	Rheinmetall (B)	Borse Berlin (m)	Lecos (Lotus)	Quickr FRITZ & MACZIDOL
		EVALUATION CRITERIA							
		COOPERATION/COLLABORATION (TOTAL)	1	3	3	4	2	2	4
1		Shared authoring	0	0	1	1	0	0	0
2		Screen sharing/shared desktop	0	0	0	1	0	0	0
3		Shared workspaces	0	1	1	1	0	1	1
4		Workspace awareness	0	1	1	1	0	1	1
5		User profiles	1	1	1	1	1	0	1
6		Ratings, rankings	0	0	0	0	1	0	1

Table 3: List of identified features grouped by the inner Cs of the 8C Model

Data analysis for RQ3: contribution, involved first the coding of benefits. These were then classified and visualised using the exp-ben framework. This framework provides a useful analytical tool to help map and understand benefits; details about how the exp-ben framework was constructed are reported in (Schubert and Williams, 2009). **Table 5** captures the most important benefits that resulted from each project implementation as

defined by the interview respondents and grouped according to the four categories in the exp-ben framework.

3 Research findings and discussion

In this section we present and discuss our research findings in the three areas: motivations, scope of activity and benefits.

3.1 Motivations and project initiation

The following list contains the motives from the 7 case studies:

1. Implement a tool for expert identification and discussion
2. Improve global knowledge management in the multi-national
3. Implement global knowledge management and expert search
4. Make available team rooms and document exchange with external partners
5. Implement tool for knowledge gathering, transfer and expert search
6. Create team rooms, support discussions and yellow pages
7. Create new communication channel (with private investors)

Table 4 shows the party that initiated the project on the one hand and the decision maker on the other.

Case Study	Initiated by	Decision maker
Capgemini	Initiator: Some Capgemini consultants from the Netherlands	No formal decision maker involved (grassroots initiative)
ESG	Initiator: Department Technology and Innovation Management	Executive board
Siemens	Principal was the Chief Technology Office	Siemens CTO and Working Group Innovation
Lecos	Project leaders	Decision group made up of heads of departments, heads of finance and IT architects
FRITZ & MACZIOL	Initiative of the division for IBM Software Solutions	Executive board
Rheinmetall	Not known from the case data	Workgroup knowledge management under the lead of the CIO
Börse Berlin	Board of directors	Board of directors

Table 4: Summary of individual/groups responsible for project initiation and decision to invest

As typical for E2.0 implementation projects, we found bottom-up and top-down approaches. In a similar study, Richter and Stocker observed two main introduction approaches, which they call *exploration* (where a technology is “tried out” and successively applied to a context) and *promotion* (where top management sets clear objectives for a defined context) (Richter & Stocker 2011). From our case sample, only Capgemini followed an exploration approach where some consultants decided to use Yammer for expert identification and discussion. The other six cases were performed top-down addressing a defined context and with clear objectives.

3.2 Scope of the solutions

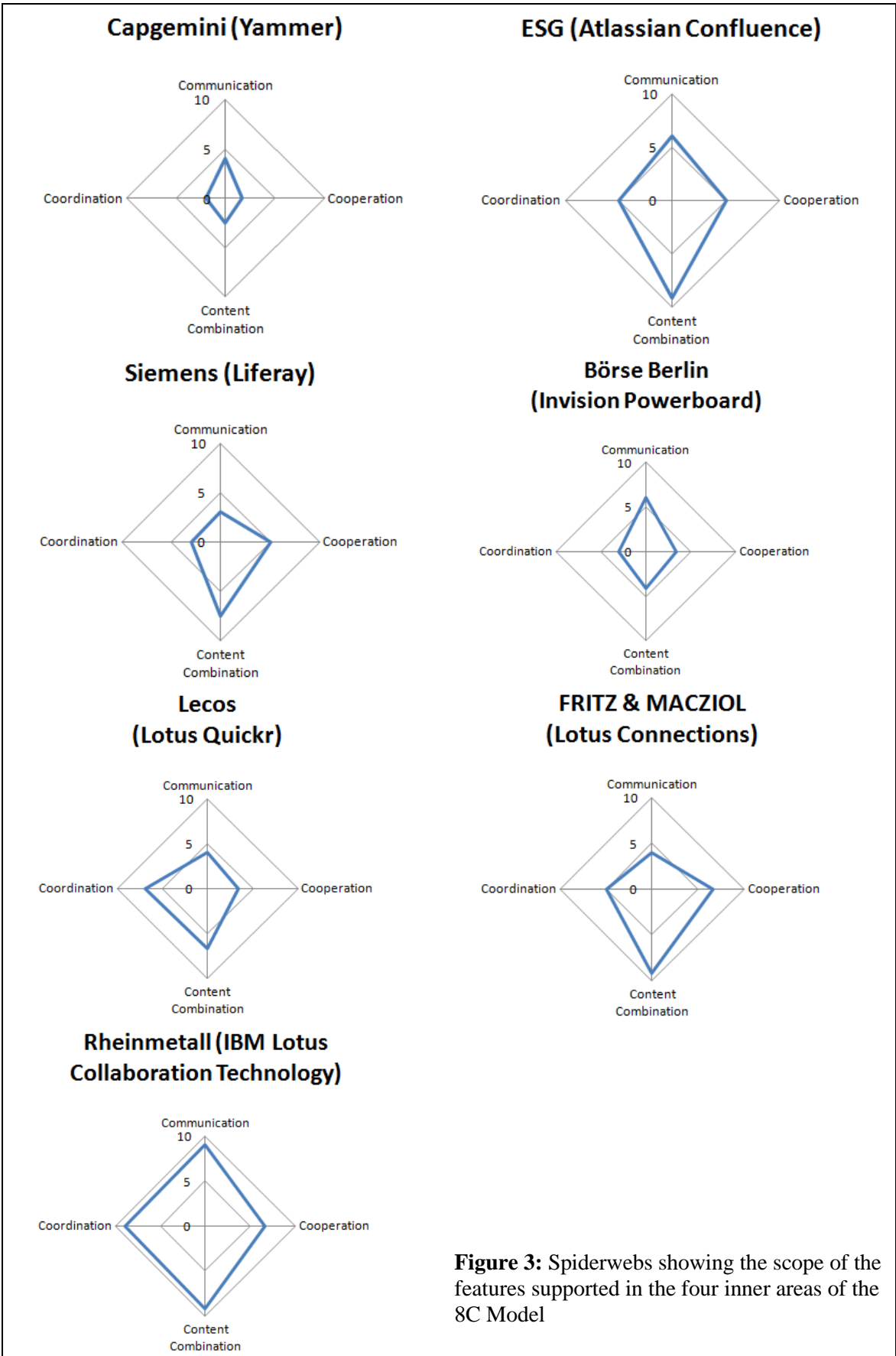
The software solutions that were implemented by the companies in our case study sample vary in both scope and functionality. Our analysis of the 4C inner core profiles the cases based on the features that are *in active use in the companies*. The distribution of these features is not even across the four Cs as we see some organisations are focusing more on the content aspects of E2.0 and others on collaborative aspects. The values on the spider diagrams represent normalized data i.e. in each of the graphics the maximum score for each of the four Cs is 10. If a company scores e.g. 6 this means that their solution includes 60% of the features that we identified in all the sample cases. None of the cases had 100% coverage in any of the four areas.

The spiderweb diagrams clearly display the differences in scope between the solutions. We do not make judgments about the value of one solution over another as each is designed to serve a specific context. However it is interesting to note that the “richest” solution is Rheinmetall for which we identified 33 distinct features in use. This is not surprising as Rheinmetall uses an integrated solution bringing together several large systems such as SAP Portal Server, Lotus Domino and the IBM Lotus Collaboration Suite (Quickr, Connections, Sametime). This high-end solution is followed by another large integrated solution at ESG (Atlassian Confluence, SAP Portal, Domino, Alfresco Share, 25 features). The feature profile of the remaining cases is: FRITZ & MACZIOL (Lotus Connections, 24 features), Lecos (Lotus Quickr, Lotus Domino, 21 features), Siemens (Liferay, 18 features), Börse Berlin (Invision Powerboard, 16 features) and Capgemini (Yammer, 10 features). In the following sections we discuss the variations in findings in terms of the 4Cs.

3.2.1 Communication

For communication Capgemini uses Yammer, which is a specialised Microblogging tool and more limited in scope. The same applies to Invision Powerboard, used by the Börse Berlin, which is a Web 2.0 communication portal software. The limited scope is visualised by a smaller size of their spiderwebs in comparison to the others. Both “small solutions” have their main focus on *Communication*. The Capgemini solution is geared towards the *internal* communication between the consultants while Börse Berlin uses its solution as a new *external* communication channel towards private end customers.

Typical features of the area of *Communication* are e.g. messages that can be sent to specific known users, a company-wide Microblog with sub-structures and Microblog messages that can be commented by others (in the case of Capgemini). At Rheinmetall Sametime allows 1:1 chatting and video conferencing; project-related blogs are supported by Quickr. ESG uses Blogs as discussion forums and for posting of special notices.



3.2.2 Cooperation/Collaboration

Looking at the spiderwebs, two solutions show a clearer focus in the area of *Cooperation/Collaboration*: FRITZ & MACZIOL (F&M) and Siemens.

Some exemplary features used for *Cooperation/Collaboration* are shared workspaces at F&M where employees can browse competence profiles and find colleagues with the right knowledge for a specific customer problem. The users can add a rating to Wiki and blog posts to make them collaboratively accessible and add more value for the community. At ESG and Rheinmetall shared authoring is encouraged in joint Wiki pages. A further example of a collaborative feature available in two of the cases is workspace awareness supported by the ability of Quickr to graphically display changes in a document and versioning.

3.2.3 Content Combination

The companies ESG, Siemens and FRITZ & MACZIOL score high on *Content Combination*. F&M supports document management features; PDF-Files can be attached to postings and have a history. Data integration is realised on personal user home pages that can be individually configured using widgets. F&M also actively uses tagging. Blog and Wiki posts and social profiles can be tagged by other users to improve content findability. These tags are also the basis for the visualisation of tag usage, the emerging tag cloud shows which keywords are frequently used by the user community. ESG supports basic functions of content management in the form of structured project information in Wikis. Rheinmetall and F&M use a shared bookmarking service; bookmarks are posted by users and made available to the community.

3.2.4 Coordination

The spiderweb of Lecos shows a special focus on *Coordination*. Lecos makes active use of user directories, roles and group access mechanisms, group calendars, resource and task scheduling and presence awareness features. These functions are used for the internal coordination of project teams. Rheinmetall also works with group calendars and shared tasks in teamspaces. Other features in the area of *Coordination* are reminders, triggers and alerts as used by Siemens; urgent requests can be sent out to solicit immediate feedback from all users of a community.

3.3 Benefits

In the following section the benefit types identified in the cases are analysed and compared. As already shown in the explanation of the 8C Model, the use of E2.0 tools is often geared at gathering, storing, managing and discovering information. The majority of cases contain the word *knowledge management*. Typical benefits that were achieved are the reduction of search cost and the finding of the right knowledge holders in the company. Companies are searching for mechanisms to make implicit knowledge explicit. The sample contains mostly large enterprises that combine breadth and depth in expertise (collective knowledge) but is often distributed and hard to access and harness. As a consequence the management hopes to give employees access to the knowledge of their colleagues that as a consequence leads to better ideas and improved innovation management. Interestingly, there was only one case in which the outcome and success of the tool implementation was systematically measured and followed up.

	BUSINESS DESIGN Strategy/Processes	MANAGEMENT Resources	FUNCTIONAL AREA Functions	IT/INFRASTRUCTURE Technology Elements
Cap-gemini	Status and activity information increase awareness and are an important success factor	Implicit knowledge is made explicit for other employees Competent staff can be (more easily) found Connectedness of employees increased, personal relationships are fostered	Platform enables interactive communication (discussions, opinions)	
ESG	Reduced maintenance and search costs due to centralized information access	Greater employee participation in the exchange of knowledge and better access to collective knowledge	Experts profiles save time in finding the direct contact	
Siemens	Exploitation of innovation potentials Easier creation of competitive solutions for customers through knowledge pooling	Employees save time and have better information	Access to wider knowledge / experience base (between divisions) Finding the right person (expert directory)	
Lecos	Simpler procedure for the previously very complicated data exchange	High volume of e-mails has been reduced Transparent and effective consumer information	Simplified manual comparison of documents archives (between external consultants and internal staff) More efficient project management	Improved data protection
FRITZ & MACZIOL	Transparency of the expertise within the company increased enormously Reduction of organizational silos	Knowledge transfer over the platform (profile pages, blog or wiki entries)	Targeted search for possible experts	
Rheinmetall	Better ideas and innovation management Reduction in costs (communication and travel)	Time saving (reusability of knowledge, project lead times) Faster and more informed decision making Higher employee motivation (especially Generation X and Digital Natives)	Central storage of business-critical information (information transparency) Simple information searches across distributed applications (reduced search times)	Protect sensitive corporate data from unauthorized access
Börse Berlin	Targeted market and product design Building of long-term communication relationship with customers New communication channel for customers to the company (so far no direct communication)		Availability of demographic data allowed determination of the preference structure of customers	

Table 5: Benefits identified in the cases

4 Concluding remarks and future work

This paper has reported on a research study to investigate the scope and nature of E2.0 implementations and to understand some of the benefits that organisations are achieving from their E2.0 initiatives. Not surprisingly we see a complex array of E2.0 initiatives. What is noticeable is that whilst the academic literature is much more focused on the collaboration aspects of social media, our case study organisations demonstrated an equal, if not greater, focus on the content creation and management aspects of E2.0.

Much of the work involved in this preliminary study focused on the use of the 4C inner core of the 8C Framework for enterprise information management and on the development of a classification and means of visualising the scope of E2.0 initiatives. Work is now underway to explore more fully the content management and compliance aspects of the 8C Model; to investigate how E2.0 initiatives are being integrated into the existing organisational information infrastructures and to explicitly measure the benefits arising.

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