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A SOCIOTECHNICAL APPROACH TO KNOWLEDGE MANAGEMENT IN THE ERA OF ENTERPRISE 2.0: THE CASE OF ORGANIK

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Abstract. The increasing need of small knowledge-intensive companies for loosely-coupled collaboration and ad-hoc knowledge sharing has led to a strong requirement for an alternative approach to developing knowledge management systems. This paper proposes a framework for managing organisational knowledge that builds on a socio-technical perspective and considers people as well as technology as two highly interconnected components. We introduce a conceptualised system architecture that merges enterprise social software characteristics from the realm of Enterprise 2.0, and information processing techniques from the domain of Semantic Web technologies. In order to deliver a KM approach that could assist in reducing the socio-technical gap, we suggest deploying such a solution using an integrated sociotechnical implementation methodology.

Key words: knowledge management, socio-technical approach, SMEs, enterprise social software, semantic web technologies, system architecture

1. Introduction. The majority of today's enterprise knowledge management tools, techniques and methodologies have been developed with large firms in mind [25], and thus adhere to requirements that are inevitably in conflict with the peculiarities of small knowledge-intensive companies [12]. Current Knowledge Management (KM) systems are not only expensive to purchase, but also require the commitment of significant resources to their deployment, maintenance, and daily operation. The amount of effort required for performing activities core to KM systems, such as designing taxonomies, classifying information, and monitoring functionality [33] is disproportionate to the resource capacity of most SMEs. Moreover, typical knowledge management systems place emphasis on predetermined workflows and rigid "information-push" approaches [26] that reflect the philosophy behind working practices in large enterprises.

In contrast, SMEs rely mostly on informal person-to-person communications and people-centric operations [12] that take place in largely ad-hoc and non-standardised ways [33]. By and large, size and structure imply that SMEs have a set of distinctive needs that call for the deployment of a new breed of digital environments for generating, sharing, and refining organisational knowledge. The management of knowledge in idiosyncratic environments such as those of small knowledge-intensive firms can, in effect, significantly benefit from key characteristics of enterprise social software, like lightweight deployment, flexibility and simplicity of use, emergent and self-organising knowledge structures, and collaboration-oriented philosophy.

Nevertheless, in the absence of a knowledge representation scheme to assist in the interpretation of the accumulated information, the evolution of content in a bottom-up fashion may hinder the effectiveness of managing this information and eventually prevent knowledge workers from transforming it into knowledge. To that end, the enhancement of enterprise social software with intelligent information processing capabilities through the use of semantic technologies appears as a rather promising direction. Such a blend would result in considerable improvements to the usability and effectiveness of enterprise social software, and would enable an SME-focused KM system to demonstrate the immediate and profound evidence of benefits needed for knowledge workers to accept it and use it in their every-day activities. The underpinning motivation in this article is that by leveraging enterprise social software applications with semantic information processing and contextual awareness, we can achieve significant benefits in managing content and knowledge, while allowing for informal, people-centred and ad hoc every-day procedures to be employed.

The aim of this paper is to propose an alternative approach to developing organisational knowledge management systems for small knowledge-intensive companies. In contrast to typical approaches, where knowledge

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management systems require specific processual use, we suggest that focus should be shifted to delivering solutions that can organically adapt to their every-day work practices and problem solving activities without imposing them from outside or above [36]. This approach to enterprise knowledge management aims at the creation of an environment where encouragement of active social interaction between individuals and teams, empowerment of participation, and self-motivated engagement can promote innovation and assist in attaining sustainable competitive advantage. This perspective suggests a combination of the up to date largely disconnected social and technical organisational system views.

The structure of the paper is the following. In the next part of this article, we analyse the main premises of the sociotechnical theory. We investigate this concept, showing the link with the OrganiK knowledge management approach and the attempt for an improved sociotechnical fit. In the third section of this study, we present the OrganiK approach to knowledge management. We discuss the sociotechnical OrganiK knowledge management framework, which comprises of two pillars: a people-centred and a technology-centred knowledge management strands. We outline both of these approaches and illustrate a conceptualised system architecture. In the following part of this article, we illustrate the anticipated OrganiK implementation methodology which is inline with the main foundations of the sociotechnical theory. Next, we outline some implications for both theory and practice. We conclude with current research limitations future investigation directions.

2. Socio-technical Knowledge Management Perspectives. Knowledge management literature has often focused on two seemingly disjoint approaches: people-centred and technology-centred strategies [20, 31]. Nevertheless, it is proposed that overly stressing the importance of either technological or social components of knowledge management can sometimes be misleading and conducive to less effective organisational initiatives, since these two approaches may, in some contexts, be of equal usefulness [3, 42]. Drawing upon the basis of sociotechnical theory we argue that is necessary to equally consider people, technologies and organisational environment (internal as well as external), in order to advance the prospect of successfully deploying knowledge management initiatives [10].

This paper adopts the view, following Lytras and Pouloudi [24], that knowledge management can be seen "as a socio-technical phenomenon where the basic social constructs such as person, team and organisation require support from Information and Communication Technology (ICT) applications" (p. 64). A socio-technical approach to leveraging organisational knowledge considers people and technology as two highly interconnected components of a single system and is applied to the study of the relationships and interactivities between the social and technical structures of an organisation [8]. Furthermore, we consider both technological as well as social structures as contextually and mutually constitutive which are often driven by co-evolutionary incidents to previously unpredicted directions [22, 34].

The tension between the social and technical organisational structures can be difficult to harmonise, however. The mutual constitutive role of people and technology inside organisations leads to a continuous negotiation procedure between these two elements. Technical infrastructures affect organisational behaviour, while social structures of organisations shape technology's functionality. Orlikowski [34] refers, in this context, to the notion of 'interpretive flexibility' of technology to characterise the way in which users constitute and interpret technology through shared understandings and meanings during its design and use. She stresses, nevertheless, that there are limits to the extent interpretive flexibility of technology can be exerted, imposed by the material characteristics of technology itself and by the institutional contexts of its design and development. Hence, there is a co-evolutionary procedure between software systems and the organisational social structures (e.g. individuals and teams) in which each are forced to adapt continually by the modifications of the one another [22].

However, it appears that social requirements are often neglected in the process of designing and implementing organisational knowledge management solutions. Overly emphasising on the technical requirements of such a solution (i. e. hardware and software components) often results in diminished attention for the social requirements of the initiative (i. e. organisational and social issues). Such a practice has led to what has become known as the socio-technical gap [36]. As illustrated in the following graphical representation of this divide (Figure 2.1), the technical sub-system leaves a significant part of the social sub-system virtually unsupported. The sociotechnical gap indicates a weakly supported social sub-system by the technical structures of the organisation.

Sociotechnical theory focuses on the joint optimisation of both technical as well as social structures of the organisation which constitute the total work system [21]. Tools, technical infrastructures, codified knowledge assets necessary to produce certain outputs comprise the technical sub-system of the organisation [16]. On

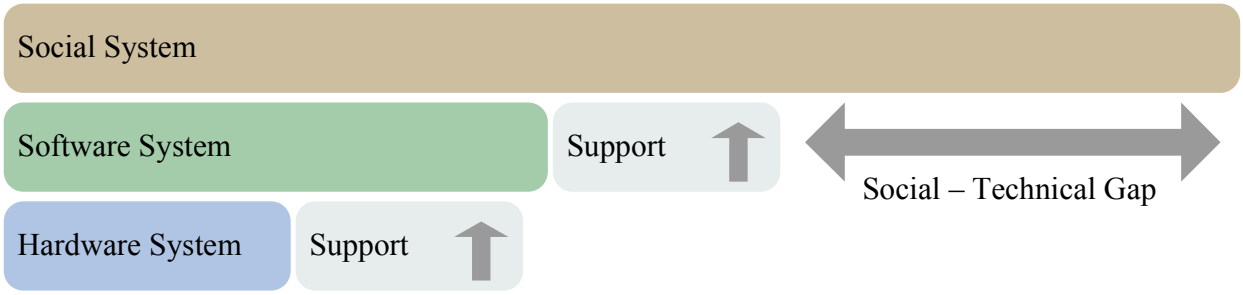

FIG. 2.1. *Socio-technical gap: software and hardware systems provide support for the technical subsystem, while the social subsystem remains virtually unsupported (adapted from [36])*

the other hand, attitudes, beliefs, relationships and results of work arrangements constitute the social sub-system of the organisation [35]. As shown in Figure 2.2, the main premise of sociotechnical studies is the contextual and mutual interdependence of social as well as technical sub-systems of organisations [22]. Post-implementation studies also suggest that often information systems are adapted in use and their organisational role if often reinterpreted and reconstructed through negotiated interaction [7, 11, 13, 40]. Our approach follows the sociotechnical paradigm and studies the relationships and interrelationships between the social and technical parts of the total system [9]. It focused on the interrelated communications which bond the relevant components together and, in accordance with the sociotechnical model it attempts to jointly optimise both elements.

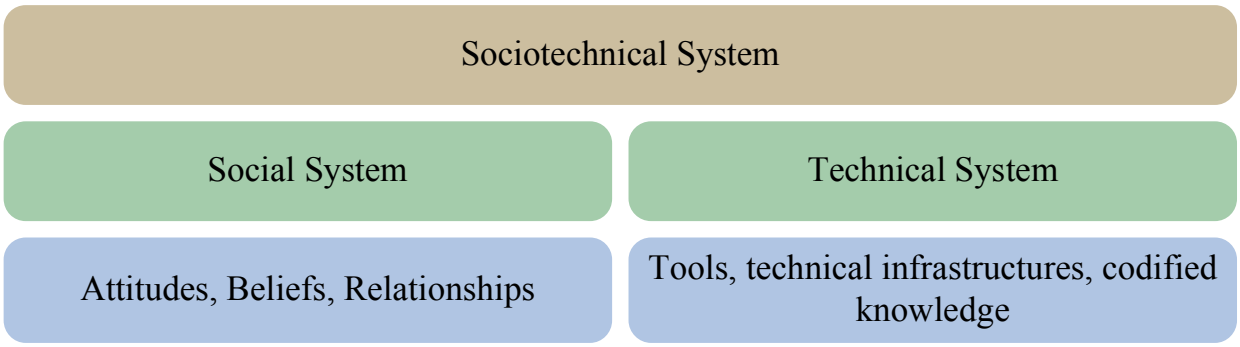

FIG. 2.2. *Sociotechnical theory attempts to jointly optimise both the technical as well as the social structures of the organisation*

We propose an organic perspective to organisational knowledge management system development [36, 10, 29], in which the characteristics of the resulting technical sub-system emerge from a continuous negotiation procedure among the social actors of the organisation and adaptation through user involvement and engagement. This approach attempts to create an iterative dialogic relationship between the social and technical sub-systems that can promote the creation of a collaborative environment for creating, sharing and distilling information in organisational settings.

OrganiK envisions resulting in a knowledge management solution with advanced flexibility and adaptability to current and future needs of the social actors of companies, in which it will be deployed. This knowledge management initiative should result in a technical system with functionalities taking into account the individuals' attitudes, beliefs and social relationships and allowing them to have high level of autonomy in order to engage into every-day problem solving activities. Such a vision is inline with the sociotechnical theory approach which emphasises the link between knowing and action, considering the continuous interplay and mutual constrains of both social and technical organisational sub-systems. OrganiK knowledge management initiative attempts to advance the user involvement and engagement during the system design phase. Furthermore, we conceive the OrganiK knowledge management solution implementation as a procedure of continuous negotiation and inter-play between the organisation's individuals, teams and technical tools. This indicates the creation of an environment in which permanent adaptation and co-evolution of the inseparable nature of systems and people is though to be an important challenge in order to approach an optimsed fit between these two elements. As

shown in Figure 2.3 the integrated sociotechnical approach of OrganiK envisions providing enhanced support for the social structures of the organisation and regards implementation and deployment as an ongoing procedure and not as an individual and isolated task.

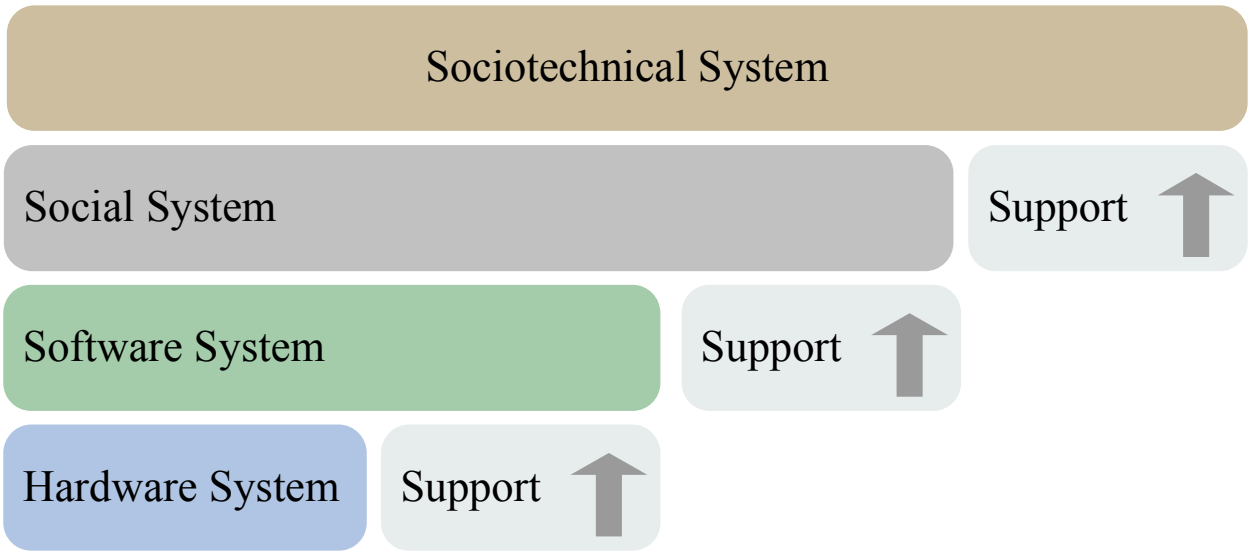

FIG. 2.3. *OrganiK's sociotechnical approach attempts to support both the technical as well as the social structures of the organisation*

3. The OrganiK Approach to Knowledge Management: Towards a Socio-technical fit. An integrated socio-technical knowledge management perspective is a prerequisite in attempting to reduce the divide between the technical and social organisational sub-systems. Therefore, we propose a socially-driven perspective to organisational knowledge management [30], in which the characteristics of the resulting technical sub-system emerge from processes of negotiation among the social actors of the organisation and adaptation through user involvement and engagement. This approach attempts to create an iterative relationship between the social and technical sub-systems and aims at the harmonisation of people and technology inside organisational settings. The vision of the proposed approach is to enable knowledge workers in small knowledge-intensive companies to effectively manage organisational knowledge with the support of an organic knowledge management framework. The major components of the proposed knowledge management framework are the following:

- A people-centred knowledge management conceptualisation, focusing on social processes and work practices of the organisational structures (i. e. individual, team, business units). Situated innovation practices, utilisation of social networks and enhancement of organisational adaptation capabilities comprise fundamental components of this socially-focused approach.
- A technology-centred knowledge management conceptualisation, focusing on the integration of enterprise social software applications (wikis, blogs, collaborative bookmarking tools and search engines) with semantic technologies (ontology-based annotation, semantic text analysis, logic-based reasoning).

Figure 3.1 illustrates the core components of the OrganiK knowledge management framework.

3.1. OrganiK's people-centred knowledge management approach. The OrganiK approach stems from the characteristics and "peculiarities" [12] of knowledge intensive SMEs. The knowledge management literature has often emphasised the lack of uptake of formal knowledge management initiatives in SMEs [28, 43, 33]. However, we propose that there are specific characteristics inherent to SMEs which lead to implicit practices that, although in some ways different to more formal initiatives in larger organisations, can nevertheless, be related to the management of knowledge.

qIt has long been proposed [19, 32] that the size of a company is often correlated with particular structural configurations and patterns and practices of organisational behaviour, namely, the predominance of flatter structures and of task orientation. Emergent and crafted strategies tend to predominate over planned strategies [32], in companies that tend to be more "constrained by resource scarcity" [43] (p. 47) than larger counterparts and therefore may have to adapt faster to survive. Aspects related to sources of power and authority in SMEs

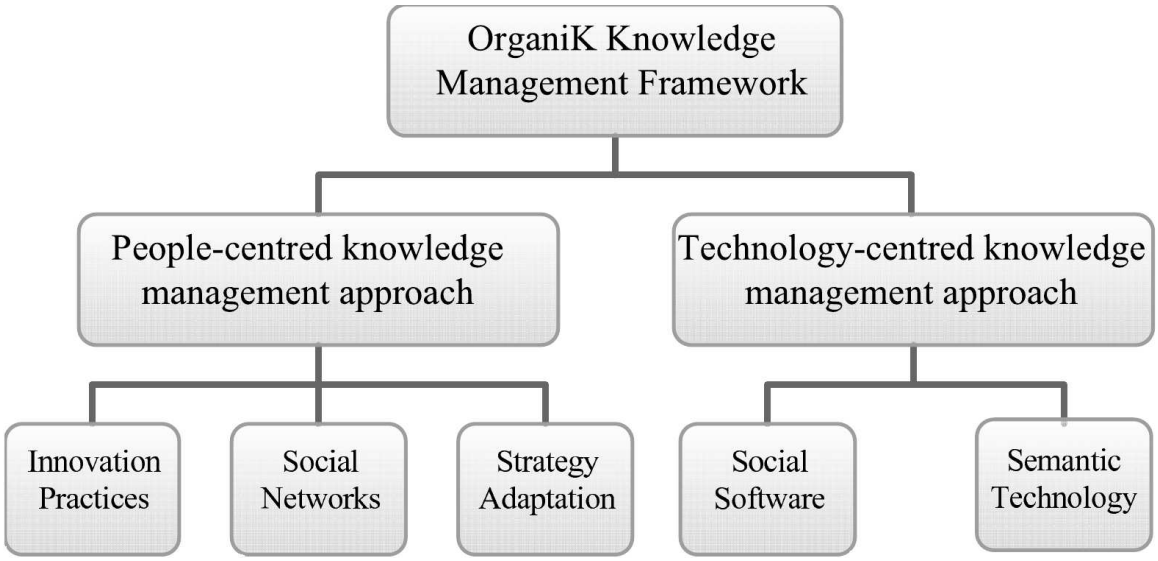

FIG. 3.1. *The proposed OrganiK knowledge management framework*

remain controversial. Authors such as Handy [19] have in seminal studies emphasised the strength of power cultures in small organisations, centred around the figure(s) of key individual(s), often the founder(s) of the company. Alvesson [1], on the other hand, adds that in the specific case of knowledge intensive SMEs, there tends to be a shift from managerial approaches, based upon direction, planning and control, to less prescriptive and non managerial approaches, where negotiated, rather than explicit sanction-based management, may predominate.

The characteristics of size, structure, behaviour and practices in SMEs can be related, in turn, to different processes of organisational learning and of managing knowledge, as proposed by Desouza and Awazu [12], who, in a case based study of twenty five North American SMEs, identified a series of commonalities in this respect. These include a strong emphasis on socialisation, as the key vehicle for knowledge sharing, and on the tacit common understanding of situations and issues, rather than a reliance on explicit knowledge repositories and formal processes. This leads to two further correlated aspects: i) a strong awareness of the 'common knowledge' of the firm, i. e., knowledge that is known and shared by all its members, and ii) a faster spread of its knowledge base than would be found on larger companies, based on people centred processes, rather than technology centred processes. It appears, therefore, that the organisational learning and knowledge management practices in SMEs tend to be more congruous with apprenticeship based learning, rather than with formal training, and therefore more amenable to management approaches that are more focused on emergence and self regulation, rather than on planning and control [41].

The much debated lack of uptake of formal knowledge management initiatives in SMEs should then be re-thought in terms of focusing on the specificity of the context of SMEs and examining more closely the informal and implicit practices that characterise their organisational learning practices. Knowledge intensive SMEs are an ideal ground to explore this perspective and alternative practices in knowledge management. On the basis of these premises, the people-centred knowledge management approach of the OrganiK framework takes into consideration: i) innovation practices, ii) communities of practice and social networks, and iii) organisational adaptation activities of small knowledge-intensive companies. The following figure illustrates the OrganiK knowledge management people centred pillar. We will now discuss each of its elements in turn.

3.1.1. Innovation practices. The concept of innovation is implicit in many knowledge management definitions and practices [31]. Innovation is often approached as a result of successful knowledge management initiatives and emphasis is placed on the utilisation of knowledge for an organisation to gain enhanced learning and innovation capabilities [24]. In our approach we view knowledge and innovation management as two interlinked processes through a knowledge innovation process model, proposed by Bibikas et al. [5]. Our research draws upon the work of Amidon [2] and explores the concept of Knowledge Innovation, which is defined as: "... the creation, evolution, exchange and application of new ideas into marketable goods and services, leading to the success of an enterprise, the vitality of a nation's economy and the advancement of society" (p. 7). The

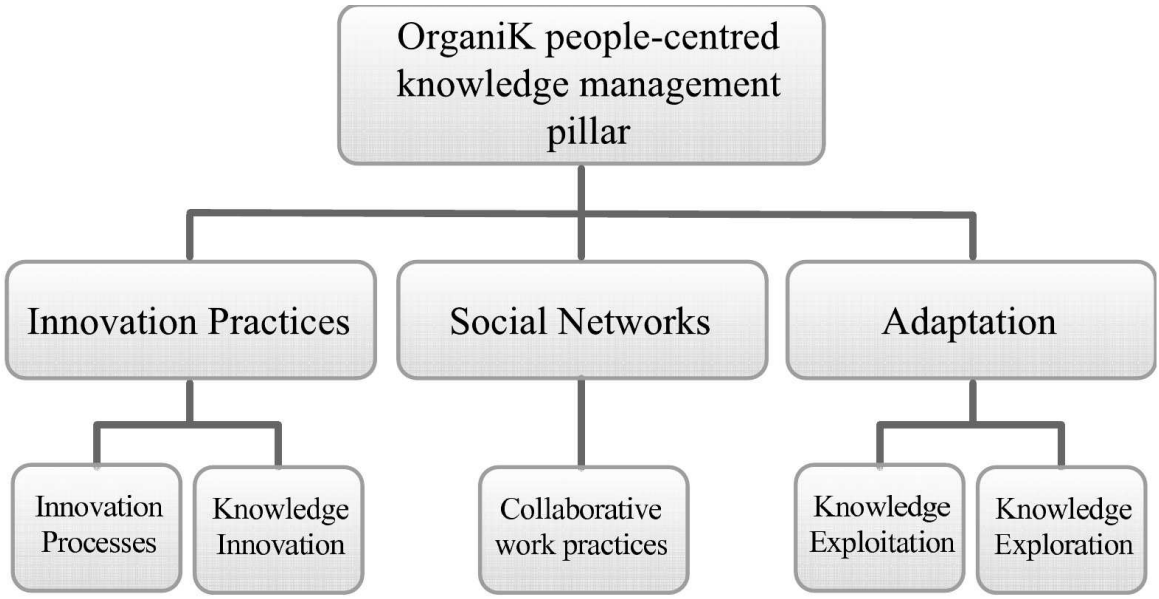

FIG. 3.2. *The proposed OrganiK KM people-centred pillar*

concept of Knowledge Innovation is particularly important to small and medium-sized enterprises (SMEs) which increasingly need to develop their innovation capabilities. This need derives from potential stronger competitive capacities of larger organisations, enabling them to erode traditional SME niche markets.

3.1.2. Communities of Practice and Social networks. The term communities of practice (CoP) was first conceptualised by Lave and Wenger [23] in order to illustrate forms of social organisation independent from formal organisational structures and procedures, binding its members based on similar interests and problem-solving focused activities. Communities of practice are voluntary and emergent groups of people, whose management is based upon self-regulation and a tacit understanding of common interests and shared practices, largely led by mutual trust [14]. In this context, knowledge can be continuously shared and negotiated among social actors, members of these networks [37]. In the OrganiK framework communities of practice and social networks are enabled in a manner which includes more than internal organisational structures (e.g. employees, shareholders, business units, etc), but, rather, integrates elements from the outer environment, such as customers, suppliers, partners and even competitors. CoPs and social networks are of particular importance to the viability of SMEs, since small knowledge-intensive companies usually operate utilising *ad-hoc* and largely social day-to-day collaborative work practices both inside their organisational structures and in their outer business environment.

3.1.3. Organisational adaptation. Typically, organisations manage their cumulative knowledge through two largely defined strategies: knowledge exploitation and knowledge exploration [27]. These perspectives represent two discrete approaches on managing organisational knowledge. Knowledge exploitation entails organisational learning practices which optimise existing processes and improve pre-existing know-how. On the contrary, knowledge exploration consists of organisational learning practices that create new knowledge for the development of novel products, services and processes. However, organisational adaptation requires a balanced adoption of both exploration and exploitation strategies to be successful [27]. Organisational adaptation is of particular importance to SMEs, since their core competitive advantage in relation to larger and globalised firms is their potential rapid responsiveness and quick market adaptation. Boisot [6] suggests that the management of core competences, key to the achievement of competitive advantage, requires the ability to deal with a complex regime that relies on organisations possessing greater and enhanced information processing capabilities than those organisations that do not possess them. We suggest that the management of core competences is based upon the development of adaptive strategies involving the balance between exploration and exploitation for knowledge.

The OrganiK approach aims therefore to support the interplay between active social networks, knowledge innovation processes and organisational adaptation in dynamic knowledge intensive SME contexts, as key ele-

ments for competitiveness, through its conceptual framework and the flexibility brought by the integration of enterprise social software applications with semantic technologies.

3.2. OrganiK's technology-centred knowledge management approach. The technology-centred knowledge management approach of the OrganiK framework largely envisions an integration of elements from the domains of Enterprise 2.0 and Semantic Web technologies. We argue that the use of a new breed of emerging collaborative environments in small knowledge intensive organisations can facilitate knowledge work [36, 30, 29]. These new digital environments for generating, sharing and refining knowledge are often popular on the Internet, where they are collectively labelled as "Web 2.0" technologies. Lately, the emerging technologies supporting Web 2.0 applications are entering enterprise bounded environments for creating and sharing organisational knowledge. McAfee [29] introduced the term "Enterprise 2.0" in order to define the employment of social software practices inside organisational settings for information and knowledge management [29].

Although the use of Web 2.0 technologies in business premises can be viewed from varying perspectives and can be referred to employing different names (i. e. social software, social computing, enterprise Web 2.0, Enterprise 2.0, etc), their core operations can be summarised in the following, known as the SLATES framework [29]:

- *Search*, to provide mechanisms for discovering information.
- *Links*, to provide guidance to knowledge workers to discover and later evaluate the needed knowledge while ensuring emergent structure to online content.
- *Authoring*, to enable knowledge workers to widely share their know-how.
- *Tags*, to present an alternative navigational experience exploiting unhierarchical categorisation of content.
- *Extensions*, to exploit collaborative intelligence by suggesting contextually relevant recommendations to knowledge workers.
- *Signals*, to automatically alert knowledge workers for newly available and relevant content.

From a technological point of view the abovementioned SLATES framework is hardly new, since these technologies existed almost since the beginning of the Internet. However, not only are they becoming more and more easy to use, they also convey a novel perspective concerning the process of managing knowledge in organisations. Namely, unlike current knowledge management technologies, where particular tools usually predefine their employment (i. e. presenting certain business rules and somehow inflexible processual requirements), enterprise social software is seemingly abstracted from its practical use. This indicates that the tools are not defining their utilisation in a strict and deterministic manner, while their deployment can be eventually emergent according to adapting needs, ideas, organisational policies etc. As a result, enterprise social software appears to be able to continuously adapt to its environment, a distinctive characteristic of successful enterprise systems [36]. Also, while current enterprise knowledge management software places emphasis on procedural tasks and routine information in a structured manner with specified up front roles, Enterprise 2.0 technologies lets structure emerge, rather than imposing it. In enterprise social software, communication and knowledge sharing structure are to a very large extent self-emerged and organic. Hence, Patrick and Dotsika [36] argue that social software presents enhanced adaptive capabilities with regard to its environment, contrary to the case in which the environment is required to adapt to the functionalities of the software.

Our aim is to provide knowledge workers with a collaborative workspace that comprises a set of integrated Web 2.0 applications, augmented with natural language processing and semantic information integration capabilities. This approach presents two significant benefits. First, the formality of semantics can decrease information ambiguity and increase data interoperability. Information silos across data and applications should communicate with one-another with compatible knowledge models. Second, semantics offer machine-processable characteristics to content, thus making possible knowledge sharing and utilisation activities by means of intelligent software tools [36].

We consider formal knowledge modeling approaches complementary to the dynamic and emergent nature of social software tools. Thus, in our knowledge management technological strand we attempt to merge the formality of semantic technologies with the bottom-up and non-standardised characteristics of enterprise social software.

The use of semantic technologies in the envisaged solution consists of the following key functionalities:

- Semantic knowledge representation: representing knowledge in a formal, machine understandable manner.

- Semantic resource annotation: annotating knowledge artefacts and other resources by reference to concepts defined in an ontological model.
- Semantic inference: performing automated logic-based reasoning to infer new, implicit knowledge based on what has been already asserted in an explicit manner.
- Semantic search and discovery: using ontological terms to describe a search query and rely on logic-based reasoning to derive the matching results.

Each of the aforementioned functions corresponds to one or more of the components in the SLATES enterprise social software framework discussed previously, and, as presented in Figure 3.3, it envisions enhancing enterprise social software basic characteristics.

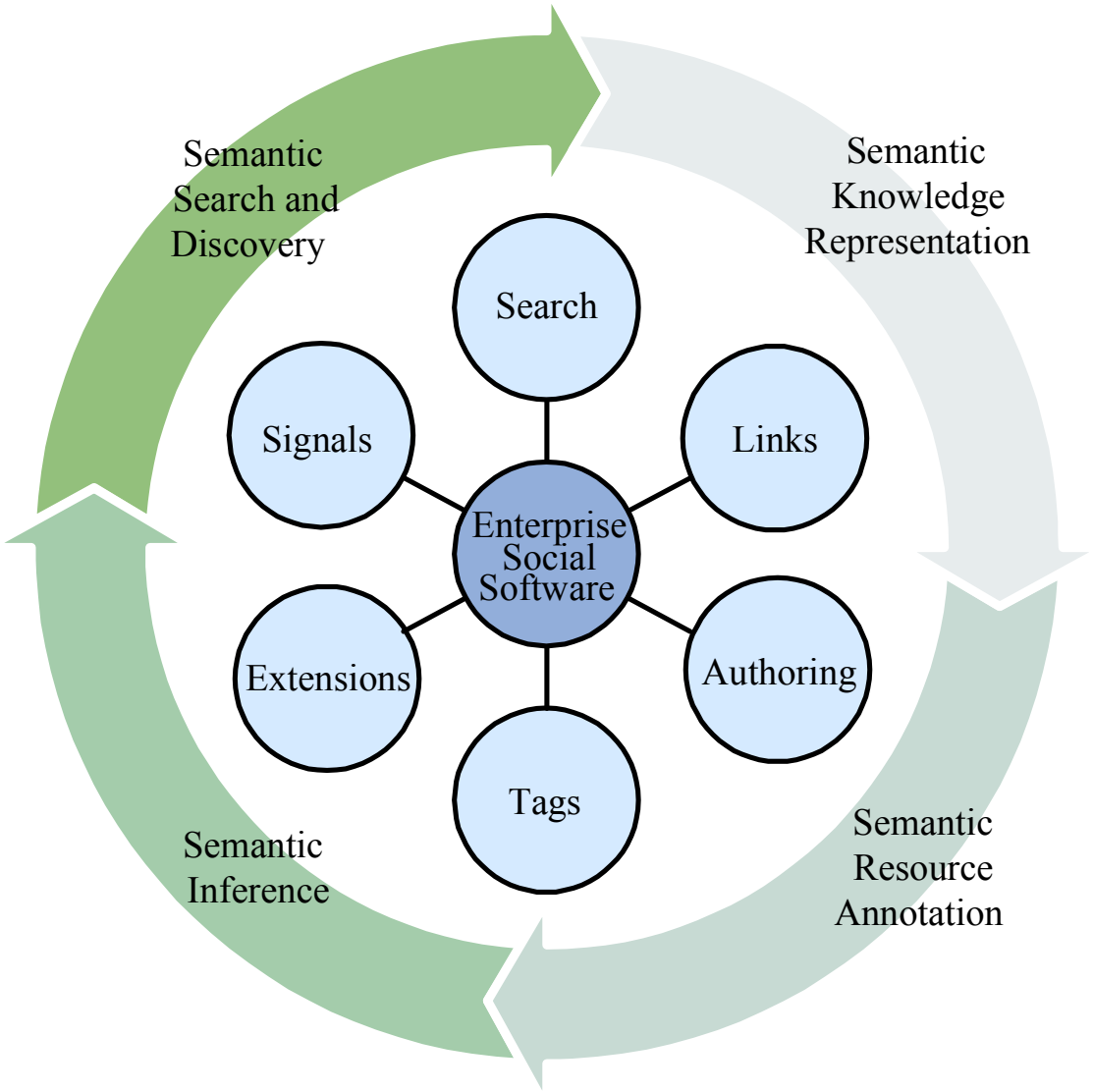

FIG. 3.3. *Integrating components of the SLATES framework with machine processable semantics*

3.3. Conceptualised Architecture. In this Section we give an overview of the anticipated OrganiK technical architecture. The architecture consists of components that function on different layers, providing the features mentioned in the earlier section. A conceptualisation of the proposed architecture is illustrated in Figure 3.4. The part visible to the end user is represented in the *Client Interface Layer*. It offers a collaborative workspace to knowledge workers and comprises a wiki, a blog, a social bookmarking tool and a search interface.

Each of the client interfaces corresponds to a server-side component in the next layer of the architecture; the *Component Interface Layer*. The server-side building blocks that comprise the *Business Logic Layer* are a recommender system, a semantic text analyser, a collaborative filtering engine and a full-text indexer. Each of the component interfaces are envisioned to access multiple of the services in the business logic layer, yet hiding their complexity from users. The *Metadata Layer* refers to repositories used for the persistence of syntactic and semantic metadata supporting the functionality of all server-side components, while the *Datasources and Back-Office Integration Layer* refers to business information systems and any form of resource container that an enterprise may depend on for its daily operations.

The functionality of the core components in the proposed architecture is envisaged as follows:

- The *Wiki Component* is a web-based authoring tool allowing knowledge workers to collaboratively create, edit, and share knowledge artefacts such as documents, diagrams, etc. The traditional wiki metaphor is extended by the possibility to bind a wiki article to a knowledge artefact, making the wiki page *represent* the knowledge artefact.
- The *Blog Component* provides a simple content management tool enabling knowledge workers to build and maintain open project monitoring diaries, complete with links to relevant resources and user commentary.
- The *Social Bookmarking Component* enables knowledge workers to organise and annotate resources relevant to their activities (e.g. intranet documents, web resources, wiki entries, blog posts, etc) and share them with their co-workers.
- The *Semantic Search Component* supports browsing, filtering, searching, retrieving and displaying knowledge resources leveraging fulltext indexing, semantic annotation indexing, and logic-based inferencing.
- The *Recommender System* focuses on the suggestion of tags and classifications for content added to the system (e.g. wiki entries, bookmarked documents and websites, blog posts and comments, etc.), and the suggestion of information items relevant to the search query or feed subscription of a user.
- The *Semantic Text Analyser* employs linguistic and statistical processing functions on the textual content of knowledge artefacts added to the system, in order to perform named entity recognition and term classification. The objective is to identify concepts of interest and establish relationships among resources that can be subsequently used by the Recommender System for suggesting tags and classifications with respect to a taxonomy/ontology. The metadata created by the Semantic Text Analyser is indexed together with the document in the Metadata Layer.
- The *Collaborative Filtering Engine* enables individual knowledge workers to benefit from the collective experience built within groups of peers. Annotations are envisaged to be created by different users, thus generating an emerging *folksonomy*. This component analyses the subjective views that are explicitly or implicitly expressed by other knowledge workers and generates a model of metadata terms and their relations to users and documents. These can assist in the selection and recommendation of resources, as well as influence the ranking of search results.
- The *Full Text Indexer* is an indispensable component of the architecture's *Business Logic* layer and complements the content retrieval techniques proposed above. Content edited by users is expected to become indexed. It is also envisioned to connect multiple back-office data sources by partially indexing existing data sources and applications for enhanced subsequent retrieval.

Additionally to the presented components, we expect requirements for modifications and changes in this architecture which are bound to come during the design and development of the system. However, the above-mentioned core elements have been known to be needed in order to support the socio-technical implementation methodology we follow. Groza et al. [17] found similar system requirements trough scenarios and end-user interviews during the related NEPOMUK research project.

Components involved in the indexing and metadata storage functions are assembled in a pipe architecture, passing the results of one element as input for the next. IBM's Unstructured Information Management Architecture (UIMA) architecture [18] comprises a role model and good basis for the interaction between these modules. A challenge concerning the technical architecture is to find such role models that fit our requirements and reuse existing frameworks to realise the architecture as such (e.g. frameworks on the architectural abstraction level of Java Platform, Enterprise Edition (Java EE), Service-Oriented Architecture (SOA) frameworks, content management frameworks such as Java Specification Requests 170). The same question of reuse also applies for each individual component.

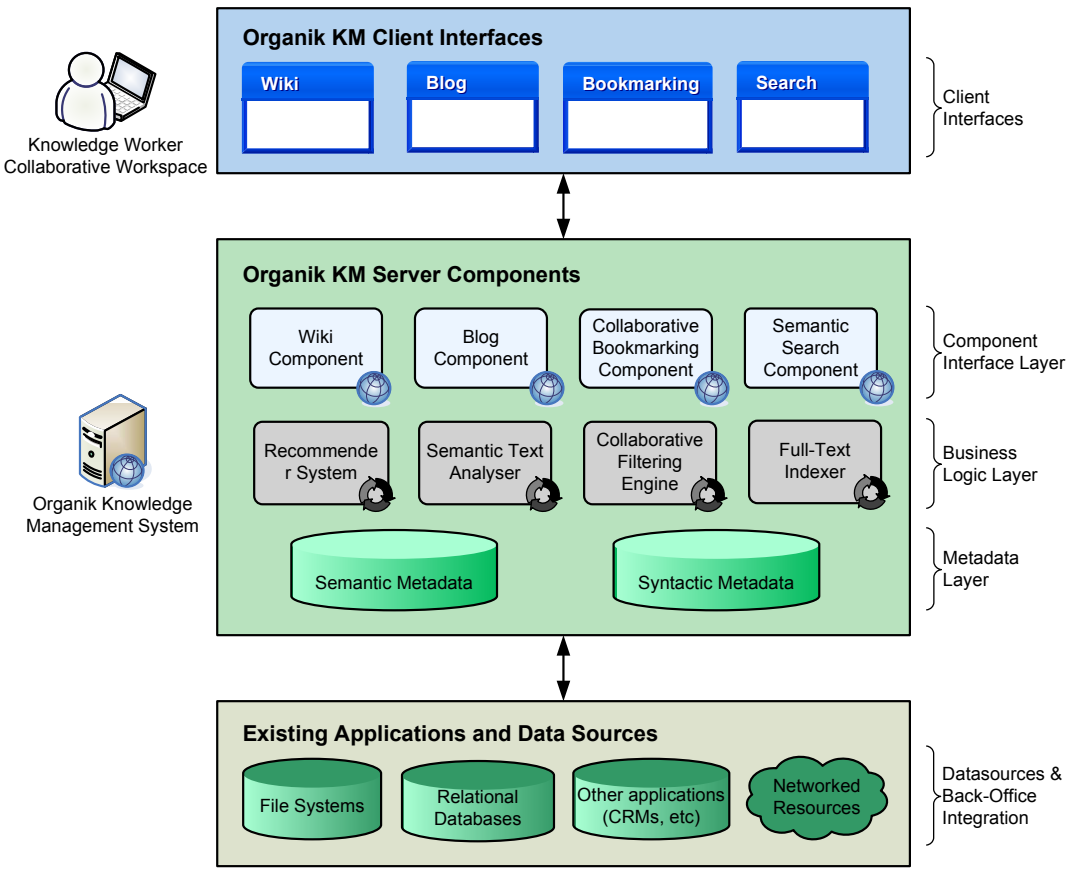

FIG. 3.4. *Proposed conceptual architecture for semantically-enriched enterprise social software*

TABLE 3.1
Association among components in SLATES and our proposed architecture

SLATES Framework	Proposed Architecture
Search	Semantic Search
Links	Collaborative Bookmarking
Authoring	Wiki and Blog spaces
Tags	Collaborative Bookmarking, Wiki and Blog spaces
Extensions	Recommender System
Signals	Really Simple Syndication (RSS)

To summarise, the enhancement of enterprise social software tools with machine-processable semantics and their respective processing techniques is expected to yield significant benefits with respect to efficiency of information management, and contribute towards improving the overall user experience of knowledge workers.

Finally, as illustrated in Table 3.1, the proposed OrganiK architecture attempts to integrate enterprise social software's basic characteristics with semantic technologies, since each suggested architectural component corresponds to specific SLATES framework element.

4. Planed sociotechnical Implementation Methodology. The envisioned OrganiK implementation methodology was designed in order to address three significant challenges often found in complex process analysis projects [21]:

- complex technological requirements;
- non-standardised and non-routine knowledge-intensive work processes; and
- considerable social influences in work habits.

Therefore, the expected OrganiK sociotechnical implementation methodology attempts to provide a balanced and holistic analysis of both the social as well as the technical aspects of the investigated processes, in order to implement the final solution. Our approach draws upon the basics of sociotechnical design methodology [15, 39] also taking into consideration its modifications [21]. Our methodology comprises of two parallel studies. The first is focused on the technical subsystem (e.g. infrastructure, software tools, information systems), while the other explores ways to encourage knowledge-worker engagement and involvement. Figure 4.1 below illustrates this integration attempt with regards to the interplay between the social and technical sub-systems.

The OrganiK implementation methodology consists of five phases: Initial Process Scanning, Technical Subsystem Analysis, Social Subsystem Analysis, Interpretation of results, and Solution Design and Implementation. Each phase is discussed below.

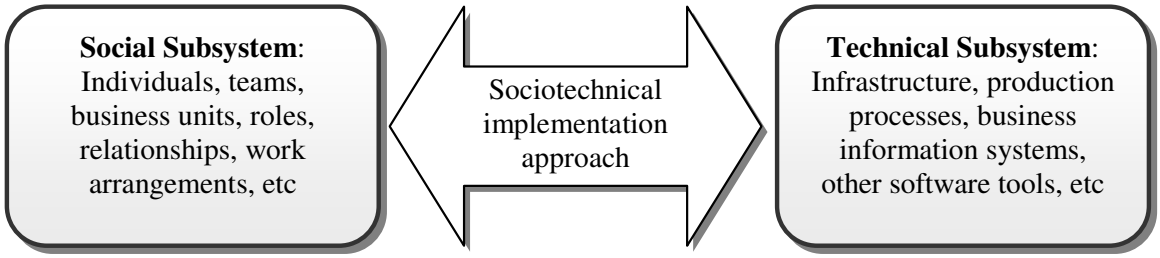

Fig. 4.1. *Integrating social and technical subsystems for the implementation of our solution*

4.1. Phase One: Initial Process Scanning. This first stage of the implementation methodology aims to facilitate a general understanding of the organisation for which the OrganiK solution is implemented for. It is the initial step in order to comprehend the purpose, the process and the environment of the system under review [38]. The scope of that phase is to reveal the main problems on which the analysis should focus [4]. Main work process, general organisational contexts that influence the process (e.g. organisational history, relationships and experiences) are to be investigated in this step. In this phase, the research team is expected to develop boundaries in which the subsequent analysis will take place, as well as a structure and approach for the effort [21]. Once the Initial Process Scanning phase will be complete the analysis will progress to the second phase of the implementation methodology, the Technical Subsystem Analysis.

4.2. Phase Two: Technical Subsystem Analysis. The aim of this phase is to investigate in detail the technical aspects of the total work system [21]. To accomplish such a task we will identify and map the detailed specifications of the main work processes (i.e. their inputs, transformation procedures and final outputs). Furthermore, we will classify the main tools (e.g. business information systems, software tools, intranets, etc) which play a role in the value chain of the organisation and present significant consequences on cost, schedule, quality, or performance. Once the Technical Subsystem Analysis in finished, the results are expected to be jointly evaluated with those of the Social Subsystem Analysis.

4.3. Phase Three: Social Subsystem Analysis. The scope of this phase is to investigate the central elements of the social sub-system of the organisation. The aim is to identify the role of the social structures in the performance of the technical configuration. Social roles, relations and needs of individuals and teams are focal points of such an investigation. Also, social dynamics, organisational design, process context and other non-technical influences are to be explored [21]. The social subsystem analysis phase is expected to take place in parallel with the technical one.

4.4. Phase Four: Analyses Interpretation. The scope of this phase is to blend and integrate the technical and social subsystem analyses. A comprehensible understanding of the holistic sociotechnical work system is the challenge here. Joint optimisation of both subsystems is the prerequisite [21]. The research team is expected to identify all major requirements and integrate both the technical as well as the social aspects for the design of the OrganiK solution.

4.5. Phase Five: Solution Design and Implementation. This last phase of the implementation methodology focuses on the transformation of the abovementioned requirements into technical and social aspects of the OrganiK solution. Details of the technical needs will materialise into concrete software tools, while continuous coaching and support to the social actors will be provided by the research team.

5. Discussion and Future Research. This paper theoretically investigates an approach to developing organisational knowledge management systems for small knowledge-intensive companies. In contrast to other approaches employed in present-day, we suggest that a specific processual use should not be imposed onto knowledge workers, but rather, the provided knowledge management solutions should be able to organically adapt to their every-day work practices and problem solving activities. Despite the fact that the OrganiK research project is still at a rather initial stage, we envisage a system that is utilised and organically incorporated into every-day *ad hoc* and knowledge-intensive SME work practices. Our objective is to realise a KM system with increased social acceptance and a positive impact on reducing the socio-technical gap. In particular, we propose an OrganiK knowledge management framework that adopts a sociotechnical perspective to leveraging organisational knowledge, and considers people and technology as two highly interconnected components. We adopt the intersection of social software and semantic technologies as the technological baseline towards realising this vision, and present a high-level conceptual architecture of the envisaged solution.

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