

Roadmapping as a Collaborative Strategic Decision-Making Process: Shaping Social Dialogue Options for the European Banking Sector

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Abstract—The new status generated by technological advancements and changes in the global economy raises important issues on how communities and organisations need to innovate upon their traditional processes in order to adapt to the challenges of the Knowledge Society. The DialogoS+ European project aims to study the role of and promote social dialogue in the banking sector, strengthen the link between old and new members and make social dialogue at the European level a force for innovation and change, also given the context of the international crisis emerging in 2008-2009. Under the scope of DialogoS+, this paper describes how the community of Europe's banking sector trade unions attempted to adapt to the challenges of the Knowledge Society by exploiting the benefits of new channels of communication, learning, knowledge generation and diffusion focusing on the concept of roadmapping. Important dimensions of social dialogue such as collective bargaining and working conditions are addressed.

Keywords—Banking Sector, Knowledge Society, Roadmapping, Social Dialogue.

I. INTRODUCTION

THE socio-economic status of the 21st century, driven by advancements in technology and changes in the global economy creates a series of challenges for individuals, organizations, communities, national and transnational stakeholders. Adapting to these challenges in many cases requires new approaches to traditional processes usually involving the aspects of exploring innovative tools and the benefits of technology [1], [2], [3].

Roadmapping is both a modeling tool and a strategic decision-making process involving the aspects of foresighting expected and desired future conditions. It constitutes a

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framework of diverse and flexible principles and practices. Roadmapping application fields vary from technology and science to government, industry and policy [4]. Most literature findings describe applications and methodologies related to supporting strategy in enterprise planning or diffusion of new technologies. Previous cases of roadmapping in social and policy topics are not equally extensive. This paper tries to fill part of this gap and describes the activities of the DialogoS+ European project¹. Within its approach, the community of Europe's banking sector trade unions attempted to exploit the benefits of creating new collaborative channels of communication, learning, knowledge generation and diffusion, focusing on the application of the roadmapping process and the dissemination of its results. Given the implications of the international crisis emerging in 2008-2009, the results of the project in issues of European Social Dialogue, such as collective bargaining and working conditions, become even more important for the future of the sector.

In the next section we briefly introduce the basic ideas of knowledge – oriented collaborative approaches and review the concept of roadmapping under this scope. In section 3, we describe the activities of DialogoS+ focusing on the roadmapping application and present its key results. In section 4 we elaborate on this description and discuss the added value and the lessons learnt from the activities of the project. We conclude by summarizing and attempting to analyze how future research can benefit from this case.

II. BACKGROUND

A. Towards Knowledge-Oriented Collaborative Approaches

The word “knowledge” describes a broad concept which has been both technologically and economically driven, approached at the same time as a product of information and a valuable asset on its own. Recent studies reveal its importance as the main characteristic of what is referred to as the Knowledge Society centered on a Knowledge Economy in which knowledge-intensive activities become primary [5]. The

¹ <http://www.otoe.gr/dialogosplus/>

Knowledge Society can be approached both as a set of problems in terms of how it needs to advance and an aggregation of solutions in terms of how it fosters societal development and innovates upon traditional processes in fields such as business, education and government [3].

From the technical aspect, the transition from the Web 2.0 to the forthcoming Semantic Web (see for example [6]) generally implies a transition from the Information Society to the Knowledge Society. From a society in which technology facilitates human interaction and massive diffusion of information to one in which available information is additionally transformed into explicit knowledge. This transition is not in any case divisive or globally viewed in that sense, but provides a framework in which intelligent and more sophisticated functionalities will facilitate activities related to creating, sharing and disseminating knowledge. The role of computer mediation in knowledge management initiatives has been discussed extensively during the last decade. For example, Walsham's article [7] emphasizes that technology can be beneficial for managing knowledge in supporting human-oriented communication processes.

From the economical aspect, knowledge sources from the workers' intellectual capabilities, skills and accumulated experience, in contrast to their traditional physical abilities as part of the labour workforce. This distinction originated a few decades ago from Peter Drucker's well known book [8], stimulating the whole concept of an economy of knowledge. It has been the centre of an on-going debate over the role of knowledge in transformation of social processes concerning issues such as public policies and corporate management, as for example discussed by Dexter and Hope [9], Rooney et al. [3] and Dolfsma [2].

In particular, knowledge-based human activity and development has been a broad issue of research over the last years. In order to address its potentials, the Journal of Knowledge Management has been publishing relevant special annual issues since 2006 [10]. Another example is the book edited by Heckscher and Adler [11], in which under the scope of the knowledge economy, a new approach to collaborative communities is presented. From the point of local governments, Metaxiotis and Ergazakis [12] propose a simplified conceptual model for stakeholder knowledge partnerships. In a more managerial thinking, Switzer [13] discusses the organisational need to shift management from traditional styles to knowledge management methods in order to gain competitive advantages.

Earlier literature had illustrated how the socially constructed nature of knowledge can "impede cross-border collaborative work and knowledge transfer" [14]. A well-known framework of creating and sharing knowledge in and across organizations is the SECI spiral model originating from Nonaka's and Takeuchi's [15] work on Japanese businesses and their tendency towards long-term employment. According to the SECI model, the process of knowledge creation is an on-going interaction between explicit and tacit knowledge, involving the modes of Socialization, Externalization, Combination and Internalization. More information on the SECI model can be found in [16] and [17]. The distinction between explicit (in the sense of systematic and transmittable)

and tacit knowledge (also including the individual's own cognitive dimension and "know-how") originates from Polanyi's classification [18].

For the scope of our study, we focus on how communities shift their traditional communication and experience sharing processes towards more knowledge-oriented strategic approaches in an attempt to adjust to modern demands and high expectations. Such is the case of the European banking sector's trade unions, which through a series of initiatives centered on roadmapping attempted to modernize their traditional processes and enhance to the societal impact and public image of their community. At the next step, we review the basic ideas of roadmapping, explain its role as a knowledge creating and sharing process and provide application examples from various fields concerning its use.

B. Roadmapping

Phaal and colleagues characterize roadmaps as "common language and structure for both the development and the deployment of strategy" [4] and applications that "seek to capture the environmental landscape, threats and opportunities for a particular group of stakeholders in a technology or application area" [19]. Furthermore, they explain that roadmapping has been mostly driven by practitioners, such as companies, governmental agencies and consulting firms, without experiencing analogous support of relevant academic foundational research. Kamtsiou et al. [20] approach roadmaps as "a tool for collaborative strategic planning, that enable us to make strategies and take actions towards the desired future, with special emphasis on anticipating changes in Technologies and new business opportunities".

Although roadmapping is a generic and highly customizable concept, its main idea lies in analyzing the gaps between expected and desired future situations with the purpose of proposing actions and recommendations aiming to bridge them; a process known as *gap analysis*. A roadmap includes an important foresight dimension, but it is not a tool for predicting the future. Our approach views roadmapping in a broad context as instrument of modeling and disseminating visions, facilitating communication, knowledge sharing and collaborative strategic decision-making within an organization, across organizations or at national or transnational level.

Roadmapping, as a process of creating and communicating a roadmap [21] is usually considered significant itself, apart from the actual roadmap which is the final outcome. This process interacts with and shapes the social mechanisms of the roadmapping community, assists in building consensus and incorporates an important knowledge creation and learning dimension. Methodologies and principles on developing, classifying and evaluating roadmaps are characterized by significant diversity in connection with the fact that roadmapping has been mostly driven by practice. For example, Phaal and Muller [4] explore issues on how to design and architect roadmaps by indentifying important variables such as scale, complexity, timeframe, visual representation, granularity, iterations during the development process and key success factors.

Common roadmapping application fields are in science, technology and corporate strategy. Other examples include policy development and fields related to socio-political issues, as for example diplomacy. Table I aggregates various indicative examples according to their application field.

TABLE I
 ROADMAPING APPLICATION FIELDS AND EXAMPLES

Roadmapping application field	Example
Product Development	Petrick and Echols [22]
Research and Development	Suh and Park [23]
Corporate Social Responsibility	Panapanaan et al. [24]
Energy Services	Daim and Oliver [25]
Electronics	Rae et al. [26]
eServices	Hwang and Yuan [27]
eCommerce	Shim [28]
eGovernment	Wimmer [29]
Diplomacy	Roadmap to Peace in the Region of Middle East [30]
Genre Equality	European Commission [31]
Public Administration	European Federation of Public Service Unions [32]

The third author of this paper has been previously involved in relevant efforts in European research through the TIME2LEARN and PROLEARN² projects, which developed roadmaps in eLearning and Technology Enhanced Professional Learning in Europe [20], [33]. In particular, the Prolearn Roadmap created a conceptual roadmapping model based on the SECI spiral knowledge creation framework, by using a special knowledge management tool [34]. As described in [20], this process brought together a vast number of stakeholders from industry and science to forming a network with the purpose of implementing the roadmapping process centred on negotiation and mutual learning, as a continuous process where “individuals and groups transcend their boundaries by acquiring a new context, a new view of the subject domain, and new knowledge”.

Additionally, this paper extends our initial work on roadmapping [35], which focused on its use as a collaborative strategic decision-making tool. In the next section, we present the activities, methodology and key results of DialogoS+.

III. THE CASE OF THE EUROPEAN PROJECT DIALOGOS+

A. Activities and Methodology

According to its official statement, the DialogoS+ European project “aims to study the role of and promote the social dialogue in the banking sector, strengthen the link between old and new members and make social dialogue at the

European level a force for innovation and change”. In fact, DialogoS+ extends the previous work of the projects DialogoS³ and Communicate⁴ which involved to a large extent the same partners during the past decade (for a partner list see the relevant page on the project website). These two projects also addressed the vital issues and mechanisms of European Social Dialogue in the banking sector, focusing on identification and exchange of experience in the form of best practices. Workshops and questionnaires were their main data collection methods.

However, issues such as the enlargement of the European Union and its implications, the potential benefits of the Web 2.0, the need to demonstrate a modernized public image and the new challenges of adapting to the needs to the Knowledge Society created the necessity to examine innovative approaches to collaboration both among the trade unions and between their officials and their members. Moreover, and since the community had already established its existence, the next steps were to establish common policies and objectives, predict future conditions and pro-act. In addition, the forthcoming events of the international crisis, although not known initially, made this necessity even more imperative.

Within this context, DialogoS+ introduced the concept of roadmapping as an innovative approach, aiming at elaborating on and extroverting the social mechanisms of this community both as a final deliverable and as a communication and knowledge creation process itself. The knowledge and conclusions generated from roadmapping were the input of the next activities of the project which included: developing training packages for the trade unions officials and the employees, establishing a series of workshops around Europe in order to discuss the future of the banking system and role playing through videoconference simulation of social dialogue.

Apart from the official activities of the project, many partners decided on the way that there was growing demand to further explore the benefits of technology and in particular the interactive participatory potentials of the Web 2.0. For this purpose, some of them created individual blogs and social networking groups aiming at disseminating the results of the project and raising awareness over issues of Social Dialogue and with respect to the financial crisis.

As mentioned before, the basic stages of roadmapping include: describing the current state, formulating the desired and expected future, analyzing the gaps and proposing actions and recommendations aiming to shift the future from the expected towards the desired. Fig. 1 provides an overview of the roadmapping process applied in DialogoS+ showing the key roadmapping stages. Table II links these roadmapping stages with their input data sources. The main data sources for were a web questionnaire which was filled by the employees and the trade union officials, a best practices report [36] compiled at the first stage of the project summarizing the current state and various workshops during which the interim and final results of the project were discussed and further developed.

² <http://www.time2learn.org/> and <http://www.prolearn-project.org/>

³ <http://www.ine.otoe.gr/inside.asp?id=3>

⁴ <http://www.otoe.gr/communicate/>

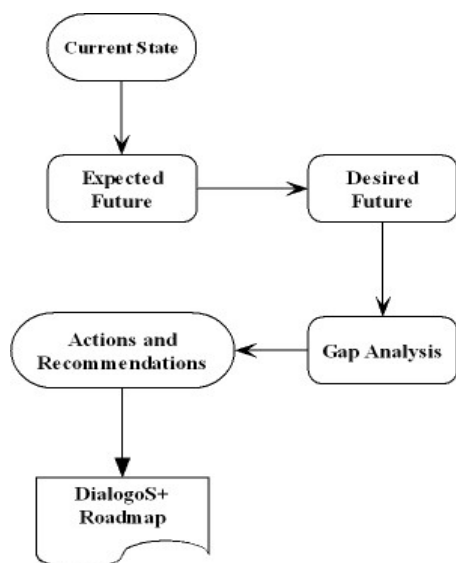


Fig. 1 Overview of the DialogoS+ Roadmapping process

An important synergy of the process was the interpretation of data which revealed interesting conclusions in connection to their broad dimensions. For instance, formulating the desired future was not a simple task. Ideal future situations are more than a wish list and need to take into account complex socio-economic implications regarding the structure of trade unions, their mission within the society and the multiple perspectives of involved social stakeholders. For example, although the mission of trade unions is to ideally achieve 100% density rates, their infrastructures in terms of benefits and services could not sustain total participation from one day to the other in all cases. At the next section we briefly analyze the results of the project in each roadmapping area.

TABLE II
 ROADMAPING STAGES AND THEIR INPUT

Roadmapping stage	Input
Current State	Presentations from partners identifying barriers, challenges and practices External literature Best practices report [36] Results of previous projects Web questionnaire
Expected Future	Web questionnaire Best practices report [36] Workshops External literature
Desired Future	Final workshop External literature
Gap Analysis	Final workshop
Actions and Recommendations	Final workshop Meetings and brainstorming sessions

B. Key Results

Social Dialogue is considered a driving force for economic and social reform, a key to better governance of the new enlarged European Union and a vital element of the European Social Model [37]. The experience of social dialogue for regulating the transformation of banking sector restructuring in nine old and new EU member states indicates that, although sectoral industrial relations remain mainly national, social dialogue is not only theory or part of a normative approach, but has provided noticeable ‘best practices’ in the banking sectors at the national level that evolved till the eruption of the global financial crisis.

In half of the countries examined, social dialogue has indeed been used as a driving force for economic and social reform in the banking sector, generating practical solutions that helped in preserving the European Social Model. The comparative analysis of different national systems of employment regulation in banking sectors highlighted different degrees and stages of social dialogue in regulating banking sector employment relations in nine EU member states [36].

In a first group of ‘old’ member states (Denmark, Spain, and Italy), the common characteristic is the relatively strong role of collective bargaining. In a second group of two ‘old’ member states (Portugal and Greece), the pre-existing pathway of developing social dialogue through sector level collective bargaining is challenged. In a third group of two ‘new’ member states (Cyprus and Malta), the influence of the national banking sector unions enhanced social dialogue as a means for regulating sector level employment relations, while in a fourth group of two ‘new’ member states (Bulgaria and Romania), the challenge is building social dialogue capacity through increasing membership and establishing sectoral collective agreements.

Despite the different degrees and stages of social dialogue in regulating ‘national’ banking sector employment relations, roadmapping can be common across six roadmap thematic areas which are summarized in Table III.

TABLE III
 DIALOGOS+ ROADMAPING AREAS

DialogoS+ Roadmapping areas
1. Union Density Rates
2. Collective Bargaining and Union Impact Negotiation Levels
3. Public Support and Industrial Actions
4. Working Life in the Banking Sector
5. Foreign Ownership, Mergers and Acquisitions
6. European Union Dialogue and Convergence

1. Union Density Rates: current differences in national union densities and the trend towards lower levels are coupled with expectations to decrease or remain the same. This contrasts with the vision of achieving the highest possible degree of

union membership and density. In addition to increasing union's densities, important dimensions are: improving participation quality from the workers' side and service quality from the unions' side. The main recommendations and actions focused on the identification and improvement of services to the members, the deeper examination of cultural diversities which cause insufficient will to participate, the introduction of improved methods of data gathering and analysis, as well as the reduction of hierarchical structures such as work councils which act as "divide and conquer" practices.

2. Collective Bargaining and Union Impact at Negotiation

Levels: currently, collective bargaining operates dominantly at the national sectoral level. Effort is in progress to change collective bargaining processes in Europe, since employers tend to ask for more flexibility at the enterprise level. Progress has also been made in achieving more common and centralized collective bargaining procedures at the European level, although there are feasibility concerns. Moreover, strong diversities exist around Europe regarding union impact at negotiation level, especially between new and old members, Western and Eastern Europe. Although employees tend to expect social dialogue procedures to increase, they are not optimistic about the ability of unions to influence their outcome. The National Sectoral Level is expected to remain dominant, but the importance of collective bargaining both at the enterprise and at the international European level is expected to increase. The gap at the level of collective bargaining is on the expected shift at the enterprise level which needs to be counter-balanced by more coordination at the national and European level. Recommendations and actions focus on sharing experience and promote European initiatives supporting Social Dialogue, as well as in preventing the shift of negotiations at the enterprise level.

3. Public Support and Industrial Actions: there is a trend towards diminishing unions' public support, deeply affected by the crisis. From the unions' side, the crisis could at minimum produce beneficial conditions for raising more awareness over sensitive issues of the sector and restoring unions' positive and coherent public image. It also stimulates a debate over how trade unions could modernize their actions in order to avoid traditional conflicts and attract increased public support and understanding. Trade unions need to demonstrate an image of workers' protection groups which function under the broad societal context, aware of how their decisions and initiatives affect the public. In terms of industrial actions, there is a need to develop more advanced and interactive dissemination mechanisms. The role of technology and new media needs to be considered and exploited. Recommendations and actions focus on the direction of investing in modern channels of raising public support, such as Web 2.0 initiatives aiming at enhancing participation and collaboration in decisions.

4. Working Life in the Banking Sector: at the present day, employment and job security tend to become the most important issues in the banking sector working life. Individualism and liberalism are treated as triggering factors

of the crisis. Neoliberalistic approaches create unregulated markets and are considered factors which destabilize working life standards. Inequality in incomes, flexibility in working life, job security and genre inequality are issues of concern. The uncertainty stimulated by the crisis affects predictions about future free market regulation, maybe even with the help of governmental intervention. The main gaps are identified in managing to eliminate practices related to individualism and cultivating a collaborative environment among workers. Job security needs to be established by creating and supporting protection systems, especially when it comes to older workers. Recommendations and actions focus on negotiating and implementing European Directives concerning genre equality, raising awareness over negatives effects of neoliberalistic practices and developing mechanisms being able to support social protection.

5. Foreign Ownership, Mergers and Acquisitions: there have been trends towards more foreign ownership, mergers and acquisitions during the recent years. The main issue is protecting workers by imposing common rules for banks which operate in different countries. The landscape is now heavily affected by the events of the crisis. Banks become more vulnerable as they loose market capitalization and it is not time to consider mergers and acquisitions in such a risky environment. Governmental considerations of applying nationalization policies in order to prevent banks from bankrupting is also an important dimension, as foreign ownership, mergers and acquisitions are expected to be more frequent phenomena in the sector. This expectation depends on the outcome of the crisis after stabilizing the current insecure environment. The main gap is focused on collaborating with management in order to regulate changes and remove their negative effects reflecting on employees. There is also a geographical gap within Europe concerning job security and protection systems, especially between old and new member states. In general, better protection mechanisms need to be established. Further recommendations and actions focus on strengthening regulatory legislation aiming to prevent flexible conditions, eliminating diversification in standards and monitoring the activities of multinational banks.

6. European Union Dialogue and Convergence: convergence is an on-going process of collaboration and dialogue among European trade unions. It is not facilitated by diversities in issues such as financial, cultural, tradition and mentality, which suggest that bridging all gaps in Europe might not be possible in the short term future. However, European regulations establishing minimum standards of uniformity and success during negotiations for collective agreements are welcomed and expected to be beneficial, especially for new member states. More convergence in issues such as working time, health and safety is expected, while in issues such as additional bonuses, wages and training, the expectations are not equally high. Although collaboration and dialogue are welcomed in all forms by trade unions' officials, there are no realistic predictions that, at least within the next 10 years full convergence will be achieved. The strategic focus is on establishing better employment and social protection mechanisms in European. Recommendations and

actions focus on investigating further into factors preventing convergence and establishing frameworks to overcome them, as well as on proposing initiatives aiming to strengthen communication and dialogue.

IV. DISCUSSION

Adapting to the challenges of the Knowledge Society requires innovative approaches upon traditional processes and a broader thinking on how organizations and communities of all kinds should or ought to develop their strategies towards their involved stakeholders. When it comes to traditional organizations like trade unions which by their nature play a central role in sensible social issues such as working relations, extrovert initiatives resulting in more collaboration are expected. The powerful means of technology and the new status of the knowledge economy create an environment which both facilitates and requires the transformation of available experiences, lessons learnt, good and bad practices into useful knowledge which could be capitalized and disseminated into transferable skills and strategic decisions.

Roadmapping is one of the most widely applied concepts for supporting collaborative strategic planning both at the enterprise and at the national level. The case of DialogoS+ demonstrates that potentially successful roadmapping depends also substantially on the process itself which entails the dimensions of collaboration, communication, learning and the creation and dissemination of knowledge. It describes an effort to apply the roadmapping process into the existing community of Europe's banking sector trade unions and address issues of European social dialogue. This effort constituted an innovative approach to the ways in which this community deliberates and disseminates its experiences and policy priorities to the public, but was aligned with the social dynamics of this community since it was built upon the experience of previous projects and existing collaboration mechanisms as an outcome of long-term relations. In SECI terms, we could comment that this process involved an interplay between explicit and tacit knowledge, since it combined the systematic knowledge of individual trade unions with their more general "know-how" through accumulated experiences, beliefs and interests.

The roadmapping approach did not aim to introduce radical changes, but provide a well-established way of strategic thinking combined with an underlying scientific background in which this effort reflects. It assisted in policy discussion and formulation in the structured way introduced by the basic roadmapping concept, which integrated new aspects of strategic thinking without seeking to apply complex procedures. By taking all these facts into account, we believe that the community of the European banking sector trade unions gained important benefits from "roadmapping thinking", which could be easily sustained and further exploited in the future.

The adoption of new technologies under the activities of the project can be considered successful since they managed to involve a large number of stakeholders contributing their opinions, proposals and relevant material through everyday web practices such as blogs, social networks and the project

website itself. For example, the Greek Federation of Bank Employees planned to involve its youth associations into the use of videoconferences in simulating social dialogue processes. The training packages created as an outcome of the project will be used in developing important workers skills, responding to the relevant call of the knowledge economy.

The activities of DialogoS+ encountered certain practical limitations and barriers. Under the scope of the project, it was practically impossible to capture all multiple stakeholders' views, interests and objectives with regards to social dialogue into the European banking sector. For example, the DialogoS+ consortium did not include all European banking sector trade unions, representatives of the employers and the policy makers both at national and European level. Other limitations were practical issues regarding the web questionnaire, since diversity in participation among different countries did not facilitate the process of statistical inference.

An important dimension of DialogoS+ was the role of the financial crisis and particularly the way its consequences were escalating during the extent of the project. The crisis was taken into account throughout all stages and especially during the final workshops. However, the uncertainty it introduced into the landscape of global economy, posed difficulties into any attempts of strategic decision-making through forecasting techniques. This uncertainty was reflected in the results of the web questionnaire which for example demonstrated pessimism around issues of work security.

DialogoS+ had a significant impact on European social dialogue and the broad role of trade unions in society also with regards to the financial crisis. The activities of the project were instruments of diagnosis and analysis of what went wrong in the banking sector and how preventive actions need to be deployed in the future. Overall, it demonstrated a clear case of traditional organizations attempting to adjust to the high expectations of the Knowledge Society and its implications.

V. CONCLUSION

The purpose of this paper was to present and examine a case of how organizations and communities shift their traditional processes to knowledge-oriented collaborative approaches in order to adapt to the challenges of the Knowledge Society. For this purpose, we reviewed the nature of these challenges and the concept of roadmapping as collaborative strategic decision-making and knowledge sharing process. At the next step, we presented the activities, roadmapping methodology and key results of the European project DialogoS+ involving the community of Europe's banking sector trade unions. Under this context, we discussed this case as an effort of creating and managing knowledge in professional communities. In addition, we commented on how this effort reflects on the roadmapping concept, issues of European social dialogue and the financial crisis in the banking sector.

We believe that despite certain practical limitations and barriers, DialogoS+ was successful both as an outcome and as a case of innovative approaches to traditional processes. Communities which bear similar characteristics, such as trade

unions and federations in other sectors, established interest groups, policy discussion forums and international networks could benefit from this knowledge in future initiatives.

Future research should address the issues of knowledge-oriented collaborative approaches in policy formulation and their socio-political implications. Adapting to the complex challenges of the Knowledge Society requires efficiency, flexibility and an open-minded attitude. We express our hopes that the lessons learnt from DialogoS+ will constitute a starting point of more efficient dialogue in the banking sector, resulting in better collaboration among social stakeholders such as trade union officials, employers and employees, policy makers and the public.

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REFERENCES

[1] G. Room, *The European Challenge: Innovation, Policy Learning and Social Cohesion the New Knowledge Economy*, Bristol: The Policy Press, 2005.

[2] W. Dolfsma, *Knowledge Economies. Organization, Location and Innovation*, London: Routledge, 2008.

[3] D. Rooney, G.E. Hearn and A. Ninan (eds.), *Handbook on the Knowledge Economy*, Edward Elgar Publishing, 2005.

[4] R. Phaal and G. Muller, "An architectural framework for roadmapping: Towards visual strategy", *Technological Forecasting and Social Change*, vol. 76, no. 1, pp. 39-49, 2009.

[5] W.W. Powell and K. Snellman, "The Knowledge Economy", *Annu. Rev. Sociol.*, vol. 30, pp. 199-220, 2004.

[6] N. Shadbolt, "The Semantic Web Revisited", *IEEE Intelligent Systems*, vol. 21, no. 3, pp. 96-101, 2006

[7] G. Walsham, "Knowledge Management: - The Benefits and Limitations of Computer Systems", *European Management Journal*, vol. 19, no.6, pp. 599-608, 2001.

[8] P. Drucker, *The Age of Discontinuity: Guidelines to Our Changing Society*, New York: Harper and Row, 1969.

[9] S. Dexter and B. Hope, "ICT and Social Capital in the Knowledge Economy", in *Proc. 3rd International Conference on Innovations in Information Technology*, Dubai, November 2006.

[10] F.J. Carillo, "Towards a global knowledge-based development agenda", *Journal of Knowledge Management*, vol. 12, no. 5, pp. 3-7, 2008.

[11] C. Heckscher and P. S. Adler (eds.), *The Firm as a Collaborative Community: Reconstructing Trust in the Knowledge Economy*, Oxford: Oxford University Press, 2006.

[12] K. Metaxiotis and K. Ergazakis, "Exploring stakeholder knowledge partnerships in a knowledge city: a conceptual model", *Journal of Knowledge Management*, vol. 12, no. 5, pp. 137-150, 2008.

[13] C. Switzer, "Time for change: empowering organizations to succeed in the knowledge economy", *Journal of Knowledge Management*, vol. 12, no. 2, pp. 18-28, 2008.

[14] A. Lam, "Embedded Firms, Embedded Knowledge: Problems of Collaboration and Knowledge Transfer in Global Cooperative Ventures", *Organization Studies*, vol. 18, no. 6, pp. 973-996, 1997.

[15] I. Nonaka, H. Takeuchi, *The Knowledge-Creating Company*, New York: Oxford University Press, 1995.

[16] I. Nonaka, R. Toyama and N. Konno, "SECI, *Ba* and Leadership: a Unified Model of Dynamic Knowledge Creation", *Long Range Planning*, vol. 33, no. 1, pp.5-34, 2000.

[17] I. Nonaka, R. Toyama, "The knowledge-creating theory revisited: knowledge creation as a synthesizing process", *Knowledge Management Research and Practice*, vol. 1, no.1, pp. 2-10, 2003.

[18] M. Polanyi, *The Tacit Dimension*, London: Routledge and Kegan Paul, 1966.

[19] R. Phaal, "Technology roadmapping - A planning framework for evolution and revolution", *Technological Forecasting and Social Change*, vol. 71, no.1-2, pp. 5-26, 2004.

[20] V. Kamtsiou, A. Naeve, L. K. Stergioulas and T. Koskinen, "Roadmapping as a knowledge creation process: The PROLEARN roadmap", *Journal of Universal Knowledge Management*, vol. 1, no.3, pp. 163-173, 2006.

[21] T. A. Kappel, "Perspectives on roadmaps: How organizations talk about the future", *Journal of Product Innovation Management*, vol.18, no. 1, pp. 39-50, 2001.

[22] I. J. Petrick and A.E. Echols, "Technology roadmapping in review: a tool for making sustainable new product development decisions", *Technological Forecasting and Social Change*, vol. 71, pp. 81-100, 2004.

[23] J. H. Suh and S. C. Park, "Service-oriented technology roadmap (SoTRM) using patent map for R&D strategy of service industry", *Expert Systems with Applications*, vol. 36, no. 3, pp. 6754-6772, 2009.

[24] V. M. Panapanaan, L. Linnanen, M. Karvonen and V. T. P. Phan, "Roadmapping corporate social responsibility in Finnish companies", *Journal of Business Ethics* vol. 44, pp. 133-148, 2003.

[25] T. U Daim and T. Oliver, "Implementing technology roadmap process in the energy services sector: A case study of a government agency", *Technological Forecasting and Social Change*, vol.75, no. 5, pp. 687-720, 2008.

[26] A. Rae, R.C. Pfahl and C. Richardson, "INEMI's gap analysis based on the 2007 electronics roadmap", in *Proc. 12th International Symposium on Advanced Packaging Materials: Processes, Properties, and Interface*, San Jose, California, 2007, pp. 32-41.

[27] Y. Hwang and S. Yuan, "A roadmap for ambient E-service: Applications and embracing model", *International Journal of E-Business Research*, vol.3, no. 1, pp. 51-73, 2007.

[28] J. Shim, "Roadmap for E-commerce standardization in Korea", *International Journal of IT Standards and Standardization Research*, vol. 3, no. 2, pp. 1-14, 2005.

[29] M. A. Wimmer, "Reflections on the eGovRTD2020 roadmap for e-government research", in *Proc. ICEGOV '07: 1st International Conference on Theory and Practice of Electronic Governance*, Macao, China, December 2007, pp. 417-426.

[30] BBC News. (2003). A performance-based roadmap to a permanent two-state solution to the Israeli-Palestinian conflict. [Online] Retrieved 18/2/2009. Available: http://news.bbc.co.uk/1/hi/world/middle_east/2989783.stm

[31] European Commission. (2008). Roadmap for equality between women and men (2006-2010). [Online] Retrieved 18/2/2009. Available: <http://europa.eu/scadplus/leg/en/cha/c10404.htm>

[32] European Federation of Public Service Unions. (2006). Roadmap 2007-2009 for the European social dialogue in national and European administration. [Online] Retrieved 18/2/2009. Available: http://www.epsu.org/a/2945?var_recherche=roadmap

[33] L.K. Stergioulas, C. Minetou, T. Koskinen, M. Klein, J. Dang, Y. Denual, V. Kamtsiou and K. Markopoulos, "Roadmap for the future of eTraining/eLearning technologies in Europe", in *Proc. IEEE International Conference on Advanced Learning Technologies (ICALT'04)*, Joensuu, Finland, August 2004, pp. 460-464.

[34] A. Naeve, "The Concept Browser - a New Form of Knowledge Management Tool", in *Proc. 2nd European Web-Based Learning Environment Conference*, Lund, Sweden, October 2001, pp. 151-161.

[35] C.A. Ioannou, P. Panagiotopoulos and L.K. Stergioulas, "Roadmapping as a Collaborative Strategic Decision-Making Process: the DialogoS+ European Project Approach", 21st Conference of the Greek Operational Research Society, Athens, Greece, May 2009, to be presented.

[36] C.A. Ioannou, "Best practices for social dialogue in the banking sector and new challenges, DialogoS+ Report", INE-OTOE, 2008, to be published.

[37] C. A. Ioannou, K. Kanellopoulos, A. Mouriki and J. Toutziarakis, "Evaluation of international experience on social dialogue in respect with changes ensuing the new economy in the banking sector and transfer of best practices, DialogoS Report", ENEKA Ltd and INE-OTOE, 2002.