Preface

"Information Systems and Modern Society: Social Change and Global Development" belongs to the *Advances in Information Systems and Social Change Series* book project. There are four sections and 17 chapters in this book.

SECTION 1: SOCIAL AND PERSONALIZED LEARNING IN WEB-BASED ENVIRONMENTS

Section one consists of 5 chapters. In Chapter 1, Malinka Ivanova and Anguelina Popova explore "Formal and Informal Learning Flows Cohesion in Web 2.0 Environment." The current state of the Web is recognized as "social" because of the multiple possibilities for participation, stimulation, and facilitation of interactions in groups, communities, networks, and among people with similar interests. Knowledge exchange is easier than ever allowing access to tools, services, and content. Social software and social media already have demonstrated their implications on the implementation of new methods for learning in both formal and informal educational settings. Web 2.0 can therefore be presented as a platform for building, running and combining services and applications. These social and technological changes have influenced Learning Management Systems (LMSs) development, proposing improved mechanisms for authoring, communication and collaboration. The features of contemporary LMSs 2.0 are conducive for the realization of multiple methods, directions, and channels for learning, encouraging informal conversation, generating collaborative content, and sharing information and knowledge.

This exploratory study examines the affordances of a free hosted LMS 2.0 for learning enhancement in order to reveal the most effective approaches to its use. The research contributes to a better understanding of formal and informal learning flows in Web 2.0 environment, including LMS 2.0 and applications beyond it, that can help lead to improvements in students' learning experiences. The activities of students are examined and their analysis is used as a basis for a model showing the preferred places and applications for formal and informal learning. This research explores the advantages of new generation LMSs combined with Web 2.0 technologies to enhance the openness of the learning process (media, content, human capabilities), bring about dynamics and interactivity in formal and informal ways, and elicit opportunities for self-regulated learning. The findings suggest that informal learning activities are performed in all parts of the learning areas organized under LMS 2.0, including personal spaces, course learning places, public libraries, and learning communities. The results suggest the positive effects of social and technological changes using the Web on student engagement and achievements. The facilitating role of informal media to bring about better learning is noted. The employment of formal learning

flow strongly dominates the course learning section, and in the public repository which collects learning resources in the course domain. It is observed that several formal activities occur beyond the LMS 2.0 frame, in other Web 2.0 applications and social media. For some students, this step transfers the abstract concepts into real world scenarios, helping them see patterns and movements that explain ideas and their importance. These informal learning flows can complement and enrich the formal learning process, and formal learning flows can be premises for informal learning to occur. Further, the parallel performance of formal and informal learning activities could be used for learning optimization.

In Chapter 2, Yuri Nishihori, Chizuko Kushima, Yuichi Yamamoto, Haruhiko Sato, and Satoko Sugie introduce "Global Teacher Training Based on a Multiple Perspective Assessment: A Knowledge Building Community for Future Assistant Language Teachers." The main objective of this research is to design and implement Web-based collaborative environments to support global training based on multiple perspective assessment for both future and novice ALTs (Assistant Language Teachers) who will come to Japan from various parts of the world. The system was created in order to improve the ability to acquire professional knowledge in advance from experienced senior teachers, both Japanese teachers (JTEs) and former ALTs. The use of Computer Support for Collaborative Learning (CSCL) was adopted as the platform for their online discussion. Named "Forest Forum," it mainly focuses on a multiple perspective assessment to help support social and personalized aspects such as individual accountability, and contributions to collaboration. It also enables future and novice ALTs all over the globe to undergo pre-training and join a community of teachers before starting to work.

This research makes a major contribution to both the creation of knowledge, and the visualization of each member's contribution. Inside the Forest Forum, the actual knowledge building can be seen in the comment box, under which various topics have been visualized as trees. Contributions from each member can be visualized as flowers on the trees. When the reply to a topic is posted, a flower is displayed in the topic tree on the reply screen as well as on the home page. Whenever a reply to the same topic is posted, the comment boxes extend downward in order of posting, and the color of the comment box becomes the same as that of the flower. Therefore, one can see the degree of members' contributions at a glance. Eventually, the more trees and flowers there are on the screen, the more active is the discussion currently within the community.

The initial results are reported using system design analysis design and a Web-based questionnaire answered by the participants involved in this knowledge-building forum. 16 ALTs and 14 JTEs enrolled in the forum, and data was collected by an anonymous online questionnaire. The results indicate that not only future and novice ALTs, but also experienced teachers demonstrated greater gains in their professional development. Both future and novice ALTs came to realize the development of their professional identity with the help of experienced teachers. Experienced teachers themselves gained a deeper awareness of their professional knowledge and identity. Moreover, most of members exhibited a willingness and engagement with the community. All in all, it can be concluded that a global online discussion forum with a multiple perspective assessment can work as an effective pre-training system offered to prospective ALTs.

According to Elvira Popescu and Costin Badica, the advent and omnipresence of information systems have been revolutionizing and changing not only the way we communicate, access information, and conduct businesses, but also the way we learn. Chapter 3, entitled "Creating a Personalized Artificial Intelligence Course: WELSA Case Study" illustrates the use of WELSA, an adaptive educational system for the implementation of an Artificial Intelligence (AI) course, which is individualized to the learning style of each student. Several of the issues addressed throughout this chapter describe similar

approaches existing in the literature, such as how the AI course is created, and what kind of personalization is provided in the course including the underlying adaptation mechanism. The authors also focus on whether the course is used effectively by the stakeholders (teachers and students respectively). The results presented in the chapter confirm the practical applicability of WELSA and its potential for meeting the personalization needs and expectations of digital native students.

Neil Rubens, Toshio Okamoto, and Dain Kaplan demonstrate "Expertise Learning & Identification with Information Retrieval Frameworks" in Chapter 4. In today's knowledge-based economy, having the proper expertise is crucial to resolving many tasks. Expertise Finding (EF) is an area of research concerned with matching available experts to given tasks. The traditional approach to expertise finding is typically a slow and burdensome process, involving directly contacting individuals who are familiar with the areas for which expertise is required, and then relying on their ability to provide appropriate referrals. This research looks at the use of computers to help mitigate this burden to a considerable degree. As a result of this technological support, expert finding systems (EFS) have started to gain acceptance and are being deployed in a variety of areas, for example the Taiwanese National Science Council has utilized EFS to find reviewers for grant proposals, and Australia's Department of Defense has deployed a prototype EFS to better utilize and manage its human resources.

Mostly, EF systems operate either via a content-based approach, which utilize the text of the input along with the text of the available experts' profiles to determine a match, or a structure-based approach, which analyze the inherent relationships between experts, affiliations, papers, etc. (such as are available in citation networks) to find likely experts. Both approaches have strengths and shortcomings. In an attempt to leverage the advantages of both, there has been work on combining the two; but the coupling has been loose – independently implementing both approaches and then combining their outputs. Since this increases the effort needed to implement and maintain both systems, they do not improve the representations of either, but only result in a combining of outputs at its final stage.

Recent work has demonstrated the merits of converting a content-based representation to a structure based one (e.g. semantic networks), and applying structure-based analysis methods to it. The authors show that a reverse approach can be equally if not more effective – meaning the technique of converting a structure-based representation to a content-based one. In addition to using content-based analysis methods (on initially structured data), the proposed conversion allows for easily combining both representations, by simply appending the structural contents to existing contents; unlike structure-based representations where the merging of structures is far from trivial. Finally, the proposed method allows for an integrated implementation with content-based (information retrieval) frameworks that provide easy deployment and scalability; this is something that structure-based approaches often lack.

In Chapter 5, Andrea Sterbini and Marco Temperini present "SocialX: An Improved Reputation Based Support to Social Collaborative Learning through Exercise Sharing and Project Teamwork." Collaborative learning is an all-important learning methodology, supporting learners in developing their knowledge, skills, and critical thinking, for both individual and group work. More recently the interest of researchers has been extended to comprise the social dimension of e-learning, where social exchange and interaction in a community of students support learning effectively. Since it helps to enable monitoring (as well as evaluating and supporting) a learner's participation through instructional activities in a social-collaborative learning system, a reputation system (a tool quite often found in social networks) can be quite effective in the learning environment.

This chapter profiles the SocialX system, in which the authors aim to integrate the group-collaborative and the social-collaborative dimensions of e-learning. The authors propose a comprehensive bouquet

of modules that allow instructors to employ learning activities based on collaborative development of exercise-tasks (home-work) and of group projects, together with the management of micro-forums dedicated to single tasks, all connected in a reputation system equipped to represent the learners' behavior and outcomes. Peer-assessment and self-assessment are supported, as components of the reputation system. The reader will have the opportunity to evaluate the design issues of the system, and to look, in particular, at those features that make the system suitable for the following: 1) training applicative skills, dealing with the applied counterpart to theoretical, and may be more individual-focused; 2) training group-work capabilities, where, in particular, such skills are used in a project-development environment where social-collaborative features are available; 3) deploying learning experiences in a social-collaborative framework, including peer and self-assessment, towards the development of high cognitive levels of skill.

Prior to this work, the authors designed and developed a system for personalized course construction and delivery, including the management of a repository of standard learning objects. The authors are focused currently on the fusion between Lecomps and SocialX, in a framework supporting the Vygotskij pedagogical theory and implementing its characteristic Zone of Proximal Development. The result of these efforts is a personalized course construction system in which the course can comprise both individual and social collaborative learning activities.

SECTION 2: INFORMATION SYSTEMS AND INFORMATION TECHNOLOGIES ISSUES IN NONPROFITS

Section two has 4 chapters. In Chapter 6, Louis-Marie Ngamassi Tchouakeu et al. work on "Exploring Barriers to Coordination between Humanitarian NGOs: A Comparative Case Study of two NGO's Information Technology Coordination Bodies." Taking the context of the massive international response to humanitarian crises such as the South Asian Tsunami in 2004, the Hurricane Katrina in 2005 and the Haiti earthquake in 2010, this chapter examines and explores the importance of humanitarian inter-organizational collaboration and coordination. Since humanitarian nongovernmental organizations (NGOs) are increasingly collaborating through inter-organizational structures such as coalitions, alliances, partnerships, and coordination bodies, these NGOs have information technology coordination bodies as groups of NGOs aimed at improving the efficiency of ICT use in humanitarian assistance endeavors through greater coordination. Despite their popularity, little is known about these coordination bodies, especially the extent to which they address inter-organizational coordination problems.

This chapter examines the effectiveness of humanitarian NGOs' information technology coordination bodies in addressing inter-organizational coordination problems. To guide the study, the authors employ an analytic framework that enables organizing a myriad of well-known inter-organizational coordination barriers into three categories, which have been recognized as factors for successful coordination among organizations in coordination bodies. The analytic framework is applied to data collected through interviews, observation, and document analysis, from two coordination body case studies that revealed fifteen different barriers to coordination among humanitarian NGOs. Findings suggest that despite positive attitudes toward coordination by members, seven of eight widely accepted barriers to coordination still exist among members of these coordination bodies. Furthermore, in a comparison of mandate-oriented, structural and behavioral coordination barriers, the research found that mandate issues were the most significant, and structural factors were found in the greatest numbers. Findings also suggest that effective

humanitarian NGO information technology coordination bodies must pay attention to both organizational design and management issues, although the former are likely to have a greater impact on coordination.

One of the greatest contributions of this research is to point out that the value of creating IT issue focused coordinating bodies in the humanitarian relief sector is that it reduces or eliminates the barrier to coordinate around resources. The authors believe that the coordinating bodies create a structure and mechanism for the home organizations and outside donors to channel funding, staff, and supplies to create collaborative IT projects that may have been impossible within any single NGO. Given the other (seven) significant barriers that still exist in this sector with IT coordinating bodies, it is significant when one can see the diminished effects of one barrier. This study has several limitations that may not allow the claim to made that all coordinating bodies, or even all IT-focused coordinating bodies, help to resolve resource barriers to coordination. However, the implications are that through the use of a well-structured coordinating body with the appropriate mandates and culture, the result may be that it helps to facilitate coordination around IT issues across organizations, at least in the area of resources.

In Chapter 7, Geoffrey Greenfield and Fiona H. Rohde focus on "Technology Acceptance: Are NFPs or their Workers Different?" Workers' attitudes towards technology, particularly those within not-for-profit (NFP) organizations, have received less attention and focus despite the growing interest in the NFP sector and the potential differences between for-profit and NFP organizations and their employees. Irrespective of firm type, the change unleashed within a firm through the implementation of new technology ultimately requires that users accept the technology. Therefore, an understanding of workers' attitude to technology allows for the improved likelihood of a successful implementation of technology in organizations.

The main contribution of this to technology acceptance research is the contrast in attitudes toward technology between NFP employees within a traditional business area, i.e., the marketing division of an NFP, or workers in the more socially sensitive area, such as social work. The present research examines whether the two groups of people who have entered different careers, have different attitudes to technology. These different attitudes to technology may in turn affect the variables contained in technology acceptance models. Data was collected using a survey instrument in two NFP organizations. In particular, the authors explored whether models developed through research focusing on the for-profit sector are equally applicable to NFP organizations and their workers. In doing this, the authors explore the relationship between attitude, perceived usefulness, and perceived ease of use in relation to technology for workers within NFP organizations.

The Technology Acceptance Model (TAM) is well accepted as a model to predict acceptance of new technology by individuals, though the universality of the TAM model, to fit across all situations, has recently been called into question. One of the main research findings was, for successful deployment of technology, organizations need to understand the attitude of their workers towards technology. Additionally, workers' underlying view of technology may drive some other decisions they make such as career choice, and ultimately their acceptance of technology. From a practical perspective, by gaining a better understanding of workers attitudes to technology, organizations can better tailor technology deployment to suit their worker's needs thus improving the likelihood of a successful implementation. That is, when deploying the same technology within an organization, different groups of employees within the same organization may have different attitudes, thereby requiring firms to consider different users when implementing new technologies.

In Chapter 8, Mohammad Mourhaf Al Asswad, Sergio de Cesare, and Mark Lycett conduct "A Query-based Approach for Semi-Automatic Annotation of Web Services." Semantic Web Services (SWS) are

very important components of the future intelligent Web because they can automate the discovery and composition of current syntactic Web services. A major issue that prevents a wider adoption of SWS is related to the manual nature of the semantic annotation task. Manual annotation is a hard, time-consuming and error-prone process and thus its automation is highly desirable. Few approaches have been proposed to semi-automate the annotation task, as they are difficult to use and cannot perform accurate annotation for the following reasons: (1) They require building application ontologies to represent candidate services; and (2) they cannot perform accurate similarity measurements between service elements and ontological entities, especially those contain compound nouns (CNs). In response to calls for a more effective SWS annotation system, the authors propose a novel annotation approach that can facilitate semi-automatic annotation of Web services. This approach is simpler and more effective than existing annotation approaches. It is simpler because it does not require building application ontologies to represent WSDL files of candidate services. Instead, candidate service elements are extracted from a WSDL file and then used to generate query instances by filling a Standard Query Template. The resulting query instances are then executed against a repository of ontologies using a novel query execution engine to find appropriate correspondences for candidate service elements. This query execution engine employs name and structural matching mechanisms that can effectively measure similarities between service elements and ontological entities containing CNs.

The proposed semi-automatic annotation approach is evaluated by employing it to annotate existing Web services using published domain ontologies. Precision and recall are used as evaluation metrics. The evaluation results demonstrate the effectiveness and applicability of the proposed approach since almost complete and clean annotation results, in relation to manual results, can be obtained. Some service elements cannot be annotated using the selected ontologies, however, due to issues related to candidate WSDL files and coverage of domain ontologies. This problem is called the low percentage problem. To alleviate the low percentage problem, future research should focus on developing effective and automatic ontology extension mechanisms that can extend existing ontologies with appropriate correspondences for service elements that do not have matches in ontologies. Moreover, text analysis techniques should be used to automate the extraction of service elements from candidate WSDL files. Automating the extraction process may lead to a fully automatic service annotation process.

In Chapter 9, Yanli Zhang et al. dissect "A Broken Supply and Social Chain: Anatomy of the Downfall of an Industrial Icon." There was a time in the history of GM when it was the largest corporation in the US and in the world. The announcement of GM's bankruptcy on June 1, 2009 shocked the world and had a tremendous impact on the United States economy. This chapter explores the following questions: What were the fundamental causes of GM's problems? What can be learned from GM's mistakes and experiences? How and why did an industrial icon come to ruin? The authors analyze the reasons that led GM into dire straits during the 2008-09 financial crises. The authors argue that the stage for the difficult situation GM fell into was actually set decades ago. GM, for far too long, had been ignoring factors that were directly responsible for the success or failure of the company. A major factor was that GM had been extremely slow in reacting to the competition from Japanese automakers and the threat of more fuel-efficient cars, and it was more focused on thinking on what they could produce, rather than what consumers wanted to buy.

The chapter goes on to analyze in detail several of the internal and external factors that led to GM's financial woes. They point out the following internal factors: 1) arrogant leadership – Executives at GM were accustomed to thinking that whatever is good for GM is good for the United States; 2) unhappy customers – GM had been losing the loyalty of younger generations because it had not been listening

to customer demands, 3) "Generous Motors" – GM's pensions and benefits were too generous to be affordable; 4) poor forecasting – GM never undertook scenario planning to anticipate market shifts; and 5) casual controls – GM failed to have a handle on its internal financial control and ran out cash to carry out the operations. External factors include 1) severe competition – foreign companies flooded the US market and changed the rule of the game with their quality and cost; 2) relentless environment – gas price continuously increasing put GM in a disadvantaged position; and 3) intense regulations – government regulation added to GM's cost. In conclusion, the authors argue that if GM had responded to its problems earlier, its financial troubles could have been avoided. The authors went on further to warn that this is what could happen to any company if it rests on its laurels and fails to adapt to change.

SECTION 3: INFORMATICS AND SEMIOTICS IN ORGANISATIONS

Section three consists of four chapters. Göran Goldkuhl proposes "Actability Criteria for Design and Evaluation: Pragmatic Qualities of Information Systems" in Chapter 10. Information systems actability theory (ISAT) is a conceptualisation of information systems emphasizing their pragmatic dimensions. It can be seen as a practical theory aiming to support the design and evaluation of IS. As a practical theory, ISAT comprises a conceptualisation of IS and several models. ISAT comprises also normative criteria of pragmatic character (quality ideals).

Information systems actability theory builds on a communicative action perspective on IS. Information systems are seen as instruments for technology mediated work communication. Human actors are communicating (i.e. sending and/or receiving messages) through an information system. Sending a message through an IS means performing a communicative action. In effect, the IS affords a communicative action repertoire to its users. This repertoire enables and constrains the users in their communicating. Such a communicative action perspective does not, however, dismiss the perspective of a human utilising and interacting with an IT artifact. ISAT comprises a number of aspects of human-computer interaction. However, usage of an information system is considered to be a user-via-system-to-user communication. ISAT gets its current theoretical backing from theories and knowledge traditions like pragmatic philosophy, speech act theory, classical semiotics, social action theories, affordance theory, semiotic HCI engineering, conversation analysis, discourse theory, and activity theory.

The chapter presents 19 actability criteria divided into three groups: 1) criteria concerning user-system interaction, 2) criteria concerning user-through-system-to-user communication, and 3) criteria concerning an information system's contribution to work practice processes. The first group is concerned with fundamental interaction criteria and navigation criteria and it consists of the following criteria: Clear action repertoire, intelligible vocabulary, action transparency, clear feedback, easy navigation, action stage overview, conceptual consistency, and action accessibility. The second group is concerned with reading and formulation criteria and it consists of the following criteria: clear and accessible work practice memory, information accuracy, actor clarity, intention clarity, satisficing communication needs, relevant communication demands, work practice memory addition, addressee relevant communication and addressee adapted communication. The third group consists of only one criterion: subsequent action support. These criteria should be possible to use in the design of information systems. The functions of the criteria are here to express possible quality ideals to strive for. The criteria can be used as inspiration for hen designing the system based on domain-specific goals. They can also be used in the formative

evaluation of design proposals during the IS development process. These criteria should also be possible to use in post-evaluations of information systems.

In Chapter 11, Vânia Paula de Almeida Neris et al. concentrate on "Collective Construction of Meaning and System for an Inclusive Social Network." This chapter addresses the problem of designing an inclusive social network information system which makes sense to the user community and also respects their diversity. To reach this audacious challenge, the authors have adopted Organizational Semiotics and Participatory Design as theoretical and methodological frames of reference. The research took place in Brazil, and the authors provide an overview of the scenario of vast diversity found in Brazil regarding societal issues such as poverty, illiteracy, and lack of access to technologies, just to mention a few examples. Considering the challenging scenario – and one that is not exclusive to of Brazil, – the authors introduce the domain of online inclusive social networks as a platform that may contribute for the constitution of a fairer society.

The research examined a group of thirty people participating in workshops in which organizational semiotics artifacts and methods were collaboratively used, such as stakeholder analysis, semantic analysis, and use of an evaluation frame. The authors argue in favor of a socio-technical view for designing inclusive systems with the involved parties, and show an approach to accomplish it. The results from the workshops were analyzed revealing people involved or affected by the system, requirements based on problems and solutions discussed with the participants, and also perceptions of the meaning of an inclusive social network in that context. Finally, the authors present an insightful discussion about how each of the aspects discussed in the workshop influenced direct or indirectly the resulting inclusive social network system. Besides the design solution and lessons learned that could inspire other user interface designers, the authors have articulated theory and practice. Some important organizational semiotics methods and artifacts were revisited to allow collective participation of users from the local community. Moreover, another interesting contribution is the system itself that proposes ways to cope with low literacy, communication among people with different functional conditions, and system maintenance by the community; which is significantly different from mainstream social network systems.

In Chapter 12, Keiichi Nakata and Stuart Moran discuss "A Semiotic Analysis of a Model for Understanding User Behaviors in Ubiquitously Monitored Environments." Ubiquitous computing as a field is developing rapidly, driven by advances in mobile, embedded, wireless, and sensor technologies. A key enabler of the interactive aspects of this technology is an unprecedented degree of data collection specifically about aspects of its users. This data is used to provide a multitude of novel services and applications to users. However, one of the problems for data collection in ubiquitous computing is the act of collecting data itself. Existing research has shown that the observation/monitoring of people can cause changes in their behavior. Hence, when users are observed they may be affected, making any data collected about them potentially inaccurate. This could render any services or applications provided by the system ineffective. The act of monitoring and the resulting impact on system services may also lead to other undesirable effects such as stress and distrust. This is particularly disconcerting when considering the scale of ubiquitous computing. This motivated the development of a predictive model, grounded in the principles outlined by the Theory of Planned Behavior and the relationship between the system characteristics of monitoring systems, and user perceptions of those characteristics. By predicting the potential undesirable effects of ubiquitous monitoring, prior to the development and deployment of systems, it gives developers the opportunity to improve their designs to minimize these effects. The model is designed around three conceptual layers: physical, technical, and social, which have several parallels

with those used in semiotic analysis. As such, semiotics was placed as an analytical perspective to gain useful insights into the problem.

The key contributions of this chapter center on the proposed model and its examination through a semiotic lens. The model provides a systematic means for analyzing and explaining user behavior in terms of both attitudes and perceptions of users in relation to systems characteristics. This is in direct contrast to other similar predictive models that do not explicitly detail the specific characteristics of a system that influences behaviors. A secondary examination of the model through semiotic framework explains how different people would interpret a monitoring device in different ways based on the unique perspective of treating such a device as a sign. This is central to the argument in the model that user attitudes and behaviors toward a system are grounded in the way a user perceives the system; and that differences in social norms that govern its interpretation and ways to interact with it lead to different, sometimes unexpected, behaviors. Overall, this chapter contributes to framing and deepening the understanding of the ways in which users can be influenced by ubiquitous monitoring systems.

In Chapter 13, Soheil Ghili, Hengameh Shams, and Madjid Tavana study "Innovation or Imitation: Some Economic Performance and Social Welfare Policy Perspectives." The tradeoff between innovation development and innovation diffusion has long been a controversial subject widely studied in the technology change and industry performance literature. This tradeoff arises from the fact that preventing free availability of existing innovative discoveries to all producers, although beneficial from an ex post efficiency standpoint, often fail to provide the ex-ante incentives for further innovation. The problem of how firms decide on innovation-related issues is of much interest and importance. In its simplest form, the appropriability problem is concerned about a firm deciding on whether or not to innovate - or how much to innovate - based on the extent to which the innovation is appropriable.

This chapter studies the interdependency between innovation and imitation and shows that a firm can be both an innovator and an imitator at the same time. While this two-fold role of a firm has been addressed sporadically in the field literature, this research considers the interdependency between innovation and imitation. In this chapter a mathematical model is constructed, addressing the question of how much to imitate in the context of the two-fold role of a firm (innovator and imitator) in a strictly competitive game setting. Other investigated issues are how firms decide on how much to innovate and imitate, and how their decisions affect social welfare under different conditions of imitability. It has also studied the effects of two widely noted policies: first, the intellectual property right (IPR) and second, the policy of treating innovation as a public good.

One of the main research findings was that imitable innovation (having low imitation cost) can be considered as a public good. By simulating the model, it was observed that in this case, tax-subsidy policy might result in more innovation development and more social welfare. Meanwhile, this policy does not function properly in the case of non-imitable innovations. It was also illustrated that IPR policy leads to more innovation development in two ways. First, it guarantees that the firm's innovations will not be easily imitated (it appropriates innovation). Secondly, it guarantees that if the firm's innovations are imitated, it will earn a profit from selling that innovation and also an equal cost will be incurred to the imitating competitor. It was also shown that the latter function is not fulfilled when the intellectual property is priced high. Another significant insight gained from this study was that an increase in imitation cost causes the effect of the tax-subsidy policy gradually become less effective and even harmful to welfare since it causes a large amount of superfluous innovation to be developed.

SECTION 4: TECHNOLOGY TRENDS AND CRITICAL SOCIAL CHALLENGES

Section four consists of four chapters. In Chapter 14, Melih Kirlidog and Aygul Kaynak initiate a "Project Technology Acceptance Model and Determinants of Technology Rejection." Technology Acceptance Model (TAM) posits that usage of an information system is determined by behavioral intention and that behavioral intention is also determined by the person's attitude towards the use of the system and also by his perception of its utility. If the individual thinks that usage of the system was affecting his/her performance, the system is evaluated as useless by them. Therefore, TAM hypothesizes a direct link between perceived usefulness and perceived ease of use.

The main contribution of this research is to show whether there is such direct relationship between usefulness and ease of use. While doing this the authors employed the negative or reverse of these ideas and observed the relationship between difficulty of use and uselessness on user rejection of technology. They conducted a survey on the customers of an Internet banking application in Turkey who disused the system. One of the research findings was that where a survey question was related to usefulness in a negative way, question about easiness of use has also been answered negatively. Survey results were collected and evaluated using SPSS. The reliability and variance analyses supported the validity of this study's TAM constructs which are perceived uselessness and perceived difficulty of use in evaluating the surveyed Internet banking application. According to their results, one of the main study findings was that TAM is useful for understanding the user behavior for not adopting the system as much as TAM is useful for adopting an information system. Collected data also showed that personal privacy and involvement both had a significant effect on a customer's decision. Collection of data taken almost 2 months, and users were reluctant to participate survey. However the authors convinced a majority of users to do the survey by committing that these will be used for improvement of the system. The results of the research were shared with this bank. The bank considered these and took necessary steps in order to improve and enhance current its Internet banking application.

In Chapter 15, Biresh K. Sahoo and Dieter Gstach pinpoint "Scale Economies in the Indian Commercial Banking Sector: Evidence from DEA and Translog Estimates." To promote efficiency and competition in the Indian financial sector, the Reserve Bank of India initiated in 1992 a number of reforms. In this scenario the authors believe that banks are in the pursuit of enlarging their sizes using available scale economies in order to enhance their asset base and profit so as to meet global standards. This chapter applies and compares two alternative approaches – the translog cost model and the DEA cost model, to analyze the impact of competition on scale economies' performance across the entire spectrum of ownership groups of the Indian commercial banking sector. This will enable one to investigate the economic linkage between ownership and performance in the light of the property right hypothesis and public choice theory. The common premise underlying both the approaches is the deterministic nature of the observations.

The empirical results indicate that while the translog model exhibits increasing returns to scale for all the ownership groups, the DEA model reveals economies of scale only for foreign banks, diseconomies of scale for nationalized banks, and both economies and diseconomies of scale for private banks. The divergence of the results obtained from these two estimation models may arise from two sources: one is the model set up, and the other is the assumed deterministic nature of production, employed in both the approaches. From a theoretical perspective, the use of DEA is advantageous as the econometric method can confound the effects of misspecification of functional form with scale economies, flexible functional forms are susceptible to multicollinearity, and theoretical restrictions imposed to have

a well-behaved production technology may be violated. From an empirical perspective, the definition of scale economies through a constant input mix employed in the translog model is restrictive. The DEA model is, however, flexible in this respect: it neither requires the restrictive assumptions that the unit factor prices are always available with certainty, nor that these prices are exogenous to the firms. This is so because the cost setup in the DEA model assumes that firms not only have control over the mix and quantities of inputs used but also exercise control over input prices. Using several different aspects of production planning process, the DEA cost model imputes a multi-factor perspective in its scale estimates to track overall performance. However, the very volatile nature of the banking industry might question the validity of the empirical estimates in this deterministic setting. Therefore, further research is required to examine the bank performance using both SFA and chance constrained DEA for the comparison in a stochastic setting.

In Chapter 16, Artur Sancho Marques and José Figueiredo seek "Stigmergic Hyperlinks: A New Social Web Object." Relatively unnoticed, at the core of every hypertext system is the hyperlink, so ubiquitous and so simple to use that hardly anyone ever glances at it long enough to question: could it be different, serve more than a navigation purpose, serve a better informed understanding of the Web and help rethink some other information systems? The authors glanced at the common hyperlink and gave it a vitality by calling this new Web object species as the "stigmergic hyperlink," or stigh, inspired in Biology's "stigmergic" behaviors, i.e. indirect communication via some mark (stigma) of work (ergon) over a shared medium, e.g. termites' pheromones while building a nest. Stighs look exactly like regular hyperlinks, but thrive when used and fade when neglected, relatively to the usage of their siblings, eventually to a terminal point when their vitality nulls. This attribute and associated behaviors create some interesting possibilities and applications. Web users perform like insects, leaving a mark when clicking hyperlinks.

The most immediate contribute of stighs is as an automatic and decentralized solution to the broken links problem. By using stighs instead of regular hyperlinks, content authors put in place pointers that, if their linked destinations disappear, on time the corresponding stighs will self-terminate after being ignored relatively to the hyperlinks that remained valid, assuming that users see less value in broken resources and hence stops following them. On the same principle, one other application is as the basic building blocks of recommender systems, where the vitality reading is at the root of the classifications. Other strictly usage based applications include real-time pricing systems for hard to price items, such as digital stock photos.

It is important to notice that there is neither central intelligence nor direct communication involved, contrary to other approaches. Each stigh is autonomous, reading its local environment and responding to it, in a bio-inspired "stigmergic" fashion. Direct applications are demonstrable since the authors did materialize the stigh into an existing Web object, first using the C# language and requiring .NET compatible Web servers, and currently on open source using PHP. The authors also coded some artificial users for stress testing. Furthermore, they have been researching other less direct applications, some dependent on factors out of their control, namely an alternative PageRank measure, computed with effective usage instead of just with structural data, and new business models that could support new relationships between content providers and infomediaries, by using stighs as objects that could be extended to serve specialized "Deep Web" search methods for their linked destinations.

In Chapter 17, Sapna Poti, Sanghamitra Bhattacharyya, and T.J. Kamalanabhan face "Social and Cultural Challenges in ERP Implementation: A Comparative Study across Countries & Cultures." Change management in the context of Enterprise Resource Planning (ERP) is not given importance to the extent that would be expected. This research is pivotal in nature because of the fact that it highlights

how different countries approach the subject of change during an ERP implementation. In certain cases while the variables studied are the same, the way each country approaches the variable varies, and one needs to understand the subtle differences of approach. In this research, data was collected by way of case recordings based on open ended questions. Further, personal interviews of respondents were undertaken to elicit qualitative information that could support the questionnaire responses. In addition to direct interviewing, company documents, e-mails, and group discussions were used to shape and triangulate findings.

The impact of social factors and cultural challenges on change management processes and elements are compared and contrasted using multiple case studies from USA, Canada, European (Western/Eastern) and Indian organizations who have adopted ERP technologies. The conceptual framework highlights cultural and social factors that affect ERP implementation. These factors should be studied prior to implementation of an ERP. Further organizations should customize their change initiatives as per the influence of the factors in their country and culture. Finally, the research framework proposed suggests a focus on certain key elements of change processes and strategies that could help address these social and cultural challenges faced by organizations in specific countries. If organizations ignore the pulse of culture and do not tweak the change processes to combat the situation they may not be satisfied with the success rate of the ERP implementation. Such organizations will also find themselves handling huge resistance to the change. Hence, this study brings in the required awareness to manage an ERP change.

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