

ADVANCES ON  
INFORMATION  
PROCESSING AND  
MANAGEMENT

## **CONFERENCE ORGANIZERS INSTITUTES**

The International Conference on Integrated Information is supported by the following Institutes:

Emerald Group Publishing Limited  
Technological educational Institute of Athens, Greece  
University of Peloponnese, Greece  
National And Kapodistrian University of Athens, Greece  
Mednet Hellas, The Greek Medical Network  
2<sup>nd</sup> AMICUS Workshop

To learn more about I-DAS, including the Book Series, please visit the webpage  
<http://www.i-das.org/>

# INTEGRATED INFORMATION

International Conference on Integrated Information

Kos, Greece      September, 29 – October, 3 2011

EDITORS

Georgios A. Giannakopoulos  
*Technological Educational Institute of Athens, Greece*

Damianos P. Sakas  
*University of Peloponnese, Greece*

**All papers have been peer-reviewed**



**Piraeus, Greece, 2011**

## Editors

Georgios A. Giannakopoulos

Technological Educational Institute of Athens  
Faculty of Management and Economics  
Department of Library Science and Information Systems  
Address: Aghiou Spyridonos Street, 12210, Egaleo  
E-mail: [gian@teiath.gr](mailto:gian@teiath.gr)

Damianos P. Sakas

University of Peloponnese  
Faculty of Science and Technology  
Department of Computer Science and Technology  
Address: End of Karaiskaki St., 22100, Tripolis, Greece  
E-mail: [D.Sakas@uop.gr](mailto:D.Sakas@uop.gr)

The copyrights will be owned by the authors under the Creative Commons Attribution-Non Commercial license (<http://creativecommons.org/licenses/by-nc/3.0/>), which permits unrestricted use, distribution, and reproduction in any non commercial medium, provided the original work is properly cited.

**ISSN:**

Printed in the Greece, EU

# CONTENTS

<b>PREFACE: Proceedings of the International Conference on Integrated Information (IC-INFO 2011)</b>	<b>1</b>
Georgios A. Giannakopoulos, Damianos P. Sakas	
<b>Conference Details</b>	<b>3</b>
<b>Keynote Speaker</b>	<b>5</b>
<b>SYMPOSIUM ON INFORMATION AND KNOWLEDGE MANAGEMENT</b>	<b>6</b>
Prof. Christos Skourlas	
<b>Towards the Preservation and Availability of Historical Books and Manuscripts: A Case Study</b>	<b>8</b>
Eleni Galiotou	
<b>An Extensive Experimental Study on the Cluster-based Reference set Reduction for Speeding-up the k-nn Classifier</b>	<b>12</b>
Stefanos Ougiaroglou, Georgios Evangelidis and Dimitris A. Dervos	
<b>Exploiting the Search Culture Modulated by the Documentation Retrieval Applications</b>	<b>16</b>
Nikitas N. Karanikolas and Christos Skourlas	
<b>Information and Knowledge Organization: The Case of the TEI of Athens</b>	<b>22</b>
Anastasios Tsolakidis, Manolis Chalaris and Ioannis Chalaris	
<b>Providing Access to Students with Disabilities and Learning Difficulties in Higher Education through a Secure Wireless framework</b>	<b>26</b>
Catherine Marinagi and Christos Skourlas	
<b>Improving Query Efficiency in High Dimensional Point Indexes</b>	<b>30</b>
Evangelos Outsios and Georgios Evangelidis	
<b>Text Segmentation Using Named Entity Recognition and co-Reference Resolution in Greek Texts</b>	<b>34</b>
Pavlina Fragkou	
<b>KINISIS, a Graphical XQuery Language</b>	<b>42</b>
Euclid Keramopoulos, Achilleas Pliakas, Konstantinos Tsekos and Ignatios Deligiannis	
<b>Dimensionality Curse, Concentration Phenomenon and the KDB-tree</b>	<b>46</b>
Nikolaos Kouiroukidis and Georgios Evangelidi	

<b>Applying Balanced Scorecard Strategic Management in Higher Education</b>	<b>50</b>
Manolis Chalaris, Anastasios Tsolakidis and Ioannis Chalaris	
<b>A Web Portal Model for NGOs' Knowledge Management</b>	<b>54</b>
Zuhal Tanrikulu	
<b>The Digital Archives System and Application Optimized for the Tradition Knowledge Archives</b>	<b>58</b>
Jeon Hong. Chan, In Deok. Hwang, Jae Hak. Park, Hyeok. Sim, U won. Gwon and Soon Cheol. Park	
<b>A Semi-automatic Emerging Technology Trend Classifier Using SCOPUS and PATSTAT</b>	<b>62</b>
Seonho Kim, Woondong Yeo, Byong-Youl Coh, Waqas Rasheed, Jaewoo Kang	
<b>Presenting a Framework for Knowledge Management within a Web Enabled Living Lab</b>	<b>66</b>
Lizette de Jager and Albertus AK Buitendag and Potjie (JS) van der Walt	
<b>4TH SYMPOSIUM ON BUSINESS AND MANAGEMENT AND DYNAMIC SIMULATION MODELS SUPPORTING MANAGEMENT STRATEGIES</b>	<b>71</b>
Dr. Damianos Sakas	
<b>New Political Communication Practices: No Budget Events Management. The New Challenge</b>	<b>73</b>
Evangelia N. Markaki, Damianios P. Sakas and Theodore Chadjipantelis	
<b>Free Software – Open Source Software. A Powerful Tool for Developing Creativity in the Hands of the Student</b>	<b>78</b>
Nasiopoulos K. Dimitrios, Damianos P. Sakas, Konstantinos Masselos	
<b>Open Source Web Applications. How it Spread Through the Internet and their Contribution to Education.</b>	<b>82</b>
Nasiopoulos K. Dimitrios, Damianos P. Sakas, Konstantinos Masselos	
<b>Culture in Modern Times in the Frame of Luhmann's System Theory</b>	<b>85</b>
Anastasia J. Chournazidis	
<b>Managing Scientific Journals: A Cultural Viewpoint</b>	<b>87</b>
Marina C. Terzi, Damianos P. Sakas, and Ioannis Seimenis	
<b>A Conceptual Framework for Analyzing Knowledge-based Entrepreneurship</b>	<b>92</b>
Nikos S. Kanellos	

<b>SESSION ON INFORMATION HISTORY: PERSPECTIVES, METHODS AND CURRENT TOPICS</b>	<b>96</b>
Prof. Laszlo Karvalics	
<b>Emerging Research Fields in Information History</b>	<b>98</b>
Laszlo Z. Karvalics	
<b>Information Management through Elementary Data Clusters: New Observations on Pridianum-Type Roman Statistical Documents</b>	<b>102</b>
Gergő Gellérfi	
<b>Information and Secrecy on the Silk Road. Methods of Encryption of Legal Documents in Inner Asia (3th-4th century)</b>	<b>106</b>
Szabolcs Felföldi	
<b>The Role of Information and Disinformation in the Establishment of the Mongolian Empire: A Re-examination of the 13th century Mongolian History from the Viewpoint of Information History</b>	<b>110</b>
Márton Gergő Vér	
<b>Early Warning Systems and the Hospitallers in the Eastern Mediterranean</b>	<b>114</b>
Zsolt Hunyadi	
<b>Information Management as Establishment Dutch Navigational Knowledge on Japan, 1608-1641</b>	<b>118</b>
Gabor Szommer	
<b>Files Everywhere - Register and Training of Men for Military and Civil Purpose in Prussia in the early 18th century</b>	<b>123</b>
Marton Holczer	
<b>SYMPOSIUM ON INTEGRATED INFORMATION: THEORY, POLICIES, TOOLS</b>	<b>126</b>
Prof. Georgios Giannakopoulos	
<b>Approaching Information as an Integrated Field: Educating Information Professionals</b>	<b>128</b>
Georgios Giannakopoulos, Daphne Kyriaki Manesi and Stryidon Zervos	
<b>Special Libraries as Knowledge Management Centers</b>	<b>132</b>
Eva Semertzaki	
<b>Digital Libraries' Developers and their Suitability: A Case Study</b>	<b>136</b>
Maria Monopoli	

<b>A Preliminary Study for the Creation of a Greek Citation index in the Humanities and the Social Sciences (GCI – H&amp;SS)</b>	<b>140</b>
Daphne Kyriaki-Manessi and Evi Sachini	
<b>Archiving as an Information Science. Evidence from a Survey Carried out on a Sample of Greek Students</b>	<b>144</b>
Georgios Giannakopoulos and Ioannis Koumantakis	
<b>Transition Process of E-records Management and Archiving System in Universities: Ankara University</b>	<b>147</b>
S. Özlem Bayram and Fahrettin Ozdemirci	
<b>Government Information: Access and Greece's Efforts for Access</b>	<b>150</b>
Aikaterini Yiannoukakou	
<b>School Archives and their Potentials in Teaching: Aspects of Greek Reality</b>	<b>156</b>
Sonia Geladaki and Panagiota Papadimitriou	
<b>Research on School Libraries in Greece and Suggestions on its Further Development</b>	<b>160</b>
Georgios D. Bikos	
<b>Building Digital Collections for Archeological Sites: Metadata Requirements and CIDOC CRM Extension</b>	<b>164</b>
Georgios S. Gkrous and Mara Nikolaidou	
<b>Museological Claims to Autonomous Knowledge: Rethinking the Conceptual Mode of Display and its Claims to Knowledge</b>	<b>169</b>
Assimina Kaniari and Georgios Giannakopoulos	
<b>Use of Library Loan Records for Book Recommendation</b>	<b>172</b>
Keita Tsuji, Erika Kuroo, Sho Sato, Ui Ikeuchi, Atsushi Ikeuchi, Fuyuki Yoshikane and Hiroshi Itsumura	
<b>Developing a National Database on Librarianship and Information Science. The Case of E-VIVA, the Hellenic Fulltext Database</b>	<b>176</b>
Filippos Ch. Tsimpoglou, Vasiliki V. Koukounidou and Eleni K. Sakka	
<b>Integrated Access to Cultural Heritage Information Pieces in Iran Astan-Quds Razavi's Organization of Libraries, Museums and Documents Center: A Theory of Unionization Disparate Information Assets over Imam Reza's Zarih</b>	<b>181</b>
Ms. Mitra Zarei and Ms. Maliheh Farrokhnia	
<b>Attitudes of University Librarians and Information Scientists towards the Draft Code of</b>	<b>185</b>



<b>Library Ethics to Present a Model for Final Library Ethical Codes</b>	
Mahsoomeh Latifi, Fatemeh Zandian and Hasan Siamian	
<b>SESSION ON OPEN ACCESS REPOSITORIES: SELF-ARCHIVING, METADATA, CONTENT POLICIES, USAGE</b>	<b>188</b>
Dr. Alexandros Koulouris	
<b>Geographical Collections in Greek Academic Libraries: Current Situation and Perspectives</b>	<b>189</b>
Ifigenia Vardakosta and Sarantos Kapidakis	
<b>Information Seeking Behavior: Factors that Affect the Behavior of Greek Astronomers</b>	<b>194</b>
Hara Brindesi and Sarantos Kapidakis	
<b>Aggregating Metadata for Europeana: The Greek Paradigm</b>	<b>198</b>
Alexandros Koulouris, Vangelis Banos and Emmanouel Garoufallou	
<b>Integrating a Repository with Research Output and Publications: The Case of the National Technical University of Athens</b>	<b>202</b>
Dionysis Kokkinos	
<b>Implementation of Workflows as Finite State Machines in a National Doctoral Dissertations Archive</b>	<b>205</b>
Nikos Houssos, Dimitris Zavaliadis, Kostas Stamatis and Panagiotis Stathopoulos	
<b>Practices of “Local” Repositories of Legally Protected Immovable Monuments. A Global Scheme for ‘Designation – Significance’ Information</b>	<b>209</b>
Michail Agathos and Sarantos Kapidakis	
<b>Integration of Metadata in BWMETA-2.0.0 Format</b>	<b>213</b>
Katarzyna Zamlynska, Jakub Jurkiewicz and Lukasz Bolikowski	
<b>SESSION ON EVIDENCE-BASED INFORMATION IN CLINICAL PRACTICE</b>	<b>216</b>
Dr. Evangelia Lappa	
<b>Applicability of Data Mining Algorithms on Clinical Datasets</b>	<b>218</b>
Wilfred, Bonney	
<b>Changing Roles of Health Librarians with Open Access Repositories</b>	<b>221</b>
Christine Urquhar and Assimina Vlachaki	
<b>From Medical Records to Health Knowledge Management Systems: The Coding to Health Sector</b>	<b>225</b>
Evangelia C. Lappa and Georgios A. Giannakopoulos	

<b>The Survey of Skill, Attitude and Use of Computer and Internet among Faculty Members</b>	<b>229</b>
Hasan Siamian, Azita Bala Ghafari, Kobra Aligolbandi, Mohammad Vahedi and Gholam Ali Golafshani Jooybari	
<b>Trends in Scholarly Communication among Biomedical Scientists in Greece</b>	<b>232</b>
Assimina Vlachaki and Christine Urquhart	
<b>SESSION ON ELECTRONIC PUBLISHING: A DEVELOPING LANDSCAPE</b>	<b>236</b>
Dr. Dimitris Kouis	
<b>E-Journal and Open Access Journal Publishing in the Humanities: Preliminary Results from a Survey among Byzantine Studies Scholars</b>	<b>238</b>
Victoria Tsoukala and Evi Sachini	
<b>Preliminary Results on a Printed VS Electronic Text Books Assessment Through Questionnaire</b>	<b>242</b>
Dimitrios A. Kouis and Kanella Pouli	
<b>An Interpretation of Aristotelian Logic According to George Boole</b>	<b>246</b>
Markos N. Dendrinis	
<b>SESSION ON INFORMATION CONTENT PRESERVATION AS OUTCOME OF CONSERVATION OF CULTURAL HERITAGE: ETHICS, METHODOLOGY AND TOOLS</b>	<b>251</b>
Prof. George Panagiaris and Dr. Spiros Zervos	
<b>Intrinsic Data Obfuscation as the Result of Book and Paper Conservation Interventions</b>	<b>254</b>
Spiros Zervos, Alexandros Koulouris and Georgios Giannakopoulos	
<b>Mass Deacidification: Preserving More than Written Information</b>	<b>258</b>
Michael Ramin, Evelyn Eisenhauer and Markus Reist	
<b>Information Literacy of Library Users: A Case Study of Mazandaran Public Library Users, Iran</b>	<b>260</b>
Hussein Mahdizadeh and Hasan Siamian	
<b>The Narratives of Paper in The Archives of the New Independent Greek State (Mid 19th c.)</b>	<b>264</b>
Ourania Kanakari and Maria Giannikou	
<b>From Macro to Micro and from Micro to Nano: The Evolution of the Information Content Preservation of Biological Wet Specimen Collections</b>	<b>268</b>
Nikolaos Maniatis and Georgios Panagiaris	

<b>Digital images: A valuable scholar's tool or misleading material?</b>	<b>272</b>
Patricia Engel	
<b>Attitudes of University Librarians and Information Scientists Towards the Draft Code of Library Ethics to Present a Model for Final Library Ethical Codes</b>	<b>277</b>
Mahsoomeh Latifi, Fatemeh Zandianand and Hasan Siamian	
<b>Investigation of the Degradation Mechanisms of Organic Materials: From Accelerated Ageing to Chemometric Studies</b>	<b>280</b>
Ekaterini Malea, Effie Papageorgiou and Georgios Panagiaris	
<b>SESSION ON DIVERGENCE AND CONVERGENCE: INFORMATION WORK IN DIGITAL CULTURAL MEMORY INSTITUTIONS</b>	<b>285</b>
Dr. Susan Myburgh	
<b>Extending Convergence and Divergence in Cultural Memory Institutions: The Old Slave Lodge in the New South Africa</b>	<b>287</b>
Archie L Dick	
<b>The Transfer of Knowledge from Large Organizations to Small: Experiences from a Research Project on Digitization in Wales</b>	<b>289</b>
Clare Wood-Fisher, Richard Gough, Sarah Higgins, Menna Morgan, Amy Staniforth and Lucy Tedd	
<b>The Usage of Reference Management Software (Rms) in an Academic Environment : A Survey at Tallinn University</b>	<b>293</b>
Enrico Francese	
<b>Varialog : How to Locate Words in a French Renaissance Virtual Library</b>	<b>297</b>
Marie-Hélène Lay	
<b>The Urge to Merge: A Theoretical Approach</b>	<b>301</b>
Susan Myburgh	
<b>SYMPOSIUM ON ADVANCES INFORMATION FOR STRATEGIC MANAGEMENT</b>	<b>304</b>
Professor Nikolaos Konstantopoulos	
<b>Empowerment in the Tax Office of Greece</b>	<b>306</b>
Antonios E. Giokas and Nikolaos P. Antonakas	
<b>Building Absorptive Capacity Through Internal Corporate Venturing</b>	<b>310</b>
Ioannis M. Sotiriou and Alexandros I. Alexandrakis	

<b>The Monitoring Information System (M.I.S.) - An information and Management System for Projects Co-financed Under the National Strategic Reference Framework (NSRF) and the Community support framework (CSF)</b>	<b>314</b>
Catherina G. Siampou, Eleni G. Fassou and Athanassios P. Panagiotopoulos	
<b>Corruption in Tax Administration: The Entrepreneurs View Point</b>	<b>318</b>
Nikolaos P. Antonakas, Antonios E. Giokas and Nikolaos Konstantopoulos	
<b>Conflicts between the IT Manager and the Software House after the Strategic Choice of Outsourcing of the Information Processes in Maritime Companies.</b>	<b>322</b>
Anthi Z. Vaxevanou, Nikolaos Konstantopoulos, Damianos P. Sakas	
<b>Contemporary Forms of Ordering Between the Supply Department and Ship Chandler Companies in the Shipping Industry</b>	<b>325</b>
Anthi Z. Vaxevanou, Nikolaos Konstantopoulos, Damianos P. Sakas	
<b>Strategies Implemented and Sources Used for the Acquisition of Information on Foreign Markets</b>	<b>329</b>
Myropi Garri, Nikolaos Konstantopoulos and Michail G. Bekiaris	
<b>The Effect of High Performance Working Systems on Informative Technology in Enterprises after Organisation Changes such as Mergers &amp; Acquisitions</b>	<b>333</b>
Nikolaos Konstantopoulos and Yiannis Triantafyllopoulos	
<b>Personnel's Absorptive Capacity as a Guiding Concept for Effective Performance in Informative Technology</b>	<b>337</b>
Nikolaos Konstantopoulos and Yiannis Triantafyllopoulos	
<b>SESSION ON CONTEMPORARY ISSUES IN MANAGEMENT: ORGANISATIONAL BEHAVIOUR, INFORMATION TECHNOLOG, EDUCATION &amp; HOSPITAL LEADERSHIP</b>	<b>341</b>
Dr. Panagiotis Trivellas	
<b>Investigating the Importance of Sustainable Development for Hotel SMES</b>	<b>343</b>
Panagiotis Reklitis and Anestis Fotiadis	
<b>Strategic Alignment of ERP, CRM and E-business: A Value Creation</b>	<b>347</b>
Catherine C. Marinagi and Christos K. Akrivos	
<b>The Impact of Occupational Stress on Performance in Health Care</b>	<b>351</b>
Panagiotis Trivellas Panagiotis Reklitis and Charalambos Platis	

<b>The Impact of Emotional Intelligence on Job Outcomes and Turnover Intention in Health Care</b>	<b>356</b>
Panagiotis Trivellas Vassilis Gerogiannis and Sofia Svarna	
<b>SYMPOSIUM ON BUSINESS MANAGEMENT AND COMMUNICATION STRATEGIES SUPPORTING DECISION MAKING PROCESS IN TOURISM SECTOR</b>	<b>360</b>
Dr. Panagiota Dionysopoulou	
<b>The Human Factor as a Mediator to the Total Quality in the Tourism Companies. The impact of Employees' Motivation to Quality Improvements</b>	<b>362</b>
Christos K. Akrivos and Panagiotis Reklitis	
<b>Tourist Destination Marketing and Management Using Advanced ICTS Technologies</b>	<b>365</b>
Anastasia Argyropoulou, Panagiota Dionyssopoulou, Georgios Miaoulis	
<b>G.N.T.O. (Greek National Tourism Organization) Communication Strategy in Advertising Campaigns 1991-2006</b>	<b>370</b>
George Stafylakis and Panagiota Dionyssopoulou	
<b>GENERAL PAPERS</b>	<b>375</b>
<b>The role of Environmental Education within the Framework of the Environmental Policy of a Regional Municipality</b>	<b>376</b>
Vassiliki Delitheou and Dimitra Thanasia	
<b>Issues of Social Cohesion: A case study from the Greek Urban Scenery</b>	<b>380</b>
Evgenia Tousi	
<b>Merging Activity and Employee Performance: The Greek Banking System</b>	<b>384</b>
Panagiotis Liargovas and Spyridon Repousis	
<b>Sustainable Development and Corporate Social Responsibility in Higher Education: Some Evidence from Greece</b>	<b>387</b>
Anastasios Sepetis and Fotios Rizos	
<b>Exploring the Effects of Organizational Culture on Collaborative vs. Competitive Knowledge Sharing Behaviors</b>	<b>395</b>
Hanan Abdulla Mohammed Al Mehairi and Norhayati Zakaria	

# **Preface: Proceedings of the International Conference on Integrated Information (IC-ININFO 2011)**

GEORGIOS A. GIANNAKOPOULOS

*Department of Library Science and Information Systems, Technological Educational Institute of Athens, Aghiou Spyridonos, Egaleo, 12210, Greece*

DAMIANOS P. SAKAS

*Department of Computer and Technology Science, University of Peloponnese, Praxitelous 89-91, Piraeus, 18532, Greece*

## **Aims and Scope of the Conference**

The International Conference on Integrated Information 2011 took place in Kos Island, Greece, between September, 29 and October, 3, 2011. IC-ININFO is an international interdisciplinary conference covering research and development in the field of information management and integration.

The conference aims at creating a forum for further discussion for an Integrated Information Field incorporating a series of issues and/or related organizations that manage information in their everyday operations. Therefore, the call for papers is addressed to scholars and/ or professionals of the fields of Library and Archives Science (including digital libraries and electronic archives), Museum and Gallery Studies, Information Science, Documentation, Information Management, Records Management, Knowledge Management, Data management and Copyright experts the latter with an emphasis on Electronic Publications. Furthermore, papers focusing on issues of Cultural Heritage Management and Conservation Management are also be welcomed along with papers regarding the Management of Nonprofit Organizations such as libraries, archives and museums.

One of the primary objectives of the IC-ININFO will be the investigation of information-based managerial change in organizations. Driven by the fast-paced advances in the Information field, this change is characterized in terms of its impact on organizations that manage information in their everyday operations.

Grouping emerging technologies in the Information field together in a close examination of practices, problems and trends, IC-ININFO and its emphases on integration and management will present the state of the art in the field. Addressed jointly to the academic and practitioner, it will provide a forum for a number of perspectives based on either theoretical analyses or empirical case studies that will foster dialogue and exchange of ideas.

## **Topics of general Interest**

Library Science, Archives Science, Museum and Gallery Studies, Information Science, Documentation, Digital Libraries, Electronic Archives, Information Management, Records / Document Management, Knowledge Management, Data Management, Copyright, Electronic Publications, Cultural Heritage Management, Conservation Management, Management of Nonprofit Organizations, History of Information, History of Collections, Health Information

## **Symposia**

The Conference offered a number of sessions under its patronage, providing a concise overview of the most current issues and hands-on experience in information-related fields.

- Symposium on Integrated information: Theory, Policies, Tools
- 4th Symposium on Business and Management and Dynamic Simulation Models supporting management strategies

- Session on Open Access Repositories: Self-archiving, Metadata, Content policies, Usage
- Session on Evidence-Based Information in Clinical Practice
- Session on Business Management and Communication Strategies supporting Decision Making Process in Tourism Sector
- Session on Electronic Publishing: A Developing Landscape
- Session on Information and Knowledge Management
- Session on Information Content Preservation as Outcome of Conservation of Cultural Heritage: Ethics, Methodology and Tools
- Session on Advances Information for Strategic Management
- Session on Information History: Perspectives, Methods and Current Topics
- Session on Divergence and Convergence: Information Work in Digital Cultural Memory Institutions
- Session on Contemporary issues in Management: Organisational Behaviour, Information Technology, Education & Hospital leadership.

The wide range of aspects that the sessions covered, highlighted future trends in the Information Science.

### **Paper Peer Review**

More than 300 papers had been submitted for consideration in IC-ININFO 2011. From them, 91 were selected for presentation, after peer review in a double blind review process. The accepted papers were presented at IC-ININFO 2011.

### **Thanks**

We would like to thank all members that participated in any way in the IC-ININFO 2011 Conference and especially:

- The famous publishing house Emerald for its communication sponsorship.
- The co-organizing Universities and Institutes for their support and development of a high-quality Conference scientific level and profile.
- The members of the Scientific Committee that honored the Conference with their presence and provided a significant contribution to the review of papers as well as for their indications for the improvement of the Conference.
- All members of the Organizing Committee for their help, support and spirit participation before, during and after the Conference.
- The Session Organizers for their willing to organize sessions of high importance and for their editorial work, contributing in the development of valued services to the Conference.
- PhDC Marina Terzi for her excellent editorial work, contributing in the production of the Conference proceedings.

## CONFERENCE DETAILS

### Chairs

Georgios A. Giannakopoulos, Technological Educational Institute of Athens, Greece  
Damianos P. Sakas, University of Peloponnese, Greece

### Co-Chairs

Daphne Kyriaki – Manesi, Technological Educational Institute of Athens, Greece  
Dimitrios Vlachos, University of Peloponnese, Greece

### Scientific Committee

Amanda Spink, Queensland University of Technology  
Andreas Bagias, European Court  
Andreas Rauber, Vienna University of Technology  
Astrid van Wesenbeeck, SPARC Europe  
Christine Urquhart, Aberystwyth University  
Christos Schizas, University of Cyprus  
Christos Skourlas, Technological Educational Institute of Athens  
Claire Farago, University of Colorado at Boulder  
Claus-Peter Klas, FernUniversität in Hagen  
Costas Vassilakis, University of Peloponnese,  
Dimitris Dervos, Technological Educational Institute of Thessaloniki  
Eelco Ferwerda, OAPEN  
Elena Garcia Barriocanal, University of Alcalá  
Emmanuel Garoufallou, Technological Educational Institute of Thessaloniki  
Filippos Tsimpoglou, University of Cyprus  
Fillia Makedon, University of Texas at Arlington  
George Korres, University of Newcastle  
Georgios Evangelidis, University of Macedonia  
Georgios Panagiaris, Technological Educational Institute of Athens  
Johan Oomen, Netherlands Institute for Sound and Vision  
José Aldana, University of Malaga  
Konstantinos Masselos, University of Peloponnese  
Luciana Duranti, The University of British Columbia  
Markos N. Dendrinis, Technological Institute of Athens  
Milena Dobрева, University of Strathclyde  
Prodromos Tsiavos, London School of Economics and Political Science  
Sándor Darányi, University of Borås  
Sarantos Kapidakis, Ionian University  
Sirje Virkus, Tallinn University  
Spiros Zervos, Technological Educational Institute of Athens  
Susan Myburgh, University of South Australia  
Theodoros Pitsios, University of Athens, Faculty of Medicine

### Organizing Committee

Alexandros Koulouris (Chair), Technological Educational Institute of Athens  
Christos Christopoulos, SCEV Scientific Events Ltd  
Marina Terzi, University of the Aegean, Greece  
Evangelia Markaki, Aristotle University of Thessaloniki



Assimina Kaniari, Athens School of Fine Arts  
Evangelia Lappa, General Hospital Attikis K.A.T.  
Dimitris Kouis, Greek Ministry of Education, Lifelong Learning and Religious Affairs  
Dionysis Kokkinos, National Technical University of Athens

## KEYNOTE SPEAKER



Professor Amanda Spink

Professor Amanda Spink has published over 340 scholarly journal articles, refereed conference papers and book chapters, and 6 books. Many of her journal articles are published in the Journal of the American Society for Information Science and Technology, Information Processing and Management, and the Journal of Documentation. She is Editor of the Emerald journal Aslib Proceedings. Amanda's research has been published at many conferences including ASIST, IEEE ITCC, CAIS, Internet Computing, ACM SIGIR, and ISIC Conferences. Her recent books include Information Behavior: An Evolutionary Instinct and Web Search: Multidisciplinary Perspectives, both published by Springer. Amanda's research focuses on theoretical and empirical studies of information behavior, including the evolutionary and developmental foundations. The National Science Foundation, the American Library Association, Andrew R. Mellon Foundation, Amazon.com, Vivisimo. Com, Infospace.com, NEC, IBM, Excite.com, AlltheWeb.com, AltaVista.com, FAST, and Lockheed Martin have sponsored her research. In 2008 Professor Spink had the second highest H-index citation score in her field from 1998 to 2008 [Norris, M. (2008)]. Ranking Fellow Scholars and their H-Index: Preliminary Survey Results. Loughborough University, Dept of Information Science Report].

# Strategic Alignment of ERP, CRM and E-business: A Value Creation

Catherine C. Marinagi<sup>†</sup> and Christos K. Akrivos<sup>‡</sup>

<sup>†</sup> *Technological Educational Institute of Chalkis, Department of Logistics, GR-32200, Thiva, Greece.  
marinagi(at)teihal.gr*

<sup>‡</sup> *Hellenic Open University  
akrivos(at)hol.gr*

**Abstract:** *The role of strategic business alignment with information management in achieving business performance is discussed in this paper. The main hypothesis is that the degree of business strategy alignment affects enterprise information management and time-related operating performance, and through these two intermediate constructs, improves business performance. The alignment between overall business objectives and technology-related decisions is a prerequisite for a business to survive in the today's global e-competition and the digital era. The strategic point of alignment is the value creation that enables a company to develop a strong competitive advantage and thus not only to survive but also to become a leader in the market.*

**Keywords:** *ERP, CRM, E-business, Business strategy, Value creation*

## I. INTRODUCTION

Many approaches to strategic alignment of business and information systems have been discussed by previous researches (Kajalo *et al.*, 2007) but the question remains the same: "How this new era of IT predominance would enable a company to successfully incorporate it into strategic management and transform it into a competitive advantage?"

A basic prerequisite to this aim is of course the IT business alignment which means (Huang and Hu, 2008) integrated planning, effective communication, active relationship management, and corporate culture of alignment. As it is it is widely recognized that whether or not IT works for a company has less to do with the technology itself, and much more with how IT is used and managed.

The business integration could be virtual integration (Abebe, 2007) which refers to an organizational strategy of integrating internal functions with both suppliers and distribution outlets. It is a process of coordination across organizational boundaries for the purposes of achieving operational efficiency and customer responsiveness.

Nowadays the great majority of companies have significantly invested in information technology systems, since they are aware that technology is an instrumental driver of their final success. To gain competitive advantage an enterprise should become "extended" by enabling connectivity to business partners, suppliers and customers. In order to achieve this goal, the information technology systems must

operate within distributed application architecture (Cherry, 2000).

The Enterprise Resource Planning (ERP) system can be considered the backbone information system of the enterprise. ERP integrates multiple business functions in order to operate collaboratively instead of independently. Customer Relationship Management (CRM) system involves the organization-wide acquisition, analysis and use of knowledge about customers to efficiently sell more products and services, while ensuring customer satisfaction (Bose, 2002). ERP and CRM software may be operated and maintained in-house, or as Software-As-A-Service, or a combination of point solutions that have evolved into an interconnected system.

The integration of CRM system with the ERP backbone is critical for business success. Integration enables communication between the organization and other members of the extended enterprise. Besides this, there are many marketing benefits of this integration. Unifying customer's financial data from ERP databases with buying patterns and marketing demographics from CRM databases facilitate targeting sales and marketing campaigns to the most valuable customers.

However, integrating such disparate solutions isn't always easy. Undertaking point-to-point, retrospective integration can be costly, complex, and risky. Different integration strategies are applied depending on company's priorities.

E-business applications could also be integrated and then be merged with the internal applications integration, to form an e-business integration market.

This paper is organized as follows: Section II discusses the strategic IT variables that derive the value of the business. Section III presents internal enterprise applications ERP and CRM systems and their Web-based versions. Section IV presents the integration of enterprise internal applications and the integration of e-business applications. A conceptual model for strategic e-business integration is also proposed. Finally, section V gives our conclusions.

## II. VALUE CREATION

In order to implement value-based management, managers must have concrete and clear target measures, since "value" is abstract and vague in its nature (Kim, 2004). They need to know specifically the strategic IT variables that derive the value of their business so that they can develop strategic planning and track its progress.

Porter's (1985) value chain framework analyzes value creation at the firm level. Porter's approach identifies the activities of the firm and then studies the economic implications of those activities. It includes four steps: (1) defining the strategic business unit, (2) identifying critical activities, (3) defining products, and (4) determining the value of an activity. The main questions that the value chain framework addresses are as follows: (1) what activities should a firm perform, and how? and (2) what is the configuration of the firm's activities that would enable it to add value to the product and to compete in its industry? Porter explores the primary activities, which have a direct impact on value creation, and support activities, which affect value only through their impact on the performance of the primary activities. Primary activities involve the creation of physical products and include inbound logistics, operations, outbound logistics, marketing and sales, and service.

In an e-business context, it is best exemplified by Porter (2001) who sees the internet as a means by which firms can gain competitive advantage by altering the competitive forces that collectively determine industry profitability. E-business capabilities can contribute to this alteration of competitive forces by contributing to either lowering costs or enhancing differentiation (Amit and Zott, 2001).

The business IT integration and the value creation are decomposed and according to (Fink, 2006) must include the following internal and external enterprise applications that refer both to business and to customer:

- ✓ Visitor relationship management (VRM). The use of a web site to attract customers to the organisation.
- ✓ B2C e-commerce. The use of a web site to conduct electronic transactions between the organisation and consumers.
- ✓ Business-to-business (B2B) e-commerce. The use of a web site to conduct electronic transactions between the organisation and other organisations.
- ✓ Customer relationship management (CRM). The management of the organisation's customers through a customer database and reporting software.
- ✓ Electronic procurement (EP). The use of internet technology to conduct electronic purchasing.
- ✓ Enterprise resource planning (ERP). The management of the organisation's resources through integrated enterprise-wide software.

Consequently the value creation for the customers must derive from the above IT initiations of a company which must be congruent to its corporate strategy.

### III. ENTERPRISE INTERNAL APPLICATIONS

#### A. ERP systems

In the past, organizations used a group of separate isolated applications to automate their business

functions. An Enterprise Resource Planning (ERP) system is a suite of integrated software applications to automate business functions such as manufacturing, financial, warehousing, logistics and human resources. ERP is primarily a back-office system because it supports background business operations.

#### B. CRM systems

A Customer Relationship Management (CRM) system is a front-office software tool that aims at building lasting and profitable customer relationships. CRM facilitates the identification and acquisition of new customers and supports the retention of existing customers. Companies need to differentiate themselves from competition and create effective switching cost for their customers.

#### C. Web-based solutions for ERP and CRM

Traditionally enterprise software applications are installed and run "on-premises", that is in the building of the organization. However, since the late 1990s companies run remotely "off-premises" software using Web-based technologies to accomplish supply chain management. New trends involve "cloud-based" CRM and ERP systems, delivered using "Software as a Service" or SaaS model. Cloud computing is the on-demand provision of computation, software, data access and storage services via a computer network. Using a web browser, users are connected to the Internet (or a company network) to submit a service request. SaaS is a delivery model for business applications, in which software and data are hosted centrally, in an Internet cloud, and are accessed using a web browser. The browser talks to an application that executes the program at the web server rather than on user's computer. The application uses links to navigate around the program (Cruz, 2011).

Currently, SaaS ERP solutions market is ruled by some of the big vendors such as SAP, Business ByDesign, Netsuite and Plex. Netsuite provides an entirely online, cloud-based SaaS business software. Netsuite application integrates CRM, ERP and Web capabilities in a single business management software solution. Due to huge competition, Microsoft has recently scheduled for 2012 the first Dynamic ERP product for SaaS cloud delivery. Azure cloud platform is going to host Microsoft Dynamics ERP solutions. Microsoft's Dynamic CRM SaaS cloud delivery is planned to be an entirely different system.

A hybrid solution is also provided by some vendors (e.g. Microsoft), based on a model of on-premises and off-premises resources. Companies can move as much or as little functionality as they want to the cloud, making specialized business processes available across the Internet or the company intranet.

Web-based ERP/CRM systems have become popular. Cruz (2011) reports that this time there are close to five-thousand downloads a month taking place. There are particular reasons for this phenomenon. Companies do not need to purchase software or

hardware, since they can host their software online with a SaaS provider for a predictable monthly subscription fee. Moreover, business partners, suppliers and customers can access the company ERP and/or CRM system with any browser. Finally, companies have less concern about security, since technology has improved.

#### IV. STRATEGIC E-BUSINESS INTEGRATION

##### A. ERP and CRM integration

Yanjing (2009) has studied the integration of ERP and CRM systems under e-commerce environment. ERP and CRM integration involves two aspects: integration of business flows and integration of technology.

Concerning business flow, discovering customer data and forward them into a unified system takes time, money and expertise. To ease the process, companies can take particular steps. Firstly, the company needs to consider its processes. It is crucial to examine which systems will be affected by an ERP and CRM implementation. Next the company needs to carefully examine front and back-office applications, since crucial customer data can reside in back-office applications. And finally the company needs to adopt a strategy for managing master data. They need to create a master-data framework by taking inventory of how and what systems and applications will be affected by the integration.

Concerning the technology aspect, software vendors provide either highly or lightly integrated modules. Technically, one or more additional CRM modules can be built at ERP server and directly related to the ERP module. Alternatively, a middleware need to be added between ERP and CRM.

Another challenge is linking applications of different partners that run across international boundaries where various pieces of customer legislation and privacy policies are applicable. This becomes more difficult when a particular partner is heavily involved in the overall customer management process and houses its own customer-centric data.

##### B. E-business integration

E-business uses “common electronic data standards with computer automation technology to electronically interconnect Information Systems, integrate internal and external data streams, and automate business processes between trading partners” (Rodgers *et al.*, 2002).

Firstly the organization needs to integrate its internal applications, then integrate e-business applications (e.g. B2B, B2C, EP, VRM) and finally merge the internal integration with the external integration to form the e-Business Integration market. Automating collaboration processes between an organization and its extended value chain provides opportunities to eliminate costs and gain strategic competitive advantage.

We propose a conceptual framework which can be used as a methodological tool for strategic e-business integration. The model depicted in Fig.1, adopts the cascade approach of the management by objectives

philosophy. The success of the system depends on how much support offers each one of its components to the top strategic thrust which must be the main pillar of this system. Additionally the IT alignment means that each company must develop and emphasize to those e-business tools on a contingency based management. This principle results to value creation not only externally to the final consumer or to the end user but also internally as the allocation of resources is done efficiently and the staff is motivated.

The success of the proposed model is not as simple as it depicts in the plan (Campbell *et al.*, 2005). There are some prerequisites to enable the idea to work. Such requirements (Love *et al.*, 2009) are related to:

- ✓ The organization culture
- ✓ The top management and leadership support
- ✓ The knowledge management of the organization
- ✓ The industry organization where a company operates
- ✓ The size of the company

Especially for the SME's which are the majority in many industries world wide it seems that where the alignment exists the benefits are very attractive in terms of growth, productivity and financial performance of the company (Raymond and Bergeron, 2008). The condition for successful integrated alignment of IT with the strategic thrust of a company is a contingency based model that takes into consideration the above parameters and adapts accordingly. The proposed model is a useful tool for researches who want to examine the relationship and the results of this alignment (Pijpers *et al.*, 2008). For example each type of the competitive strategies can be implemented successfully by adopting the right organization culture, the right mix of e-business tools so as the company is able to offer the right value to the right customers.

Of course, if the model is going to be tested in different industries, to different size of companies with different e-business intensity and priorities there will be another group of interesting results. From these results new relation could arise between each one of the variables that are going to lead to specific answers to a number of relevant questions such as:

1. Which e-business tools are appropriate to the low cost strategy?
2. Which mixture of these tools maximizes value that means customer satisfaction and profitability in a specific strategy?
3. Which mixture of e-business tools can have better internal results in terms of company's efficiency, e.g. better internal communication, decision making, leadership support, conflict resolution etc.
4. When and under which conditions corporate strategy must follow the e-business strategy as this operation department could be of major importance in a specific industry or a country

or due the knowledge management intensity as a prerequisite for competitive advancement.

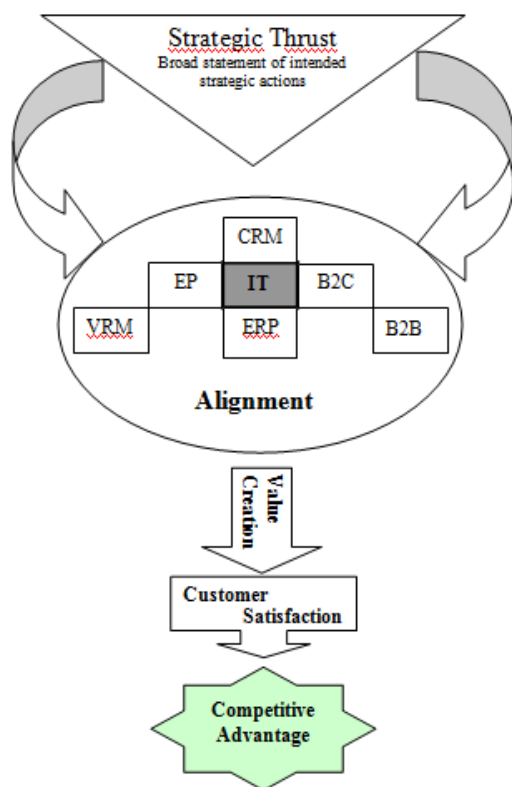


Figure 1. Conceptual model of strategic e-business integration.

## V. CONCLUSIONS

In today's eBusiness-centric economy, companies' success depends on bringing more alignment between ERP, and CRM solution investments. In order to reap the greatest rewards, companies need to carefully integrate their internal applications, integrate external applications and then form the e-Business Integration market.

The alignment sought is not only internal to the IT department but the most important is the alignment of IT with the corporate strategy. The proposed model looks for e-business alignment and its effect on organizational performance in both SMEs and large enterprises since there is very little conceptualization and empirical investigation in the field (Velitchkov, 2008).

## REFERENCES

Abebe A.M., "To integrate or not to integrate: factors affecting the adoption of virtual integration strategy in organizations," *Business Strategy Series*, **8/3**, 196-202 (2007).

Adebanjo, D., "E-procurement in digitally clustered organisations: an analysis of sustainability," *International Journal of Logistics: Research and Applications*, **13/6**, 441-458 (2010).

Amit, R. and C. Zott, "Value creation in e-business," *Strategic Management Journal*, **22**, 493-520, (2001).

Bose, R., "Customer Relationship Management: Key Components for IT Success," *Industrial Management and Data Systems Journal*, **102/2**, 89-97 (2002).

Campbell, B., R. Kay and D. Avison, "Strategic alignment: a practitioner's perspective," *Journal of Enterprise Information Management*, **18/6**, 653-664 (2005).

Cherry, Tree. *Extended Enterprise Applications*. Edina, Minnesota: Cherry Tree & Co. (2000).

Cruz, A., "Web Based ERP Systems", ERP.com (2011).

Fink, D., "Value decomposition of e-commerce performance," *Benchmarking: An International Journal*, **13/1/2**, 81-92 (2006).

Huang, E. and Q. Hu, "Achieving IT-Business Strategic Alignment via Enterprise-Wide Implementation of Balanced Scorecards," *Information Systems Management*, **24**, 173-184 (2007).

Kajalo, S., R. Risto and W. Mika, "Approaches to strategic alignment of business and information systems: A study on application service acquisitions", *Journal of Systems and Information Technology*, **9/2**, 155 - 166 (2007).

Kim, S.K., "Strategic planning for value-based management. An empirical examination," *Management Decision*, **42/8**, 938-948 (2004).

Love, P., D.J., Edwards, C., Standing and Z., Irani, "Beyond the Red Queen syndrome: CRM technology and building material suppliers," *Engineering, Construction and Architectural Management*, **16/5**, 459-474 (2009).

Pijpers, V., J., Gordijn and H., Akkermans, "Business strategy-IT alignment in a multi-actor setting: a mobile e-service case," *Proc. 10th international conference on Electronic commerce* (2008).

Porter, M.E., *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press: New York (1985).

Porter, M.E., "Strategy and the internet," *Harvard Business Review*, **79**, 62-78 (2001).

Rodgers, J.A., D.C. Yen and D.C. Chou, "Developing e-Business: A Strategic Approach," *Information Management & Computer Security*, **10/4**, 184-192 (2002).

Velitchkov, I., "Integration of IT Strategy and Enterprise Architecture Models," *Proc. of the 9th International Conference on Computer Systems and Technologies and Workshop for PhD Students in Computing - CompSysTech* (2008).

Yanjing J., "Integration of ERP and CRM in E-commerce environment," *Proc. International Conference on Management and Service Science*, 1-9 (2009).