Analyzing the diffusion of a multi-side ICT platform for urban logistics services: A System Dynamics approach

Original

Availability:
This version is available at: 11583/2663681 since: 2017-01-23T18:09:48Z

Publisher:
Business Systems Laboratory

Published
DOI:

Terms of use:
openAccess
This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

(Article begins on next page)
Model-based Governance for Smart Organizational Future

BSLab-SYDIC International Workshop

Roma - January 23-24, 2017

BOOK OF ABSTRACTS

Editors

Fabio Nonino, Stefano Armenia, Gandolfo Dominici

Copyright © 2017 Business Systems Laboratory
All rights reserved.
ISBN: 9788890824258
ONLINE FREE VERSION
BUSINESS SYSTEMS BOOK SERIES

The book series "Business Systems" publishes research and essays, coming from the scientific and consulting activity of the members of the nonprofit scientific organisation Business Systems Laboratory (Italy) as well as from invited well-known scientists in the business systems field.

The book series aims to attract the cutting-edge research at international level and to make it available for academics and practitioners.

The official languages of the Business Systems books series are English, Spanish and Italian.

The main topics include, but are not limited to, the following areas of knowledge: Systems Theory; Systemic Approaches for Business; Complex Systems Theory; Managerial Cybernetics; Economics and Social Systems; Business Communication Systems; Innovation Systems; Action Research; Financial Systems; Service Science; Sustainability; Corporate Social Responsibility; Knowledge Management; Supply Chain Management; Strategic Management; Consumer Behavior; Marketing; Corporate Finance; Banking; e-Business; e-Learning; Business Process Management.

The abstracts have been evaluated by the Scientific Board after a double blind peer review.
WORKSHOP BOARD

Workshop Program Chair
Fabio Nonino, Sapienza University of Rome

Scientific Directors
Gandolfo Dominici, Scientific Director Business Systems Laboratory, University of Palermo
Stefano Armenia, President System Dynamics Italian Chapter and Sapienza University of Rome

Scientific Advisory Board
- Gianpaolo Basile, Business Systems Laboratory (Italy)
- Manlio Del Giudice, Link Campus University, Rome (Italy)
- Gerhard Fink, WU-Wien (Austria)
- Mauro Sciarelli, University “Federico II” of Naples (Italy)
- Markus Schwaninger, University of St. Gallen (Switzerland)
- Kim Warren, Strategy Dynamics Ltd (UK)
- Maurice Yolles, Liverpool John Moores University (UK)

Secretariat Manager
Davide Di Fatta, Ph.D. Student, University of Messina (Italy)
WORKSHOP SCOPE

Today, the effective governance of any organisation - be it a government, a firm, a state-owned entity, or a charity - needs to be based on resilience, transparency, accountability, evidence of effectiveness. This need is stimulated by the all-encompassing public scrutiny of organisations, a trend continuously growing due to the advances in IT. This process has been described in terms of the emergence of technologies and practices of calculation in the context of governance.

A common problem is that organisations frequently approach governance as a process of conforming strictly to rules and regulations instead of considering it from a wider systemic perspective.

In this workshop, we called for both practical and theoretical research proposals for a better modeling of organizational systems as well as examples of successful application of model-based governance to any kind of organizational system.
WORKSHOP ORGANIZING INSTITUTIONS

The workshop has been jointly organized through the collaboration in place between BSLab, the Business Systems Laboratory, and SYDIC, the System Dynamics Italian Chapter, and thanks to the collaboration and technical support of DIAG Sapienza, the Department of Computer, Control and Business Engineering “Antonio Ruberti” at the Sapienza University of Rome.

WORKSHOP HOSTING INSTITUTION

This Workshop has been hosted in Rome, at the premises of DIAG Sapienza, the Department of Computer, Control and Business Engineering “Antonio Ruberti” at the Sapienza University of Rome.
# TABLE OF ABSTRACTS

<table>
<thead>
<tr>
<th>From/to</th>
<th>SESSION TITLE, ABSTRACTS TITLES AND RELATED PAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>pp.10-25</td>
<td>COMPLEX SYSTEMS</td>
</tr>
<tr>
<td></td>
<td>- NSS to Support Optimal Social Agreements, p 10.</td>
</tr>
<tr>
<td></td>
<td>- Can we consider Stakeholder Networks CAS or MAS? An interpretative framework, p 13.</td>
</tr>
<tr>
<td></td>
<td>- Community centrality and inter-community detection in spatial networks, p 17.</td>
</tr>
<tr>
<td></td>
<td>TECHNOLOGICAL SYSTEMS</td>
</tr>
<tr>
<td></td>
<td>- The Transformation Toward Service Innovation of IT Firms, p 28.</td>
</tr>
<tr>
<td></td>
<td>- Analyzing the diffusion of a multi-side ICT platform for urban logistics services: A System Dynamics approach, p 33.</td>
</tr>
<tr>
<td></td>
<td>- Examining the role of e-learning in promoting health awareness of young internet users (Case study: Girl students of Allameh Tabataba’i University), p 36.</td>
</tr>
<tr>
<td></td>
<td>- Exploring the dynamical behaviour of software systems quality attributes throughout its evolution: A case study from the maintenance process perspective, p 38.</td>
</tr>
<tr>
<td></td>
<td>- Smart Model-based Governance: from Big-Data to future Policy Making, p 44.</td>
</tr>
<tr>
<td>pp.26-53</td>
<td>SYSTEM DYNAMICS APPLICATIONS</td>
</tr>
<tr>
<td></td>
<td>- Mechanisms of meme propagation in the mediasphere: a simple system dynamics model, p 54.</td>
</tr>
<tr>
<td></td>
<td>- Interorganizational Collaboration Dynamics, p 56.</td>
</tr>
<tr>
<td></td>
<td>- Governance of Smart Clusters; the role of Proximity in Model-Based Governance, p 64.</td>
</tr>
<tr>
<td></td>
<td>- Sardinian dairy sheep supply chain: opportunities from a big data platform described with a causal loop diagram, p 70.</td>
</tr>
<tr>
<td>pp.54-73</td>
<td>SYSTEMIC ORGANIZATION AND MANAGEMENT</td>
</tr>
<tr>
<td></td>
<td>- The challenges and opportunities of using the Industry 4.0 technologies for the integration of knowledge management processes through building collective networks of strategic intelligence, p 74.</td>
</tr>
<tr>
<td></td>
<td>- Service-script as an employee governance tool: Evidence from dual jobholders, p 80.</td>
</tr>
<tr>
<td></td>
<td>- Dynamic capability for multi-stakeholder management, p 83.</td>
</tr>
<tr>
<td></td>
<td>- The spin-offs organization: A systemic view, p 88.</td>
</tr>
<tr>
<td></td>
<td>- Developments in Model-Based Trade Policy Analysis, p 93.</td>
</tr>
<tr>
<td></td>
<td>- Walking the talk: Catalyzing organizational values alignment, p 98.</td>
</tr>
<tr>
<td></td>
<td>- Intelligent managers require Systems Thinking, p 101.</td>
</tr>
<tr>
<td></td>
<td>- Organization and function. Next key factors in organization theory and practice, p 111.</td>
</tr>
<tr>
<td>pp.74-119</td>
<td>SUSTAINABLE AND SOCIAL RESPONSIBLE POLICIES</td>
</tr>
<tr>
<td></td>
<td>- A proposed model for new Socioeconomic Environmental Dynamics project, p 120.</td>
</tr>
<tr>
<td></td>
<td>- Risk management in a complex environment: a model based systemic approach, p 128.</td>
</tr>
<tr>
<td></td>
<td>- Towards A Systemic Perspective Of The Sustainable Development Goals Through The Brazilian Case, p 132.</td>
</tr>
<tr>
<td>pp.143-151</td>
<td>TOURISM AND PLACE SYSTEMS</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>- Corporate Social Responsibility Disclosure in the Banking System, p 137.</td>
<td></td>
</tr>
<tr>
<td>- Perspectives of improvement in the dynamics of management of the vehicular flows in the great cities with the purpose to optimize the relationship social cost / benefits. A way to achieve the social good or to make cash?, p 142.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pp.152-185</th>
<th>POSTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>- From Place Brand to “Place as Brand”: a Systemic view, p 143.</td>
<td></td>
</tr>
<tr>
<td>- A systems approach on sustainable mobility of visitors travel behaviour case Chatuchak market Thailand, p 148.</td>
<td></td>
</tr>
<tr>
<td>- The importance of institutional assets for business models. The case of tourism industry, p 150.</td>
<td></td>
</tr>
<tr>
<td>- Entrepreneurial University Model – Short literature review, p 152.</td>
<td></td>
</tr>
<tr>
<td>- Challenges of Entrepreneurial Attitudes and Business Activity in Georgia, p 155.</td>
<td></td>
</tr>
<tr>
<td>- The State Tourism Policy Model of Georgia, p 159.</td>
<td></td>
</tr>
<tr>
<td>- The objective of the Company mission is based on the policy for enhancement of corporate social responsibility, p 165.</td>
<td></td>
</tr>
<tr>
<td>- Effective models formation of travel companies’ management in Georgia, p. 172</td>
<td></td>
</tr>
<tr>
<td>- The role of the information systems in the risk management model (On the example of the customs system of Georgia), p 177.</td>
<td></td>
</tr>
<tr>
<td>- The systemic approach to teach safety in the workplace. A concrete example, p 182.</td>
<td></td>
</tr>
</tbody>
</table>
Analyzing the diffusion of a multi-side ICT platform for urban logistics services: A System Dynamics approach

Alberto De Marco  
Associate Professor of Project Management  
Department of Management and Production Engineering, Politecnico di Torino, Italy  
e-mail: alberto.demarco@polito.it  
Corresponding author

Giulio Mangano  
Assistant Professor, Department of Management and Production Engineering, Politecnico di Torino, Italy.  
e-mail: giulio.mangano@polito.it

Giovanni Zenezini  
Ph.D. Candidate, Department of Management and Production Engineering, Politecnico di Torino, Italy  
e-mail: giovanni.zenezini@polito.it

Anna Corinna Cagliano  
Assistant Professor, Department of Management and Production Engineering, Politecnico di Torino, Italy.  
e-mail: anna.cagliano@polito.it

Abstract

The rapid urbanization of world populations is increasing CO2 emissions due to logistics and handling activities (Wang et al., 2015). Therefore, all the problems related to the consequent growing freight transportation demand have led both public authorities and researchers to focus their attention on City Logistics (CL) initiatives. CL supports the integration of a logistics system wherein each actor is coordinated in order to reduce the negative impacts on citizens such as traffic congestion and air and noise pollution (Lam and Dai, 2015). Therefore, urban environments require specific policies at the local level, aimed at regulating a proper use of the available spaces and at identifying levels of satisfaction for different stakeholders with diverging interests.

In this context, forms of collaboration among the different parties are advisable to reach an increased level of efficiency for the logistics activities together with positive externalities for the
environment. To this end, the URBeLOG project, funded by the Italian Ministry of Education and Research, was launched by a consortium of various CL stakeholders with the objective of developing a distributed, innovative, dynamic and participated platform of services and applications for last mile urban logistics. The platform is able to aggregate the involved stakeholders and manage the distribution process in real time. The URBeLOG platform has been designed for providing value-added services such as interface transactions for the use of logistics resources, dynamic tariff-based payments, management of certification and accreditation for the transport of goods within a city.

The purpose of this paper is to study the diffusion dynamics of the URBeLOG platform and its related services among the main potential user/customer segments in the Italian market. These are municipalities characterized by a limited traffic zone (ZTL), logistic service providers (LSP) and own freight carriers. The main levers of diffusion that have been considered are the Value Propositions that emerged during two different sessions of building a Business Model Canvas (Osterwalder and Pigneur, 2010). To this end, a variety of stakeholders were involved in order consider multiple points of view, namely: a public manager, an expert in urbanism, an ICT company, and a logistics consultant. The Business Model Canvas appears to be very useful, since it easily identifies the essential parts of a business, taking into account nine different pillars. One of them is the Value Proposition that can be defined as the combination of the benefits in terms of cost reduction, support for complex processes, and solutions to problems for the various customers. The identified Value Propositions have been then used as a basis to develop the diffusion model. For the municipalities, these are the “Green Credit System” that the platform is able to manage as interface between the public authority and the freight carrier and the effect related to the Policy Making Support and the Enforcement. For the Logistics Service Providers (LSP) the enhanced efficiency originated by a more proper routing management, the effect of focused advertising campaigns and the reduced footprint associated with the operations are considered as crucial levers of diffusion. Word of mouth is another aspect that has been taken into account. In the proposed study two kinds of word of mouth are analyzed: within a single population and cross-side between two populations, since it can be assumed that there are some forms of contacts among the different stakeholders that are likely to adopt the platform.

Basing on the Bass diffusion theory (Bass, 1969), the model is developed using the System Dynamics (SD) approach, in the light of its proven ability of simulating the behavior of diffusion via a
system of interrelated causal feedback loops. The results of the simulation for a test bed area show that
within the simulation timespan the three different populations of potential adopters almost fully join the
URBeLOG platform. In particular, the 224 municipalities and the 9 LSPs complete the adoption process
in 54 months. On the contrary, 2643 out of the 2688 own freight carriers adopt the proposed technology,
thus the market saturation is not completely achieved. Therefore, the management of the green credits
system, the policy making support and enforcement, the effectiveness of advertising campaigns, the
routing efficiency and the effect related to a more environmental friendly footprint are crucial elements
for entering the URBeLOG platform.

This work contributes to the field of studies associated with the investigation of the mutual
relationships between the diffusion of innovative ICT systems among different interconnected
populations of adopters in the CL arena. Also, this research fosters collaboration between public
authorities and LSPs to identify the most important factors for adopting a shared IT CL platform. In
addition, this work might assist public authorities in defining CL strategies by capturing the main levers
related to CL policies prior to their implementation. From a LSP and own-freight carrier’s point of view
the study provides a tool to evaluate the performance of their activities with the adoption of new ICT
technologies. Finally, the proposed model is a roadmap able to capture the enabling factors for the
expansion of new forms of technologies and to simulate their behavior over time.

**Keywords:** City Logistics, Diffusion Model, System Dynamics.

**REFERENCES**

215-227.


chasers, and challengers*. John Wiley and Sons.

reduction – an exploratory study of UK’s grocery retail industry. *The International Journal of
LIST OF AUTHORS
(in alphabetical order)

Ana Paula Cabral Seixas Costa, p 10.
Antonella Ferri Maria, p 143.
Armenia Stefano, pp. 38, 44.
Atzori Alberto, p 70.
Bardi Ugo, p 54.
Bardy Roland, p 117.
Bartocci Liboni Lara, 132
Basile Giampaolo, p 143.
Brancato Luca, p 141.
Breitbart Douglas, p 98.
Cagliano Anna Corinna, p 33.
Charlton Michael, p 114.
D’Andrea Chiara, p 150.
De Marco Alberto, p 33.
De Moura Jadielson Alves, p 10.
Del Gaudio Giovanna, p 150.
Della Corte Valentina, p 150.
De Santis Daniele, p 182.
Davide Di Fatta, pp 20, 137.
Di Nauta Primiano, p 88.
Dimovski Vlado, p 74.
Dominici Gandolfo, p 143.
Drago Carlo, p 17.
Dugarte Peña German Lenin, p 107.
Falsini Sara, p 54.
Ferreira Franco Eduardo, p 38, 44.
Ferreira Caldana Adriana Cristina. p 132
Gagnidze Inez, p 152.
Gogorishvili Irina, p 165.
González Margarita Castro, p 56.
Hirama Kechi, p 38.
Ia Natsvlishvili, p 155.
Isabel Sanchez Segura Maria, p 107.
Kia Ali Asghar, p 36.
Ketevan Tchanidze, p 172
Lachapelle Nathalie, p 64.
Leva Antonio, p 182.
Mangano Giulio, p 33.
Martinez-Moyano Ignacio J, p 56.
Mazzara Paolo, p 120.
Mecella Massimo, p 44.
Medina Dominguez Fuensanta, p 107.
Mesko Maja, p 74.
Metreveli Marina, p 159.
Nania Ivan, p 137.
Nepomuceno Thyago Celso Cavalcante, p 10.
Onori Riccardo, p 44.
Oranges Cezarino Luciana, 132
Papakashvili Nino, p 93.
Pazzi Luca, p 91.
Pellicciari Marcello, p 91.
Perissi Ilaria, p 54.
Peterlin Judita, p 74.
Pulina Giuseppe, p 70.
Reina Rocco, p 88.
Roblek Vasja, p 74.
Romero Edmundo Ortiz, p 56.
Roth Steffen, p 111.
Saba Luca, p 70.
Sacilotto Donaires Omar, 132
Schaarschmidt Mario, p 80.
Sciarelli Mauro, p 13.
Secchi Davide, p 26.
Sedehi Habib, p 60.
Sellitto Giovanni Paolo, p 128.
Sepe Fabiana, p 150.
Seri Raffaello, p 26.
Seturi Maia, p 169.
Seturidze Rusudan, p 177.
Szulanski Fabian, p 98.
Tani Mario, p 13.
Tremblay Diane-Gabrielle, p 64.
Urotadze Ekaterine, p 169.
Vallerotonda Rita, p 182.
Vesperi Walter, p 88.
Walsh Gianfranco, p 80.
Wejwithan Amphai, p 148.
Yolles Maurice, p 20.
Zeinab Surmanidze, p 172
Zenezini Giovanni, p 33.