# Designing the Market of Data - For Practical Data Sharing via Educational and Innovative Communications

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## ABSTRACT

*This special issue of Open Journal of Information Systems (OJIS) reports work on designing the market of data for practical data sharing via educational and innovative communications (MoDAT). In the market of data, data are reasonably dealt with sold, opened, or shared based on negotiation. Since last years, we have been aiming at realizing a social environment, where each person feels free to share one's own and others' data for learning the latent value of data without fearing the loss of business opportunities. In the market, data and analysts' knowledge are shared by selling and buying, with reasonably determining the conditions for sharing. People in the market may communicate with each other in order to decide to expose the data as open-source, if the trust of the data provider is expected to be elevated highly due to the contribution to people in the public. Thus the Market of Data means a place where the value of data and knowledge can be externalized. OJIS is published by RonPub (www.ronpub.com), which is an academic publisher of online, open access, peer-reviewed journals.*

## TYPE OF PAPER AND KEYWORDS

Editorial*: MoDAT, special issue, Open Journal of Information Systems, OJIS, RonPub*

## 1 INTRODUCTION

This special issue contained the extended versions of papers selected from the workshop "MoDAT: Designing the Market of Data - for Practical Data Sharing via Educational and Innovative Communications", taken place in Shenzhen, China, on December 14th, 2014. MoDAT is a special issue of Open Journal of Information Systems (OJIS) [5]. OJIS [5] is an open access, peer-reviewed, academic journal published by RonPub [6].

MoDAT workshop series started in association with the IEEE International Conference on Data Mining in 2013. Here we have been discussing methods and technologies for realizing an innovative market of data - a social environment, where each person are encouraged to share and combine one's own and others' data. Participants of this market are expected to discover the latent value of data without fearing the loss of business opportunities.

We not only organize the series of the workshops, but also observed the effects of participants' communications in the experimental markets of data. According to our findings, humans' thoughts for and by sharing/combining data turned out to be innovative in that born ideas tend to lead to novel and productive proposals in real businesses. The market also turned out to be educative in that participants learn techniques for

analyzing latent dynamics behind data. Furthermore, data scientists came to learn and create techniques that accelerate discoveries from data. Analogies based on similarities between data and problems support such learning, and this analogy is being reinforced by visualized correlations among features of data. Our confidence in calling for contributions to MoDAT workshops came to be more and more strengthened.

10 to 13 papers in each past MoDAT workshop have been selected via the review process with a 50% acceptance rate. After the session of oral presentations and discussions, we enjoyed an experimental market of data, a post workshop called Innovators Marketplace on Data Jackets. As a result of these new challenges, MoDAT has been evaluated quite highly. For example, the first MoDAT workshop has been evaluated to the best workshop in ICDM2013 according to the steering committee, and we are continuing to organize a full-day workshop.

## 2 CONTENTS OF THE SPECIAL ISSUE

The authors in MoDAT workshop submitted their papers to this special issue, and each paper has been reviewed blindly. The four papers are accepted, which was extended significantly if presented in a MoDAT workshop.

"*Relationship between Externalized Knowledge and Evaluation in the Process of Creating Strategic Scenarios*" [1]: This paper is dedicated to dealing with the incomplete ideas created in the market of data. Due to the incompleteness of knowledge and data, it is important for humans to make decisions with incomplete ideas created based on knowledge and available data. The proposed method for Action Planning works in refining ideas presented in the market of data with the Action Planning Sheets, which enable participants to create solutions for real problems in businesses. The authors computed the relativeness between participants' roles in the society and scenarios of businesses they wrote on the sheets. As a result, it turned out that the less relative a scenario is to a participant's social role, the higher the scenario is evaluated in novelty. Some other tendencies are reported, which will guide readers to data-driven innovation in businesses.

"*Concept Design for Creating Essential Hypothesis, Rules, and Goals: Toward a Data Marketplace*" [4]: To create novel, demanded, and feasible ideas in the market of data, an cognitive model for abductive reasoning had been previously discussed so far in the context of business strategies. Existing models were however not practical for applications in the real business world,

considering the unpredictable and competitive business environment. The paper improves the model by formulating an experimental case study through a web-based workplace for generating product ideas. The authors discuss the possible embodiment of product ideas as the basis for configuring features through the extension of quality function deployment. The most essential concept here is design process as a blueprint for building a data marketplace.

"*Model of Creative Thinking Process on Analysis of Handwriting by Digital Pen*" [2]: To enable participants of the market of data to perceive hints for creating new ideas about sharing and reusing data, this paper addresses how model the cognitive process to create and refine ideas. Authors report patterns in human's writing with thinking by using pen sensors, which detect the movements of the pens in writing. A finding here is that people who spend a long time in writing tend to achieve a high creativity, spending a shorter between writing one sentence and the next and frequently backtracking, i.e. returning to a former sheet and modifying opinions. The authors conclude that cycles of divergent thinking, convergent thinking and evaluation increase the frequency of backtracking, which as a result makes the ideas more consistent.

"*A Toulmin's Framework-Based Method for Design Argumentation of Cyber-Physical Systems*" [3]: In the domain of cyber-physical systems (CPSs), the authors propose a system design method using the interaction between human's intelligence in logical reasoning and data visualization. The result is quite straightforward in that they achieved a success in the design of a diagnosis system for semiconductor device manufacturing equipment. However, the message of this study seems to be useful for a broader range of businesses. That is, by creating rebuttals in a systematic matter, the proposed method aids designers in the collection of essential data, which pushes them to focusing on the essential part of the complex system to be redesigned. This process will be practical in service industries as well as in manufacturing. We regard this paper as a proposal of a method for data-based communication toward innovation.

The basic findings presented in these papers are now reflected to the real marketplace of data, organized by METI (the Ministry of Economics, Trade, and Industries), DXC (Data Exchange Consortium), and other organizations in Japan. The workshop MoDAT is being continued, welcoming submissions and audience. We are looking forward to seeing readers. We express many thanks to the editors and staff of OJIS [5], as well as to all reviewers of MoDAT workshops.

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