

Incentive Mechanism Design to Increase Employees' Willingness to Share

Master's Thesis

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Context

Data sharing has become increasingly prevalent in today's society [1]. It has been associated with positive effects on individuals, companies, and society as a whole [1]. On the one hand, these effects can be attributed to increased self-confidence, self-integrity, and the fulfillment of ego needs among individuals [4, p. 325]. On the other hand, data sharing can also be beneficial for improving decision-making within companies and designing products [5, p. 5]. Furthermore, data sharing can facilitate scientific discoveries and advancements in fields such as medicine [6]. Despite that, users' privacy and security concerns remain significant challenges that affect their behavior [1, 2]. To balance these perceived risks, one approach is to improve perceived benefits, which have been shown to also influence user behavior [3].

One example for perceived benefits can be explicitly given incentives [9]. Studies have demonstrated that incentives play a crucial role in influencing user behavior and enhancing the likelihood of data sharing. For instance, a study conducted by Hann et al. [7] indicated that offering financial incentives led to increased motivation for individuals to share data. Similarly, Naous et al. [8] found that both monetary and non-monetary incentives, such as perceived social status, can boost people's willingness to share personal data. In addition to the aforementioned incentives that are linked to financial gain and social status, other types of incentives, such as gamification, mental health support, and educational tutorials, can be considered [9].

The success of incentives and incentive mechanisms depends on several critical factors, including user preferences, trust, and the perceived value of both the shared data and the incentive itself [10]. Designing incentive mechanisms typically involves considering various aspects, such as psychological human factors and theories, game theoretical approaches, and different types of incentives [10]. However, these approaches may sometimes contradict each other as they are based on different assumptions [10]. For instance, game theoretical approaches assume humans to act rationally [10, 11]. However, according to Kahneman [12, pp. 1458–1463], human behavior depends on factors such as biases, risk aversion, framing, and the tendency to consider only a narrow portion of the context when making decisions. Additionally, some incentives are only analyzed in specific environments, such as crowdsourcing [10]. This highlights the need for a more general and unifying approach to designing effective incentive mechanisms. Within this approach, adjusting incentives to suit each user's specific needs and preferences and combining multiple incentives may prove worthwhile. Thus, there is a need to examine and determine the effectiveness of incentives in relation to the type of data and the perceived risks associated with sharing it. Additionally, exploring how incentive mechanism design can be used to increase the general appeal of data sharing is necessary. By doing so, incentive mechanisms can become more effective and better able to address privacy and security concerns while encouraging data sharing.

Goal

This thesis aims to develop effective incentive mechanisms for data sharing. To achieve this, an extensive literature review will be conducted on incentive mechanism design and data sharing. Part of this thesis will be investigating key factors that influence user behavior in data sharing systems and exploring how incentive mechanisms can be designed to encourage desired data sharing behaviors. Furthermore the impact of different types of incentive mechanisms on user behavior and data sharing outcomes will be analyzed. Moreover, a prototype of an incentive mechanism incorporating the insights from the literature review will be developed and evaluated through a study. By comprehending the factors that influence user behavior and the effects of various incentive mechanisms, this thesis intends to contribute to the development of efficient and effective data sharing systems. To that end, this work consists of three parts: theoretical research, implementation, and evaluation.

Theoretical research. The theoretical phase will begin with a systematic literature review of incentive mechanisms, focusing on data sharing. In addition, data sharing incentives from different contexts, including workplaces and healthcare, will be considered. Different domains are researched in order to gain an in-depth understanding of what influences users to participate and or share and how the context influences their behavior. The underlying principles that motivate users to share their data and the concerns that prevent them from doing so will also be explored. Subsequently, the findings of the literature review will be analyzed to identify the critical factors related to incentives for data sharing. These factors, along with the most pertinent insights on incentive mechanism design, will be combined to create an effective incentive mechanism. The mechanism may consist of several diverse incentives or specify different incentives for various users.

Implementation. During the implementation phase, the objective is to implement the incentive mechanism established in the theoretical phase. The implementation of the incentive mechanism will extend the already existing incentive mechanism app cluster.

Evaluation. The evaluation phase will involve a thorough assessment of the implemented incentive mechanism. The goal is to evaluate the effectiveness of both the theoretical approach and its practical implementation. The evaluation will have a broad scope, and the specific evaluation type has not been determined yet. However, a crucial aspect of the evaluation will be to analyze whether the proposed and implemented incentive mechanism successfully increased users' willingness to share personal data.

Work Plan

1. Systematic literature review of incentive mechanisms and data sharing incentives.
2. Analysis of findings to identify critical factors.
3. Creation of effective incentive mechanism for data sharing in the workplace.
4. Implementation of the mechanism into the incentive mechanism app cluster.
5. Evaluation of the effectiveness of the developed mechanism.
6. Assessment whether the mechanism can increase users' willingness to share.
7. Documentation of the work in the thesis.

Deliverables

- Source code of the implementation.
- Raw data from the evaluation.
- Thesis written in conformance with TUM guidelines.
- Presentation slides.

References

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