

Titel

UNTERTITEL

**Bachelor/Masterthesis**

eingereicht am: DD.MM.YYYY

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geboren am DD.MM.YYYY

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Studiengang: XXX

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**Abstract**

[Hier ein Beispiel für ein Abstract. Ihr Abstract sollte 150-250 Wörter haben] We investigate how each of the two steps that are typically supported by purchasing platforms ― filtering and joint evaluation ― affects the success of a prosocial microlending platform. Users of such platforms lend money interest-free to people in need, such as small-scale entrepreneurs from developing countries. We hypothesize that while attribute-based filtering can reduce the decision effort and provide guidance, which is often perceived as helpful in purchasing decisions, it may be perceived as inappropriate and restrictive in the prosocial microlending domain, thereby reducing users’ choice satisfaction. Building on evaluability theory, we further hypothesize that joint evaluation is a double-edged sword: Jointly evaluating more than one alternative increases choice satisfaction by facilitating evaluability, as alternatives can serve as reference points, and because not being able to compare alternatives could feel restrictive. However, jointly evaluating alternatives also highlights conflicts and tradeoffs between alternatives and thereby decreases users’ willingness-to-contribute to the alternative they finally choose. We test our hypotheses in an incentivized lab experiment, using real prosocial lending decisions. Our findings suggest that offering attribute-based filters does not increase a platform’s success, and confirm that joint evaluation is a double-edged sword. Platforms have to trade off decreased choice satisfaction with increased willingness-to-contribute.

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Abbreviations

CA combinatorial auction

VCG Vickrey-Clarke-Grooves

# Introduction

Wissenschaftliche Arbeiten weisen standardisierte Strukturen auf. Dabei existieren verschiedene Standards für verschiedene Arten von Arbeiten.

## Struktur der Arbeit bei empirischen Arbeiten

Mögliche Struktur:

* Abstract [Abstrakt]
* Introduction [Einleitung]
* Related Work oder Literature [Grundlagen /Theorie/ Verwandte Arbeiten]
* Hypotheses [Hypothesen]
* Method/Experimental Design [Methode/Experiment]
* Results [Ergebnisse]
* Discussion [Diskussion]
* Conclusions and Limitations [Fazit oder Schlussfolgerung]
  + Conclusions
  + Limitations and Future Research [Limitationen und Ausblick]
  + Contributions [Wissenschaftlicher Beitrag]
* References [Literaturverzeichnis]
* (Appendix) [Anhang]

## Struktur der Arbeit bei strukturiertem Literaturüberlick

Ziel: Vorhandene Literatur zu einem Thema komplett analysieren, strukturieren, etc., um z.B. neue Forschungsfragen aufzuwerfen

Mögliche Struktur:

* Abstract [Abstrakt]
* Introduction [Einleitung]
* Theory [Grundlagen /Theorie/ Verwandte Arbeiten] 🡪 Achtung, meist gibt es mehrere Kapitel, die inhaltlich benannt werden, z.B. Virtuelle Realität oder Customer-Relationship-Management-Systems, etc.
* Methode
* Results of Literature Analyses [Ergebnisse der Literaturanalyse]
* Discussion [Diskussion]
* Conclusions and Limitations [Fazit oder Schlussfolgerung]
  + Conclusions
  + Limitations and Future Research [Limitationen und Ausblick]
  + Contributions [Wissenschaftlicher Beitrag]
* References [Literaturverzeichnis]
* (Appendix) [Anhang]

## Struktur der Arbeit bei normativen Arbeiten

Mögliche Struktur:

* Abstract [Abstrakt]
* Introduction [Einleitung] – die Methode hier beschrieben in einem Absatz
* Theory [Grundlagen /Theorie/ Verwandte Arbeiten] 🡪 Achtung, meist gibt es mehrere Kapitel, die inhaltlich benannt werden, z.B. Virtuelle Realität oder Customer-Relationship-Management-Systems, etc.
* Discussion [Diskussion]
* Conclusions and Limitations [Fazit oder Schlussfolgerung]
  + Conclusions
  + Limitations and Future Research [Limitationen und Ausblick]
  + Contributions [Wissenschaftlicher Beitrag]
* References [Literaturverzeichnis]
* (Appendix) [Anhang]

# Kurzer Überblick über den Inhalt von Kapiteln

## Abstract (Zusammenfassung)

* Kurze Zusammenfassung der Arbeit (150-250 Wörter)
* Ähnlich strukturiert wie Einleitung, nur viel kürzer

## Introduction (Einleitung)

1. Problemstellung und Motivation
2. Stand der Forschung, darauf aufbauend Forschungslücke und Forschungsfrage(n) herausarbeiten
3. Ziel der Arbeit und eigener methodischer Ansatz zur Beantwortung der Forschungsfrage(n): Absatz beginnt meist mit: The goal of this thesis/work/manuscript is ….
4. Erwarteter wissenschaftlicher (und praktischer) Beitrag [=Contribution]
5. Manchmal folgt noch: Gliederung [ausformuliert]

## Related Work/Theory/Literature

1. Welche Theorien und Grundlagen gibt es?
2. Auf einige, wenige und zentrale konzentrieren
3. Absolute Grundlagen müssen nicht erklärt werden. Sie können annehmen, dass die Leser schon viel wissen. (Fachpublikum!)
4. Oft untergliedert in Unterüberschriften entsprechend der verschiedenen Arten der Grundlagen/Theorien
5. Noch kein Bezug auf eigene Arbeit und eigenen Ansatz nehmen, also nie „Vorreferenzieren“

🡪 Ziel ist es: die Forschungslücke muss klar werden. Diese gerne auch explizit benennen und herausarbeiten. [das ist die einzige Stelle, in der implizit auf eigene Arbeit Bezug genommen wird]

## Discussion

1. Die Diskussion reflektiert über Ergebnisse der Arbeit
   1. In empirischen Arbeiten berichtet somit der Ergebnisteil sehr trocken die Datenlage (z.B. Hypothesentests) und erst in der Diskussion werden diese Ergebnisse interpretiert
   2. In rein normativen Arbeiten fällt die Diskussion oft mit der Darstellung der Ergebnisse zusammen, da sich die beiden Teile schwerer trennen lassen

## Conclusions & Limitations

Je nach länge der Arbeit muss dieses Kapitel nicht unterteilt warden.

1. Conclusions
   1. Fällt unterschiedlich stark aus, basierend auf Detaillgrad der vorherigen Diskussion. In empirischen Arbeiten: Kurze Zusammenfassung der Ergebnisse und Analyse auf höherer Ebene der Ergebnisse
   2. Referenz zu Forschungsfragen und inwieweit diese beantwortet wurden
2. Limitations und Future Work/Research
   1. Welche Probleme gab es bei der vorliegenden Arbeit?
   2. Wie können diese in zukünftiger Arbeit adressiert werden?
   3. Welche anderen zukünftigen, angrenzenden Forschungsthemen sollten zukünftig bearbeitet werden?
3. Contribution:
   1. Welche Schlüsse können gezogen werden?
   2. Welche Beiträge zu Forschung und Praxis macht die Arbeit? [Contribution]

# Figures and Tables

## Experimental Design

In the NO-FILTER condition, ten randomly chosen projects were shown to the participant on the overview page (see Figure 1). There was a short description of each project on the list, as well as a photo, the name, the amount of money already lent to the project and one sentence describing the project. The participants could then click on each project in any order to access the detailed project description page, which described the project in a longer text of mostly two to three paragraphs (see Figure 2). In addition, information was provided on the repayment schedule. The participants could navigate between the overview page and the detailed description in any order and as long they wanted. Finally, they had to choose one project by clicking on the “Choose” button in the detailed project description.

Condition STANDARD: Filter Followed by Joint Evaluation

In the STANDARD condition, participants could set filters for several criteria (see Figure 3). They were not forced to set filters, but all participants used them. Subsequently, they were asked to rank the order of the filter criteria they selected according to their importance (see Figure 4). Afterwards, they saw the same overview page and the detailed project description page as the participants in the NO-FILTER condition (see Figure 1 (right) and Figure 2). However, the ten projects they saw were not randomly chosen, but selected on the basis of their filters and importance sorting.

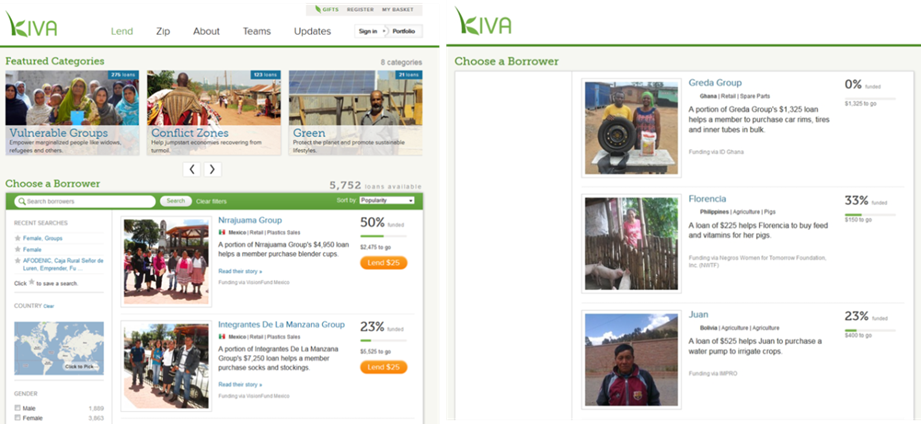


Figure 1: Overview page. Left: Original Screenshot from KIVA (www.KIVA.org/lend). Right: Screen that participants saw in the experiment (overview page).

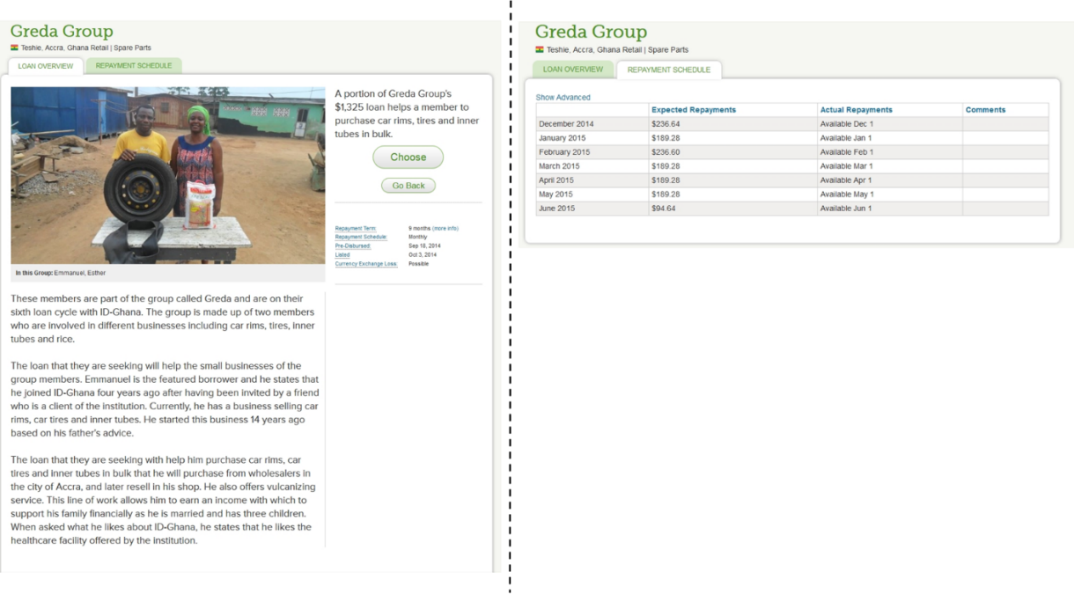


Figure 2: Detailed Project Description Page with repayment schedule.

As filter criteria, the participants could set: country, gender, sector, groups or individuals, and attributes (for example, green, start-up, youth, fair trade, etc.). These are the same filters the KIVA offered on the standard screen at the time of our experiment. If less than ten projects met the filter criteria, the least importance criteria were relaxed. For example, if a participant had set the two filters gender=females and sector=education and had indicated sector as more important than gender, but only eight projects fulfilled both criteria, we selected these eight projects and then selected another two projects randomly drawn from all projects in the education sector with entrepreneurs of any gender. Participants were fully informed about this procedure (see text in Figure 4).



Figure 3: First step of the attribute-based selection process: Filter. The figure sketches the process with three different screenshots.

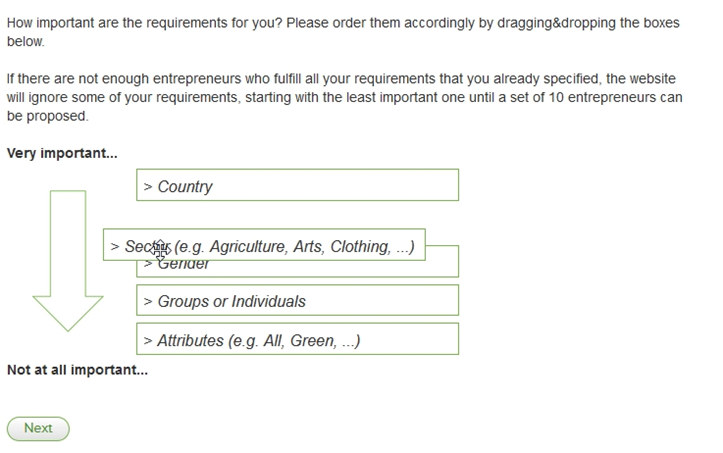
****

Figure 4: Step two of the attribute-based selection process: Importance Sorting.

## Procedure

Figure 5 illustrates the experimental procedure. In addition to a lab session that lasted about 45 minutes, the participants completed two short online surveys: a pre-questionnaire two weeks before this session and a post questionnaire 12 weeks later. In the pre-questionnaire, we asked participants what their goals would be when lending money, the situation-specific thinking style they would use when deciding this, and other control variables, like their age and gender. The two-week delay allowed us to measure the constructs without making them overly salient during the lab study, thereby reducing the risk that the elicitation of these constructs would potentially influence participants during the lab session. In the post questionnaire, we asked the participants how satisfied they still were with their choice in the lab, and how often they had revisited the platform since that time. We considered the 12-week delay between the lab session and the post questionnaire sufficiently long to gauge the impact of our manipulations and of any long-lasting effects resulting from the experience in the experiment. There was no attrition between the pre-questionnaire and main experiment (the pre-questionnaire was a pre-requisite in register for the experimental session), but only 69 (78.4%) of the 88 participants completed the post questionnaire.

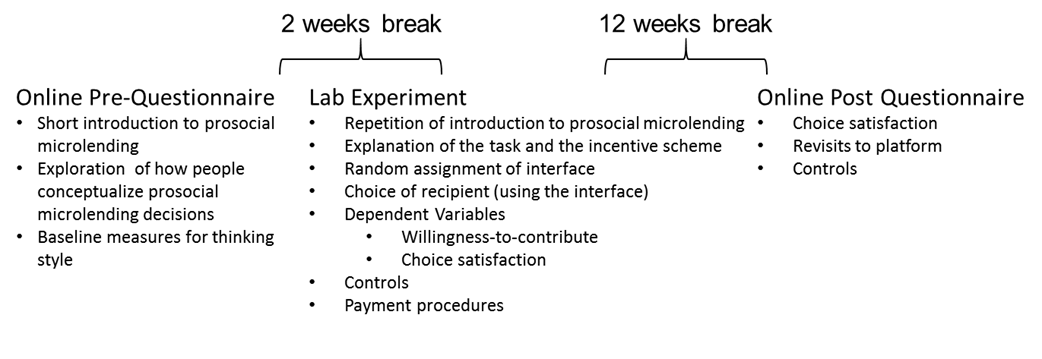


Figure 5: Experimental Procedure.

## Results

***Testing our Hypotheses***

Table 1 shows the descriptive statistics of the dependent variables and mediators that we use for testing our hypotheses. In particular, we conceptualize analyticalStyle (experientialStyle) as the change in analytical (experiential) thinking style evoked by the interface in the main experiment. In particular, we calculate the difference between the scores of the analytical (experiential) thinking style scales of the pre-questionnaire and the main questionnaire. We see that, after a choice has been made, the thinking style becomes less analytical (two-sided t-test, t(87)=4.46, p<0.01) and slightly more experiential (t(87)=-1.74, p=0.09). (A positive value indicates an increase in the analytical/experiential thinking style after the participants had made their choice in the lab experiment, compared to the one they had anticipated in the pre-questionnaire.) Furthermore, Table 1 reveals that the perceived strategy restrictiveness is, with an average of 3.60, rather in the middle of the scale. In contrast, immediately after the participants had made their choice, their choice satisfaction is relatively high at 5.45, and also remains on a high level when asked again 12 weeks later in the post questionnaire (both scales range from 1 to 7). Finally, the participants were rather generous: On average, they contributed $60.81 to the chosen project and only took $39.19 in cash.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| variable | mean | SD | variable | mean | SD |
| Dependent variables and mediators (thinking style: min: 1, max:5, all others min:1, max:7) | | | | | |
| analyticalStyle | -0.37 | 0.79 | experientialStyle | 0.12 | 0.65 |
| perceived strategy restrictiveness | 3.60 | 1.26 | choice satisfaction main questionnaire | 5.45 | 1.08 |
| choice satisfaction post questionnaire | 5 | 1.27 | willingness-to-contribute | 60.81 | 25.11 |

Table 1: Descriptive statistics of mediators and dependent variables

To test our Hypotheses 1, 2, and 3 about the effects of the interfaces on the different dimensions of the platform’s success, we conducted a separate OLS regression for choice satisfaction and willingness-to-contribute. We computed two models for choice satisfaction, one that regresses on the choice satisfaction that was reported immediately after the choice in the lab (choice satisfaction main) and one that regresses on the choice satisfaction reported in the post questionnaire (choice satisfaction post). The STANDARD condition was coded as the reference, so that the coefficients for NO-FILTER and SINGLE reflect the respective differences when comparing these conditions with STANDARD. In particular, the difference between the condition that supports an attribute-based selection and the one that does not, is reflected in the coefficient for NO-FILTER. The difference between the condition that supports joint evaluation and the one that supports only single evaluation is reflected in the coefficient for SINGLE. Table 2 summarizes the results of the three models. …

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Choice satisfaction main** | | **Choice satisfaction post** | | **Willingness-to-**  **Contribute** | |
| **Reference category: STANDARD** | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| NO-FILTER | .039 | 0.887 | .131 | 0.727 | -3.42 | 0.603 |
| SINGLE | -.618 | 0.029 | -.429 | 0.266 | 12 | 0.073 |
| constant | 5.60 | <0.010 | 5.10 | <0.010 | 57.92 | <0.010 |
| *N* | 88 | | 69 | | 85 | |

Table 2: Results of Hypothesis 1, Hypothesis 2, and Hypothesis 3.

***Additional Analyses***

AND SO ON

# Zitationen

## Literatur zitieren

Wer die Literatur nicht verwalten will, sondern nur formatieren will, kann Word verwenden: <https://support.office.com/de-de/article/erstellen-eines-literaturverzeichnisses-zitate-und-verweise-17686589-4824-4940-9c69-342c289fa2a5•>

**Nutzen Sie aber lieber Literaturverwaltungsprogramme wie Citavi, Mendeley oder Endnote:**

* Verwalten der PDF-Dokumente
* Automatisches Einlesen der Quellinformationen über Plugins im Browser, PDF, Datenbanken etc.
* Volltextsuche
* Anmerkungen, Notizen, Taggen,...
* Beispiele:
  + Endnote: <https://www.uni-giessen.de/ub/lernort-ausstattung/literaturverwaltung/endnote>
  + Citavi: <https://www.uni-giessen.de/ub/lernort-ausstattung/literaturverwaltung/citavi>
  + Mendeley:

<https://www.mendeley.com/?interaction_required=true>

* Vergleich der Software: <https://mediatum.ub.tum.de/doc/1316333/1316333.pdf>

## Zitationsstil

* American Psychological Association (APA) Zitationsstil (aber nur für die Literatur, nicht für die Formatierung der Arbeit!)
* Bitte sehr gute Anleitung online anschauen:

<https://www.scribbr.de/category/apa-standard/>

* Sowohl wörtliche bzw. direkte Zitate (🡪 übernommene Passagen im Wortlaut) als auch indirekte Zitate (🡪die Übernahme eines Gedankens) müssen kenntlich gemacht werden
* Jede in der Arbeit verwendete Quelle (Buch, Beitrag in einem Sammelwerk, Zeitschriftenartikel, Webseite) durch Quellenverweis belegen!
* Meistens verbirgt sich hinter einer Webseite eine Veröffentlichung, z.B.: hinter <https://sloanreview.mit.edu/projects/artificial-intelligence-in-business-gets-real/> verbirgt sich folgende Quelle: Ransbotham, S., Gerbert, P. Reeves, M., Kiron, D., & Spira, M. (2018). Artificial intelligence in business gets real*. MIT Sloan Management Review and The Boston Consulting Group*.

## Indirektes Zitieren

1. Eine frühe Beschäftigung mit diesem Phänomen (Barr, 1999)...Dieses Phänomen wurde bereits früher beobachtet (Beutel, et al., 2004)… Bereits früher wurde sich schon mit diesem Phänomen beschäftigt (Satariano, 2019)…
2. Schon Barr (1999) beschäftigte sich mit diesem Phänomen ...
3. Bereits 1999 beschäftigte sich Barr mit diesem speziellen Phänomen…

**Zwei Autoren:**

* (Cadogan & Lee, 2013)
* Aber: Schon Cadogan und Lee (2013) beschäftigte sich mit diesem Phänomen…

**Bei mindestens 3 Autoren**

* generell immer nur den ersten Autor zitieren und dann mit et al.
* Beispiel: statt (Baschek, Bredenkamp, Öhrle & Wippich, 2001): (Baschek et al., 2001)

**Bei mehreren Quellen:**

* Die verschiedenen Quellen werden durch einen Semikolon getrennt und alphabetisch sortiert
* Beispiel: Mehrere Studie (Barr, 1999; Beutel, et al., 2004) belegen, dass ...

## Wörtliches Zitieren

1. Wörtliche Zitate sind wortgetreu wiederzugeben und zwischen Anführungszeichen zu setzen!
2. Beispiel für ein wörtliches Zitat: Höhere Bildung ist die „Summe erweiterter materieller und ideeller Lebenschancen“ (Wehler, 1980, S. 127).
3. Wörtliche Zitate von mehr als 40 Wörtern als eigenen Absatz ohne Anführungszeichen anführen, Text einrücken

Traxel (1974) gibt folgende Umschreibung:

Die Psychologie von heute versteht sich als eine Erfahrungswissenschaft. Diese Feststellung gilt insofern allgemein, als sich sämtliche gegenwärtig bestehenden Richtungen der Psychologie auf die Erfahrung als ihre Grundlage berufen, auch wenn sie im Einzelnen die Erfahrungsdaten auf verschiedene Art gewinnen und sie unterschiedlich verarbeiten. (S.15)

1. Falls Sie nur einen Ausschnitt direkt zitieren wollen, können Sie mittels […] kennzeichnen, dass sie etwas weggelassen haben. Wichtig ist, dass hierdurch nicht der Inhalt des zitierten Textes verändert wird.

„[…] it is possible that participants attended less to effectiveness ratings for charities because they wished to have agency when making charitable decisions […]” (Berman et al. 2018 p. 827).

# Literaturverzeichnis

## Grundlegend

* Alle verwendeten Materialien anführen
* Nach Autorennamen alphabetisch geordnet (innerhalb eines Autors chronologisch –mit ältester Quelle zuerst)
* Gerne etwas einrücken
* Nicht nach Quellentyp unterscheiden
* Formatierung ohne Aufzählungszeichen

## Verschiedene Quellenarten

**Zeitschriftenartikel:**

Autor, A., Autor, B. & Autor, C. (Jahreszahl). Titel des Artikels. *Titel der Zeitschrift*, Ausgabe, Seitenzahl.

Beispiel: Peukert, C., Pfeiffer, J., Meißner, M., Pfeiffer, T. & Weinhardt, C. (2019). Shopping in Virtual Reality Stores: The Influence of Immersion on System Adoption. *Journal of Management Information Systems*, *36*(3), 755-788.

**Dissertation:**

Köster, J. (2010). Journalistisches Qualitätsmanagement, das wirkt? Unveröffentlichte Dissertation, Technische Universität Ilmenau.

**Buchkapitel oder -beitrag:**

Autor, A. (Jahreszahl). *Titel des Kapitels*. In B. Autor (Hrsg.), Titel des Werks (Seitenzahl). Ort: Verlag.

Beispiel: Beutel, J., Kasten, O., Mattern, F., Römer, K., Siegmund, F. & Thiele, L. (2004): *Prototyping Wireless Sensor Network Applications with BTnodes*. In: Karl, H., Willig, A. & Wolisz, A. (Hrsg.), Proceedings of the 1st European Workshop on Wire­less Sensor Networks (S. 261–271). Berlin: Springer.

**Webseite:**

Müller, T. (24. Januar 2020). Quellen nach APA zitieren. Scribbr. https://www.scribbr.de/quellen-nach-apa-zitieren

Wenn es sich nicht um Artikel handelt, sondern eher um pure Webseiten (oftmals im Intro der Fall, dann URL als Fußnote angeben, z.B. www.ikea.de)

Für mehr Beispiele, siehe: https://www.scribbr.de/apa-standard/beispiel/internetartikel/

**Konferenzbeitrag:**

Jeweils optional mit doi

Wenn in online-Proceedings:

Tattersall, I. (2009). Human origins: Out of Africa. Proceedings of the National Academy of Sciences of the United States of America, 106, 16018-16021. doi:10.1073/pnas.0903207106

Wenn in Buchform veröffentlicht:

Katz, I., Gabayan, K. & Aghajan, H. (2007). A multi-touch surface using multiple cameras. In J. Blanc-Talon, W. Philips, D. Popescu & P. Scheunders (Red.), Lecture notes in Computer Science: Vol 4678. Advanced concepts for Intelligent Vision Systems (S. 97-108). Berlin, Deutschland: Springer-Verlag. doi:10.1007/978-3-540-74607-2\_9

# Combinatorial Auctions

Die ist der Ausschnitt eines Beispielkapitels. Combinatorial auctions (CAs) are a part of electronic market design. Research in elec- tronic market design joins two disciplines: economics and computer science. Economical research focuses on game theoretical aspects by analyzing strategic behavior of self- interested agents. From the viewpoint of computer science, computational problems are addressed, such as ﬁnding the optimal allocation in auctions. As this work concentrates on computational aspects, we assume that the reader has a stronger background in computer science than in economics. Thus, in this chapter we will point out the main ideas of the economical perspective to provide some basic knowledge in this area.

## Mechanism Design

### Definition

Mechanism design was introduced by aims at implementing system-wide solutions to prob- lems in non-cooperative environments with multiple self-interested agents. Such problems can be political elections, public projects in which the participants themselves have to invest money, or allocation problems. Given that agents hold only private information about their preferences, a structure has to be chosen in which in equilibrium each agent behaves according to the designer’s or principal’s intentions. The designer can either act on behalf of the society, for example when collecting taxes for a public project, or she can pursue self-interests when, for instance, being an auctioneer. Since the agents’ information is private, the principal faces the problem that the agents might lie about their real valuations in order to inﬂuence the outcome according to their preferences. In most cases, whenever such manipulations occur, they damage the resulting system-wide welfare the participants to reveal their preferences is unfavorable. Therefore, the principal has to deﬁne other rules which lead to the desired outcome. The most common solution to this problem is to introduce monetary transfers providing incentives for the agents to behave truthfully. In mechanism design two economic areas are joined: game theory and social choice theory. In game theory the agents’ strategies are analyzed, and in social choice theory an outcome is selected according to a set of agents’ preferences. The outcome in social choice theory is determined by a social choice function, which is to be implemented by a mechanism. Formally we have a set of possible outcomes O and agents i ∈ I, |I| = n. Each agent i has a type θreﬂecting the possible preference sequences the agent can have. The type captures all of the agent’s private information relevant to her decision. The agent’s utility over each outcome depends on her type; while means that the outcome o1 is preferred over the outcome o2. The social choice function maps from the space of all types Θ to the space of all outcomes O,

(2.1)

Examples for such social choice functions are allocation problems or political voting pro- tocols in which a candidate or a party is chosen. The most common objective of a social choice function is the maximization of the social welfare, the so called allocative-eﬃciency all utilities over all agents:

(2.2)

Another objective is individual rationality; the agent’s payoﬀ is never less when participat- ing in the mechanism than her payoﬀ without participating. Additionally there is Pareto optimality. An outcome is Pareto optimal whenever none of the agents could perform better without causing another agent to perform worse than in the current situation. So far, we have learned what a social choice function is, and what typical objectives for the choices of outcomes are. Now, a mechanism has to be found which implements a given social choice function with one or several of these objectives. For this purpose, the agents’ possible strategies have to be speciﬁed together with an outcome function based on these strategies. The mechanism should guarantee an implementation despite the self-interest of the agents mechanism M is deﬁned on the strategy spaces Si of the agents:

(2.4)

where g is an outcome function and Si denotes all strategies or actions an agent i is allowed to take. A mechanism implements a social choice function if there is an equilibrium strategy proﬁle of the game induced by M so that

(2.5)

where is the strategy agent i with type θi plays in the equilibrium. Please note that the equilibrium concept is not speciﬁed in this deﬁnition. It could, for example, be a Nash equilibrium. In this case, given the other players , conform to the equilibrium strategies , no other player i has an incentive to unilaterally deviate from her equilibrium strategy. Other examples are the dominant strategy or the Bayes-Nash strategy equilibrium. The dominant strategy equilibrium facilitates it for the agents since the optimal strategy for an agent is independent of any strategies the other agents could play. Thus, the agents do not need to speculate about the way the others might behave. Informally, we could say that the concept of dominant strategies ”removes game theory from the problem” equilibrium is similar to Nash equilibriums, but assumes that agents have incomplete information about the opponents’ types. Therefore, agents use probability functions to speculate about the other agents’ preferences.

### Revelation Principle and Gibbard-Satterthwaite Theorem

In equation 2.3, we see that a mechanism deﬁnes the available strategies and the function for selecting an outcome. It is necessary that these strategies are kept simple so that they can be applied by the agents. The easiest strategies occur when choosing a direct mechanism asking the agents to report their types directly to the principal, . Direct mechanisms lead to a centralization of the problem as agents report their types to a center that determines the outcome and reports it back to the agents. On the contrary, when applying indirect mechanisms agents have to think about how to transform their type into a strategy and the latter is reported to the mechanism. In other words, ”the computations that go on within the mind of any bidder in the non-direct mechanism are shifted to become part of the mechanism in the direct mechanism”. When applying these direct mechanisms agents may still lie about their true types. Mechanisms which, in contrast, succeed in establishing an equilibrium in which all agents tell the truth, are called incentive-compatible. In this case, it is in the interest of all agents to report their true types, ∈ Θi . Further, if telling the truth is a dominant strategy, the mechanism is called strategy-proof. As will be shown later on, this can be achieved by the Vickrey-Clarke-Grooves (VCG) mechanism. We learned that the equilibrium strategy proﬁle does not determine the concept of equilibrium. Some equilibrium concept must be chosen and implemented together with the mechanism. In the worst case, in order to ﬁnd out if a certain social choice function can be implemented by a certain mechanism with, for instance, dominant strategies, one would have to consider all possible mechanisms. However, research on mechanism design led to the revelation principle as a solution to this. It states that for any mechanism, there is a direct, incentive-compatible mechanism with the same outcome explanation for this principle consists in: the transformation from types into strategies, which occurs in the agents’ minds in indirect mechanisms, and which is used as a ﬁlter in the direct mechanism. That is, the direct mechanism ﬁrst ﬁlters all reports of the agents and simulates the indirect mechanism with the ﬁltered input. This principle is valid for the optimal mechanism as well. Thus, the search for a mechanism can focus on direct mechanisms. Therefore, if no direct mechanism can implement a given social choice function, then no indirect mechanism will do so. In contrast to the positive result of the revelation principle, there also exists a negative result, the Gibbard-Satterthwaite theorem. According to it, it is impossible to ﬁnd a mechanism with certain positive characteristics. To understand the theorem, ﬁrst note that a social choice function is truthfully implementable if and only if the dominant strategy is to reveal the truth. Furthermore, a social choice function f is onto if for each o ∈ O at least one element in Θ exists so that f maps to o. Finally, a social choice function f is dictatorial whenever there is a dictator j among the agents so that for all outcomes, oj is strictly preferred to another outcome ok whenever the dictator j strictly prefers oj to ok. Obviously, this is an unwanted characteristic. It turns the Gibbard-Satterthwaite theorem impractical for real-life mechanisms since they allow manipulation. Gibbard-Satterthwaite Theorem: Given O is ﬁnite, |O|≥ 3, and the social choice function f is onto, then f is truthfully implementable in dominant strategies if and only if f is dictatorial. According to the theorem it is impossible to elicit the truth if dominant strategies exist. However, despite this result, the theorem can be circumvented by placing restrictions on the agents’ preferences, the way it is done in the VCG mechanism.

### Vickrey-Clarke-Grooves Mechanism

The VCG mechanism combines the following important virtues by introducing a special payment scheme. First, it implements social choice functions in dominant strategies. Thus, agents do not have to speculate which strategies the other agents might play, and they do not need to waste resources on learning about their competitors’ strategies. Second, the mechanism does not have to make any assumptions about the information agents have on each other. And, third, the VCG mechanism is allocative-eﬃcient (see equation 2.2), strategy-proof and non-dictatorial. AND SO ON...

# Conclusions

Auf Deutsch: Fazit

Bei einem kurzen Fazit muss keine weitere Untergliederung stattfinden. Kapitelnahme in diesem Fall sollte dann wie folgt lauten: „Zusammenfassung und Fazit“.

## Summary

Auf Deutsch: Zusammenfassung

Die Zusammenfassung der Arbeit ist optional. Sollten Sie die Arbeit noch einmal zusam- menfassen wollen, so halten Sie dies bitte eher kurz und wiederholen Sie sich nicht zu sehr.

## Limitations and Future Research

Auf Deutsch: Limitationen und Ausblick

Es ist sinnvoll, jede Limitation an eine Idee zu knüpfen, wie diese in zukünftigen Arbeiten zu adressieren wäre.

## Contribution

Auf Deutsch: Beiträge

Was sind die Beiträge Ihrer Arbeit sowohl für die Wissenschaft (und Theorie) als auch für die Praxis? Hier sollten Sie versuchen, über den Tellerrand hinauszuschauen und einen eher weiten Blick einnehmen.

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Appendix

Selbstständigkeitserklärung

Hiermit versichere ich, die vorgelegte Thesis selbstständig und ohne unerlaubte fremde Hilfe und nur mit den Hilfen angefertigt zu haben, die ich in der Thesis angegeben habe. Alle Textstellen, die wörtlich oder sinngemäß aus veröffentlichten Schriften entnommen sind, und alle Angaben die auf mündlichen Auskünften beruhen, sind als solche kenntlich gemacht. Bei den von mir durchgeführten und in der Thesis erwähnten Untersuchungen habe ich die Grundsätze guter wissenschaftlicher Praxis, wie sie in der ‚Satzung der Justus- Liebig-Universität zur Sicherung guter wissenschaftlicher Praxis‘ niedergelegt sind, eingehalten. Gemäß § 25 Abs. 6 der Allgemeinen Bestimmungen für modularisierte Studiengänge dulde ich eine Überprüfung der Thesis mittels Anti-Plagiatssoftware.

Datum Unterschrift