Web vs. Mobile: Comparing Trading Performance in Stationary and Mobile Settings

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ABSTRACT
Typically, Information Systems (IS) are used to improve the efficiency and effectiveness of processes. On the one hand, mobile IS, with their ubiquitous character, have the potential to extend the application range of traditional IS. On the other hand it is also known that mobile IS have drawbacks, like a small screen size and limited processing power. The question arises if mobile IS changes decision behavior and more importantly decision performance. This paper contains a field experiment in a play money prediction market with over 2,000 participants in which users use a web frontend as well as a mobile application. Its market setting is well suited to study both decision behavior and decision performance on a user-by-user basis. It is found that participants' trading behavior using a mobile device does differ from using a stationary device. Moreover, looking at decision performance, this paper finds significantly lower trading profits when using mobile devices.

Keywords: Decision Behavior, Decision Making, Decision Performance, Mobile IS, Mobile Trading, Prediction Markets

INTRODUCTION
We often rely on information systems (IS) to filter, aggregate, and present information we need in a manner that supports decision making processes. A common misbelief about decision making is that the more information available, the better our decisions. In contrast, it has been shown that more information can lead to decreased decision making performance, e.g. due to information overload (cf. Malhotra, 1982). For electronic markets, Teschner et al. (2011) showed that more information can be harmful for individual trading performance.

With the rise of mobile information systems, the question arises how decision behavior and decision performance are influenced by its usage. In general, we see two major developments influencing the usage of information systems (IS) here. Firstly and obviously, mobile IS enables the usage of IS in a mobile context. Hence, one is enabled to make use of IS in settings where it was not possible before. This opens a whole new set of opportunities (e.g. Muntermann & Janssen, 2005) and hindrances which can, for instance, result in faster reaction times to news in a trading context as well as to a higher degree of distraction or uncertainty.
Secondly, mobile IS might also supersede traditional IS in certain settings. Mobile Human-Computer Interaction (HCI) often differs from its stationary counterparts (e.g. Schmiedl et al., 2009) for a variety of reasons: inter alia different screen sizes (e.g. Adipat & Zhang, 2005; Brewster, 2002), gesture controlled vs. mouse and keyboard, operation systems, and reliability of network connectivity. Thus one might expect that these differences do result in different outcomes in some cases. Therefore we expect that users of mobile IS will perform differently than users of stationary IS for a given task or problem.

In order to design mobile systems that support good decision making we need to analyze how participants search for information and how they incorporate this information in their decision process. Moreover we need to link behavioral aspects of IS users and the quality of their decisions in order to improve the design of mobile IS. More precisely, we try to answer the question ‘How do different devices (and therefore user interfaces) affect decision behavior and decision outcome?’ Hence, we conduct a field study on an electronic market to shed some light onto this higher research question.

Specifically, we conduct our research in a repeated market environment called “Kurspiloten” (engl. “quotation pilots”). The Kurspiloten market is a prediction market (cf. Luckner, 2008; Wolfers & Zitzewitz, 2006) designed to forecast the stock exchange value of selected stock indices and commodities on a weekly basis. This prediction market is setup as a continuous double auction, like in financial markets, with one stock representing each new release of economic information. Participants buy if they think that prices underestimate the probability of an event and sell if they think prices overestimate the probability of an event. The prediction market thereby aggregates information in the same way a stock market does, which is relatively efficient in an ex-ante information sense. In the Kurspiloten field experiment we study the impact of mobile and stationary interfaces on user behavior and decision performance with over 2,000 participants.

The remainder of this paper is structured as follows: the second section presents a review of related work in the prediction market domain. Additionally it summarizes previous results from interface effects on decision making. The third section details the field experiment setting and the framing of the participants’ trading process. The fourth section specifies the research model. The subsequent section first presents some descriptive data and then introduces the evaluation methodology. Specifically, we use market measures to separately analyze trading performance and trading behavior. In section six we link the interface elements to trading outcome and interpret the results. Finally section seven concludes this paper.

**RELATED WORK**

In the following section we will first present related work on prediction markets and then summarize previous work on participant behavior in information systems as well as electronic markets.

**Prediction Markets**

Prediction markets have a long track of successful application in a wide area ranging from political to sport events, and sometimes outperform established forecast methods (Berg et al. 2008). The roots of their predictive power are twofold; the market provides incentives for traders to truthfully disclose their information and an algorithm by which to weight opinions. They facilitate and support decision making through aggregating expectations about events (Berg & Rietz, 2003; Hahn & Tetlock, 2005; Hanson, 1999).

The most basic trading mechanism for prediction markets is based on a continuous double auction for one stock that represents the outcome of an event. The stock will pay 1 if an event has the predicted outcome and else the stock will be worthless. Market participants form expectations about the outcome of an event. Comparable to financial markets, they buy if they find that prices underestimate the event in question and they sell a stock if they
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