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# Value potential and challenges of service-oriented architectures - A user and vendor perspective

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# THE SIGNIFICANT OTHERS OF SUBJECTIVE NORM -

## A SCIENTOMETRIC STUDY OF SUBJECTIVE NORM IN IS TOP-JOURNALS OVER TWO DECADES

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### Abstract

*Undoubtedly social influence in IS research is an issue that needs to be much more clearly examined. In order to assuage the wants for more research in this field we conducted a scientometric analysis of subjective norm in the IS top-journals of the JAIS ranking for the last two decades. In total 113 empirical and conceptual research models predominately in adoption research contained the factor subjective norm. The results revealed that subjective norm is just in seven of ten models a significant antecedent. To gain more knowledge about this problem we followed the ideas of social psychology and marketing researchers and correlated the strength of the impact of subjective norm with its measurement as well as the impact of intention with the impact on other endogenous variables. The results show a significant negative correlation between the significant antecedent subjective norm and its original measurement, the perceived opinion of important others. Furthermore it revealed a significant negative correlation between the significant impact of subjective norm on intention and the significant impact on other endogenous variables.*

*Keywords: Subjective Norm, Social Influence, Scientometric Study, Meta-Analysis*

# 1 INTRODUCTION

*“There's one advantage to being 102. There's no peer pressure.”* (Wolfberg 2008)

In older ages the social influence of referent groups in private, public or workplace contexts might be not that important anymore as Dennis Wolfberg - a US comedian - assumed but it is exceptionally important in the whole life before. As we are confronted almost throughout our daily complete behavior by the opinions, actions and advices of important others (Fishbein and Ajzen 1975; Triandis 1971) it is not surprising that subjective norm or social factors are an important determinant for an individual's intention and behavior respectively to use or adopt a specific technology or information system (e.g. Thompson et al. 1991; Lewis et al. 2003; Lee et al. 2006). However two decades after the introduction of the Technology Acceptance Model (TAM) (Davis et al. 1989) IS research still struggles to define and measure social influence appropriately. Various researchers have claimed for *“more sophisticated methods for assessing the specific types of social influence”* (Davis et al. 1989), *“additional research that clarifies the precise role of social pressure in technology acceptance”* (Agarwal 2000) or *“further research that should study if this factor generate any direct impact on intention to adopt”* (Lu et al. 2005). Compared to other classic technology adoption parameters subjective norm or social influence never reached their path significance for the impact on an individual's behavioral intention or other endogenous variables (Schepers and Wetzels 2007). Therefore other researchers suggest *“that social norms need to be conceptualized in a more distinguishing manner to capture the nuances of the social environment”* (Srite and Karahanna 2006). In the JAIS special issue on TAM in 2007 Benbasat and Barki recommended for further research in this field to get back to the underlying Theories of Reasoned Action (Fishbein and Ajzen 1975) and Planned Behavior (Ajzen 1985) (Benbasat and Barki 2007). So we focus our research on two specific aspects of social influence in the underlying theories: its concrete measurement and its general role in dependence with other parameters.

Surprisingly besides being insignificant (e.g. Mathieson 1991; Hsieh et al. 2008) or excluded due to insignificance (e.g. Davis et al. 1989; Ha et al. 2007) from numerous empirical models, the parameter subjective norm or social factors was never critically questioned in IS research like in other fields as social psychology or marketing. Researchers with these backgrounds particularly criticized the basic measurement of subjective norm in the underlying theories (Fishbein and Ajzen 1975; Triandis 1971) as not distinguishing enough to analyze social influence appropriately (e.g. Ahtola 1976; Miniard and Cohen 1983; Liska 1984). In their opinion is *“the person's perception that most people who are important to him think he should or should not perform the behavior in question”* (Fishbein and Ajzen, 1975) not adequately as an individual does not feel the pressure of collective important others, but of individual groups as peers or superiors in a working environment respectively friends or parents in a private environment (Eckhardt et al. 2008). Within this approach we aim to reassess these points of critique for IS research by conducting a scientometric study of all IS top-journals of the JAIS ranking (Lowry et al. 2004) for the last twenty years. With the results of this study and the help of a correlation analysis we would like to answer the following research question:

RQ1: Is there a correlation between how Subjective Norm is measured and the significance of the impact?

Furthermore another point of critique regarded the relationship between attitudinal and normative beliefs (Liska 1984; Miniard and Cohen 1983). Social psychology and marketing researchers discussed that a further weakness of the TRA (Fishbein and Ajzen 1975) is its complete ignorance of a causal relationship between attitudes and social norms (Liska 1984). Fishbein and Ajzen regarded these effects as totally independent. It was mentioned that these effects might be independent by definition but not independent by reason as well as statistically interactive (Liska, 1984). Despite the inclusion of potential interaction and dependency effects in the Theory of Planned Behavior (Ajzen 1985) and the confirmed importance of a further examination (Yang and Yoo 2004) this fact was barely observed in further research approaches. By analyzing the data of 113 empirical and conceptual

models containing the factor subjective norm or social influence found through our scientometric study we address the following second research question:

RQ2: Are there any correlations between the influence of subjective norm on behavioral intention and the influence on other endogenous variables?

We answer both research questions with a correlation analysis in SPSS v.16. Beforehand we describe the theoretical derivation of the observed factor subjective norm or social influence and its function in the underlying Theories of Reasoned Action (TRA) and Planned Behavior (TPB) (Fishbein and Ajzen 1975; Ajzen 1985) as well as Interpersonal Behavior (TIPB) (Triandis 1971; 1980) in section 2. The following section includes the introduction of our research method (scientometric study) and the description of our data pool plus details regarding the search process and the database access. After the descriptive statistics and the correlation analyses in section 4 we discuss the results of our approach. By concluding our scientometric study about subjective norm we provide implications for further research in section 6.

## 2 THEORETICAL BACKGROUND

After the detailed description of our research objectives and its related research question in the introduction we will use this section to briefly describe the theoretical background of subjective norm respectively social influence in IS research especially in the field of technology adoption, acceptance and usage. Furthermore we introduce the underlying theories and models which include the parameter subjective norm.

### 2.1 The Term Subjective Norm

The origin of the term subjective norm or social influence lies in the cradle of social psychology research back in the early fifties of the 20<sup>th</sup> century. Luminaries in social psychology research as Solomon Asch, Kurt Lewin or Leon Festinger introduced and experimentally proofed the concept of social influence as a pressure of conformity on an individual human being to act conform to the behavior of a distinct group or person (Asch 1951; Lewin 1952). This also includes a continuous comparison from an individual's point of view with the behaviors, opinions, actions of peers (Festinger 1954). Social influence expresses itself in an individual person as a change of thinking or feeling concerning a specific behavior due to communication with another individual or a person. In 1962 the knowledge about this topic was further deepened by the work of Everett M. Rogers on the diffusion of innovations. Within his approach Rogers describes social influence as norms or the roles of opinion leaders and change agents in innovation diffusion in a distinct social system which is defined as *"a set of interrelated units that are engaged in joint problem solving to accomplish a common goal"* (Rogers 2003)

Altogether the term social influence in IS research could be predominately related to the concepts of peer pressure and social comparison in a distinct social system (Eckhardt et al. 2009). The construct subjective norm as well as social factors was than founded about 10 years later, introduced within the competing Theories of Reasoned Action (Fishbein and Ajzen 1975) and Interpersonal Behavior (Triandis 1971). A first approach adapting the factor social influence for management literature and forming a factor of subjective norm was made by Gerald Salancik and Jeffrey Pfeffer who built a conceptual framework to describe social information processes on an individual's job attitude (Salancik and Pfeffer 1978). The introduction for subjective norm in IS research started with an exclusion from the Technology Acceptance Model (Davis et al. 1989) due to insignificance. Subsequent approaches in technology adoption including subjective norm kept the balance between significant (Thompson et al. 1991; Taylor and Todd 1995) and insignificant results for the factor of subjective norm (Mathieson 1991; Dishaw and Strong 1999). Beside these mixed results one thing remained over the years, a large number of IS researchers requested a further investigation of this "unloved child" of technology adoption research (Davis et al. 1989; Agarwal 2000; Lu et al. 2005).

Beyond technology adoption research subjective norm or social influence was comparatively seldom used in IS research. But there are some examples as Austin et al. (1993) who evaluated the factor social influence in the context of who controls the technology in group support systems (Austin et al. 1993). Other researchers included social influence in the context of media richness concerning electronic communication (Schmitz and Fulk 1991). For this purpose Janet Fulk and her co-authors Schmitz and Steinfield developed a social influence model of technology use to incorporate the influence of workplace referents such as superiors or co-workers on the use of electronic communication (Fulk et al. 1990). Also in the field of IT turnover first approaches were made to observe the impact of social influence in the form of social support on an IT professional's turnover intention (Lee 2002).

Overall it can be concluded that a majority of empirical and conceptual models including any term of subjective norm, social influence, normative beliefs, social norms, etc. in IS research is related to the field of technology adoption, nevertheless social influence appears in a great variety of synonyms as social support in IT turnover (Lee 2002), as social presence in telecommunication (Short et al. 1976) and in online auctions bidding behavior (Rafaeli and Noy 2005) or as social status in virtual team management (Austin et al. 1993) in other IS domains as well.

## **2.2 Basic Theories Including the Term Subjective Norm**

As concluded in the previous subsection a majority of empirical and conceptual models including a factor for social influence in IS research could be related to technology adoption research. The list of popular and frequently cited adoption models is countless, starting with the most famous Technology Acceptance Model (TAM) (Davis et al. 1989), the Model for PC Utilization (Thompson et al. 1991), the Model of Adoption of Technology in Households (Venkatesh and Brown 2001) up to the UTAUT Model (Venkatesh et al. 2003), just to name a few. All of these adoption models and almost all remaining of the not mentioned ones base upon two competing behavioral theories from social psychology research: The Theory of Reasoned Action (Fishbein and Ajzen 1975 and its extension the Theory of Planned Behavior (Ajzen 1985) as well as the Theory of Interpersonal Behavior (Triandis 1971; Triandis 1980).

A lot more recently published research models have their seeds in the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) by Icek Ajzen and Martin Fishbein (Fishbein and Ajzen 1975; Ajzen 1985). The objective of their theories is to explain the determinants that predict an individual's specific behavior and the behavioral intention to adopt the respective behavior. The antecedents for an individual's behavioral intention are an individual's attitude toward the behavior, perceived behavioral control and subjective norm. Subjective norm is referred to as "*the perceived social pressure to perform or not to perform the behavior as a sum of the perceived expectations of specific referent individuals and/or groups weighted by the individual's "motivation to comply" with those expectations*" (Fishbein and Ajzen 1975).

Interestingly although accepted within the psychological literature and founded before the TRA the Theory of Interpersonal Behavior by Harry Triandis (1971) has not been used frequently within the IS context. Just a few but highly significant approaches include this theory as underlying (Thompson 1991; Lee et al. 2001). Already in 1971 Triandis argued "*that an individual's behavior is influenced by social norms, which depend on messages received from others and reflect what individuals think they should do*" (Triandis 1971). Nine years later, Triandis expanded this term and called it social factors, that is, "*the individual's internalization of the reference groups' subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situations*" (p. 210). The reference groups' subjective culture includes norms (self-instructions to do what is perceived to be appropriate and by members of a distinct culture in a certain environment and situation); roles (which are related with behaviors that are considered appropriate but concerned to persons holding a particular position in a social system, society or group); and self concept (abstract

categories with highly emotional components) (Triandis 1980). Both extended theories (Ajzen 1985; Triandis 1980) are shown in the following Figure 1.

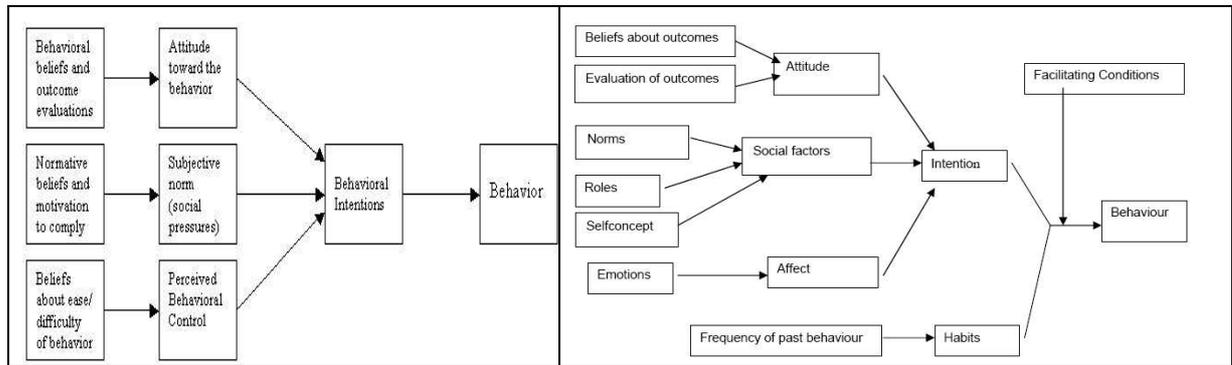


Figure 1. The Theory of Planned Behavior (Fishbein and Ajzen 1975; Ajzen 1985) and the Theory of Interpersonal Behavior (Triandis 1971; Triandis 1980)

To what extent these theories are related to the criticism for measurement and role definition of subjective norm as described in the introduction will be analyzed with the help of our scientometric study in section 4.

### 3 RESEARCH METHODOLOGY

The objectives of this section are to introduce our research method, the scientometric study, to argue why we chose the JAIS ranking of 2004 (Lowry et al. 2004) as our data pool and to describe how we searched through this large amount of data to find valuable content for our scientometric study about subjective norm in IS research.

#### 3.1 Research Method

We chose scientometrics as research method for our literature review about subjective norm. Reason for that choice was the adequacy of the scientometric analysis for our research approach as it answers particular questions about way and form IS researchers publish their contents. For example researchers defined scientometrics as the quantitative study of research (Davis 2001) or the scientific study of the process of science (Lowry et al. 2004). In this context it needs to be outlined how this research method differs from regular surveys. Hunter et al. (1982) highlighted the major difference between both forms. A survey is used to collect data about people’s behavior, opinion or background. On the contrary a scientometric analysis focuses on the article itself and not the observed people (Hunter et al. 1982). With employed tools as citation analysis or meta-analysis a scientometric analysis observes the affiliations of authors, paper abstracts and texts or references and appendices. Overall scientometric studies are considered to become very important and highly valued for scientific research in future (Straub 2006). Detailed information about the ranking we observed and the way we accessed the included journals is described in the following subsection.

#### 3.2 Data Pool and Included Publications

If you conduct a scientometric analysis major questions a priori are: How far do you want to go and where you got to draw the line? Unlike other already conducted quantitative meta-analyses on subjective norm that included dissertation theses and conference proceedings (Schepers and Wetzels 2007) or journal articles from other research domains as marketing or social psychology (Eckhardt et al. 2008) we focus in our approach solely on IS top journals. In order to exactly define and concentrate our approach we decided to choose a journal ranking as boundaries for the scientometric study. There

is a broad range of IS journal rankings at present with different foci national and international so we had to analyze several rankings to find the perfect fit to our research objectives. Finally we decided to use the JAIS ranking by Lowry et al., published in 2004. It is one of the most cited IS journal rankings and part of the MIS journal rankings of the Association for Information Systems and widely known as an extremely comprehensive ranking of IS journals (Mbarika et al. 2005) with an outstanding reputation. In total we included all 48 journals of the five world rankings in our scientometric study. We started our approach two decades ago and searched through every single issue since 1988 of all 48 journals included in the JAIS ranking (Lowry et al. 2004), more than 20,000 articles overall. We accessed these journals for our scientometric study via literature online databases and electronic libraries. The actual search process with its related search criteria will be described in the following subsection.

### **3.3 Database Search Process and Criteria**

With the objective to conduct our scientometric study we accessed the included IS journals via ten databases and electronic libraries. These sources were in alphabetical order: ACM Digital Library, AIS Library, EBSCOhost, Elsevier, Emerald, IEEE Xplore, JSTOR, Palgrave Macmillan, ScienceDirect and Wiley InterScience. IS journals which were not accessible via one of these sources were retrieved with the help of colleagues in other universities and IS research institutions.

Two main search techniques were mostly provided by the respective databases or e-libraries, the "General Search and the "Advanced Search". Both search techniques include the Boolean operators ("AND"+"OR") to facilitate the search with more search items. Like other literature research approaches (e.g. Dwivedi et al. 2008) we predominately used the "General Search" as it allowed us to repeat our searches frequently with consistent results and without any confusion. For the purpose of finding all relevant IS journal articles we started our search with the term "Subjective Norm" and several synonyms or related terms already found in literature (Karahanna et al. 1999; Lewis et al. 2003; Lee et al. 2006; Kim et al. 2007) and used in other meta-analyses (Schepers and Wetzels 2007) as "Social Influence", "Normative Beliefs", "Social Norm", "Social Pressure", "Social Exchange", "Peer Group Influence", "Peer Group Norm", "Peer Group Pressure", "Peer Pressure", "Superiors Influence", "Superiors Pressure", "Friends Influence", etc. Our scientometric search was restricted to incidences of any of these search terms appearing in the body of the text or the article title. In order to sharpen and improve our results we added further information as frequently underlying models or theories which imply subjective norm as well as the names of the related and frequently cited authors. Therefore in databases as EBSCOhost we used extended search terms as the following example for the search through the journal Information Systems Research:

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JN "Information Systems Research" AND (TX "technology acceptance model" OR TX "Venkatesh" OR TX "Ajzen" OR TX "subjective norm" OR TX "TAM" OR "TAM"2 OR TX "theory of planned behavior" OR TX "theory of reasoned action" OR TX "social influence" OR TX (important N2 me) OR TX "normative beliefs")
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This search style resulted in the extraction of 1,856 articles providing topics and content related to social influence in IS research. All 1,856 records were then analyzed manually to examine and crosscheck their relevance for the overall study. A number of further analyses were then performed afterwards to categorize the findings due to their title, author, year of publication, research subject as well as most important to the individual role of subjective norm its significance, measurement and impact as exogenous and endogenous variable on further endogenous variables. After the categorization process all results were stored and coded within a database. In total 113 articles (107 empirical models and 6 conceptual frameworks) were included for our scientometric study. The results were first coded in SPSS v.16 and then counted and percentage values generated. The complete descriptive statistics is shown in the following Table 1. The empirical evaluation of these data and the implying correlation analyses are presented in the following section 4.

Year Publ.	Title	Authors	Year Publ.	Title	Authors
1988 MS	Managerial Influence in the Implementation of New Technology	Barton et al.	2005 I&M	Extending the TAM for e-commerce	Yu et al.
1989 MS	User Acceptance of Computer Technology:	Davis et al.	2005 JIS	Personal innovativeness, social influences and adoption of wireless Internet services	Lu et al.
1991 ISR	Predicting User Intentions: Comparing the TAM with the TPB	Mathiesen et al.	2005 JIS	Model of electronic government services among business organizations in SIN	Tung & Rieck
1991 JIS	Factors Influencing Software Piracy: Implications for Accountants	Christensen et al.	2005 MISQ	Adoption of Technology in Households Cycle	Brown et al.
1991 MISQ	Personal Computing: Toward a Conceptual Model of Utilization	Thompson et al.	2005 MISQ	Behavioral Intention Formation in Knowledge Sharing	Bock et al.
1993 AMJ	Social Construction of Communication Technology	Fulk	2006 CAIS	The Effect of Culture on User Acceptance of Information Technology	Bandyopadhyay et al.
1993 HCI	Who Controls the Technology in Group Support Systems?	Austin et al.	2006 I&M	A comparison of the behavior of different customer clusters	Wu
1994 MS	Explaining the Role of User Participation in Information System Use	Hartwick et al.	2006 I&M	Acceptance of electronic tax filing: A study of taxpayer intentions	Fu et al.
1994 OS	Capturing the complexity in advanced technology use:	DeSanctis et al.	2006 I&M	Understanding information technology acceptance by individual professionals: Household Technology Use:	Yi et al.
1995 ISR	Understanding Information Technology Usage: A Test of Competing Models	Taylor et al.	2006 ISOC	Use of A Groupware Product: A Test of Three Theoretical Perspectives	Brown et al.
1995 MISQ	Computer Self-Efficacy: Development of a Measure and Initial Test	Compeau et al.	2006 JIS	Determinants of Instructors' Intentions to Teach Online Courses:	Lou et al.
1995 MISQ	Assessing IT Usage: The Role of Prior Experience	Taylor et al.	2006 JIS	Why Wait?	Alshare et al.
1996 CACM	Evaluating ethical decision making and computer use	Loch et al.	2006 JIS	Software Piracy among Accounting Students:	Loras et al.
1996 JIMIS	A Motivational Model of Microcomputer Usage	Igarria et al.	2006 MS	Information System Success: Individual and Organizational Determinants	Woolley et al.
1997 ISR	Executive Decisions About Adoption of IT in SME	Harrison et al.	2006 MISQ	The Role of Espoused National Cultural Values in Technology Acceptance	Sabherwal et al.
1997 MISQ	Personal Computing Acceptance Factors in Small Firms: A SEM	Igarria et al.	2006 MISQ	Understanding and Predicting Electronic Commerce Adoption:	Srite et al.
1999 DSCI	Technology Use and Performance: A Field Study of Broker Workstations	Lucas Jr. & Spitzer	2006 DATA	The Pendulum Swings back	Fang et al.
1999 ISR	Extending the technology acceptance model with task-technology fit constructs	Kraut et al.	2006 DATA	Using Attitude and Social Influence to Develop an Extended Trust Model for IS	Li et al.
1999 ISR	Information and Communication: Alternative Uses of the Internet in Households	Karahanna et al.	2006 DATA	Testing an Extended Model of IT Acceptance in the Chinese Cultural Context	Mao et al.
1999 MISQ	Information Technology Adoption Across Time: A Cross-Sectional Comparison	Khalifa et al.	2006 DATA	Social Influence on Technology Acceptance Behavior	Lee et al.
2000 CACM	Exploring the telecommuting paradox: exploring the telecommuting paradox	Cheung et al.	2007 CAIS	Do Perceived Leadership Behaviors Affect User Technology Beliefs?	Dong et al.
2000 DSS	Prediction of Internet and WWW usage at work: a test of an extended Triandis model	Anandarajan et al.	2007 EJIS	Charismatic leadership and user acceptance of information technology	Neufeld et al.
2000 IT&P	Technology acceptance in the banking industry	Tan et al.	2007 EJIS	Perceived critical mass and the adoption of a communication technology	Van Slyke et al.
2000 JANS	Factors influencing the Adoption of Internet Banking	Venkatesh et al.	2007 I&M	An investigation into the factors influencing the adoption of B2B trading exchanges	Quaddus et al.
2000 MS	A Theoretical Extension of the Technology Acceptance Model	Venkatesh et al.	2007 I&M	Students' participation intention in an online discussion forum:	Yang et al.
2000 MISQ	Why don't men ever stop to ask for directions?	Trevino et al.	2007 I&M	Information technology (IT) in Saudi Arabia:	Al-Gahtani et al.
2000 OS	Making Connections	Chang et al.	2007 IT&P	The effects of gender and age on new technology implementation	Baker et al.
2001 I&M	Determinants of the intention to use Internet/WWW at work: a confirmatory study	Lucas Jr. et al.	2007 JIT	The application and adaptation of a diffusion of innovation framework	Wainwright et al.
2001 I&M	Implementation in a world of workstations and networks	Lee et al.	2007 JIT	An empirical investigation into the utilization-based IT success model:	Kim et al.
2001 JIS	Adoption of Information Technology in Small Business	Lau et al.	2007 JIS	e-Business strategy and firm performance:	Coltman et al.
2001 JECR	Adoption of On-line Trading in the Hong Kong Financial Market	Venkatesh et al.	2007 JANS	The Centrality of Awareness in the Formation of User Behavioral Intention	Dinev et al.
2001 MISQ	A Longitudinal Investigation of Personal Computers in Homes:	Brown et al.	2007 DATA	Why People Buy Virtual Items in Virtual Worlds with Real Money	Guo & Barnes
2002 EJIS	Do I really have to? User acceptance of mandated technology	Riemenschneider et al.	2008 DSCI	Acceptance of Agile Methodologies: A Research Agenda on Interventions	Venkatesh et al.
2002 IEET	Explaining Software Developer Acceptance of Methodologies	Chau & Hu	2008 DSS	Examining the effects of cognitive style in individuals' technology use	Chan et al.
2002 I&M	Investigating healthcare professionals' decisions to accept telemedicine	Anandarajan et al.	2008 DSS	What Drives Continued Knowledge Sharing?	Chakraborty et al.
2002 JIM	IT acceptance in a less-developed country: a motivational factor perspective	Riemenschneider et al.	2008 EJIS	The role of perceived enjoyment and social norm in the adoption of technology	He et al.
2002 JIS	Assessing Belief Differences in Small Business Adopters and Non-Adopters	Pavlou et al.	2008 I&M	Social networks, social trust and shared goals in organizational knowledge sharing	Dickinger et al.
2002 JECR	What Drives Electronic Commerce Across Cultures?	Daniel et al.	2008 I&M	Determinants of accepting wireless mobile data services in China	Chow et al.
2002 JIT	An exploratory comparison of electronic commerce adoption	Chau et al.	2008 I&M	Internet messaging: An examination of the impact	Lu et al.
2002 JIMIS	Examining a Model of IT Acceptance by Individual Professionals	Khalifa et al.	2008 I&M	Explaining non-work-related computing in the workplace	Premkumar et al.
2003 CACM	Drivers of Internet Shopping	Brown et al.	2008 I&M	Understanding Web-based learning continuance intention:	Chiu et al.
2003 CACM	Bringing Non-Adopters Along: The Challenge Facing the PC Industry	Bagchi et al.	2008 I&M	Acceptance of blog usage:	Hsu et al.
2003 EJIS	Modeling use of enterprise resource planning systems: a path analytic study	Riemenschneider et al.	2008 I&M	Exploring the effects of direct experience on IT use:	Mao et al.
2003 I&M	Understanding IT adoption decisions in small business: integrating current theories	Hu et al.	2008 I&M	Adopting organizational virtualization in B2B firms: An empirical study in Singapore	Liu et al.
2003 I&M	Examining technology acceptance by school teachers: a longitudinal study	Huang et al.	2008 I&M	An empirical investigation of anti-spyware software adoption:	Lee et al.
2003 JIS	The Impact of Power Distance on Email Acceptance: Evidence from the PRC	Limayem et al.	2008 ISR	An assessment of advanced mobile services acceptance:	Lopez-Nicolas et al.
2003 JANS	Force of Habit and Information Systems Usage: Theory and Initial Validation	Hsu & Chiu	2008 IT&P	How Does Personality Matter?	Devaraj et al.
2003 MISQ	User Acceptance of Information Technology: Toward a Unified View	Venkatesh et al.	2008 JIM	Intra-organizational relationships and technology acceptance	Magni et al.
2003 MISQ	Sources of Influence on Beliefs About Information Technology Use	Lewis et al.	2008 JIS	Drivers for Transactional B2C M-Commerce Adoption:	Khalifa et al.
2004 DSS	Internet self-efficacy and electronic service acceptance	Hsu & Lu	2008 JIS	How Endogenous Motivations Influence User Intentions:	Malhota et al.
2004 IEET	Factors motivating software piracy: a longitudinal study	Vijayarathay	2008 JIS	Adoption of ICT in a government organization in a developing country:	Gupta et al.
2004 I&M	Why do people play on-line games?	Hu et al.	2008 MISQ	Why Do We Trust New Technology?	Li et al.
2004 I&M	Predicting consumer intentions to use on-line shopping:	Konama et al.		Understanding Digital Inequality:	Hsieh et al.
2005 CACM	Is Spyware an Internet Nuisance or Public Menace?	Rafaeli et al.			
2005 CACM	Investigating factors affecting the adoption of anti-spyware systems				
2005 DSS	The Social-Economic-Psychological model of technology adoption and usage:				
2005 EM	Social Presence: Influence on Bidders in Internet Auctions				

Table 1. Findings of the scientometric study

## 4 RESULTS

After the theoretical derivation of subjective norm and the description of its explicit role and measurement in the underlying theories in section 2 and the introduction of our research method in section 3 we present in this section the descriptive statistics of our scientometric study as well as the evaluation of the collected data with the help of a correlation analysis. For information about these journals including the parameter subjective norm as title, authors, name of journal and year of the publication, see Table 1. To answer the research questions asked in the introduction we collected explicit data regarding the measurement and of subjective norm.

Generally spoken the degree of significance of subjective norm or social influence in the empirical models analyzed is low. We found the parameter in 31.7 percent of all empirical models observed as an insignificant antecedent for an individual's behavioral intention or further respective parameters as the specific behavior, attitude, perceived usefulness, perceived ease of use, perceived enjoyment, trust, etc. In 68.3 percent of all empirical models subjective norm was found as a significant antecedent for the parameters mentioned before. Compared to other meta-analyses as one by Wetzels and Schepers (2007) this represents a slightly lower percentage for the significant impact of subjective norm. They found the parameter as a significant antecedent for intention in 86.4 percent of all articles observed, for perceived usefulness in 91.7 percent and for perceived ease of use in 66.7 percent of all articles. However compared to our approach they used a much smaller sample size with 51. Additionally they included conference proceedings as well as not ranked IS journals in their approach and did not limit their findings to IS top-journals as we did. Compared to other regular adoption parameters as perceived usefulness, perceived ease of use or attitude, who were found significant on average in more than 90 percent of all cases in other meta-analyses (Ma and Liu 2004; King and He 2006) subjective norm is substandard regarding its significance.

Following the descriptive statistics of our scientometric study we analyze the correlations within the dataset with regard to our research questions. Therefore we collected the individual measurement items of each model observed according the following classification (Eckhardt et al. 2008): (1) private environment (Private), (2) workplace environment (Job), (3) important others (Important) and (4) public environment (Government). Furthermore we analyzed if subjective norm significantly influences an individual's behavioral intention (SigInt), not significantly influences intention (NoSigInt), significantly intention with determinants (SigIntDet), not significantly influences intention with determinants (NoSignIntDet), significantly influences other endogenous variables (SigOther) or not significantly influences other endogenous variables (NoSigOther).

The following Table 2 shows the correlation between the values and factors mentioned above. As one can see there are a few interesting outcomes. With respect to our first research question we can note a significant negative correlation for  $p < 0.01$  between subjective norm as a significant antecedent for intention and its measurement with the items of important others. Additionally interesting in this context is the significant positive correlation between subjective norm as a significant antecedent for intention and its measurement with influence groups of working environment. Therewith we can conclude that if subjective norm has a significant impact on behavioral intention in most cases the measured items are influence groups from the working environment and not the originally measured important others of the underlying definition by Fishbein and Ajzen's Theory of Reasoned Action (Fishbein and Ajzen 1975). Concerning our second research question we evaluated a significant negative correlation between the significant influence of subjective norm on intention and the significant influence of subjective norm on other endogenous variables. So we can summarize for this correlation that if subjective norm has a significant impact on intention a significant impact of subjective norm on further endogenous variables as attitude is uncommon.

		Correlations										
		SigInt	NoSigInt	SigIntDet	NoSigIntDet	SigOther	NoSigOther	Private	Job	Important	Government	
SigInt	Correlation by Pearson	1,000	-,232	-,337**	-,154	-,218	-,050	-,038	,344**	-,314**	,025	
	Significance (2-sides)		,014	,000	,104	,021	,603	,694	,000	,001	,795	
	N	107	107	107	107	107	107	107	107	107	107	
NoSigInt	Correlation by Pearson	-,232	1,000	-,229	-,105	-,203	-,175	,064	-,034	,163	,037	
	Significance (2-sides)		,014	,015	,271	,032	,064	,504	,722	,085	,702	
	N	107	107	107	107	107	107	107	107	107	107	
SigIntDet	Correlation by Pearson	-,337**	-,229	1,000	,113	-,103	-,101	,096	-,047	,238	-,035	
	Significance (2-sides)		,000	,015	,237	,281	,292	,316	,620	,012	,711	
	N	107	107	107	107	107	107	107	107	107	107	
NoSigIntDet	Correlation by Pearson	-,154	-,105	,113	1,000	-,080	-,046	,025	-,064	,100	-,057	
	Significance (2-sides)		,104	,271	,237	,404	,630	,797	,501	,294	,547	
	N	107	107	107	107	107	107	107	107	107	107	
SigOther	Correlation by Pearson	-,218	-,203	-,103	-,080	1,000	,044	-,032	,043	,100	-,092	
	Significance (2-sides)		,021	,032	,281	,404	,642	,735	,653	,292	,332	
	N	107	107	107	107	107	107	107	107	107	107	
NoSigOther	Correlation by Pearson	-,050	-,175	-,101	-,046	,044	1,000	-,011	-,015	,000	,016	
	Significance (2-sides)		,603	,064	,292	,630	,642	,907	,876	1,000	,867	
	N	107	107	107	107	107	107	107	107	107	107	
Private	Correlation by Pearson	-,038	,064	,096	,025	-,032	-,011	1,000	,048	-,177	,182	
	Significance (2-sides)		,694	,316	,797	,735	,907		,613	,062	,055	
	N	107	107	107	107	107	107	107	107	107	107	
Job	Correlation by Pearson	,344**	-,034	-,047	-,064	,043	-,015	,048	1,000	-,411**	-,076	
	Significance (2-sides)		,000	,722	,620	,501	,653	,876	,613	,000	,423	
	N	107	107	107	107	107	107	107	107	107	107	
Important	Correlation by Pearson	-,314**	,163	,238	,100	,100	,000	-,177	-,411**	1,000	-,209	
	Significance (2-sides)		,001	,085	,012	,294	,292	1,000	,062	,000	,027	
	N	107	107	107	107	107	107	107	107	107	107	
Government	Correlation by Pearson	,025	,037	-,035	-,057	-,092	,016	,182	-,076	-,209	1,000	
	Significance (2-sides)		,795	,702	,711	,547	,332	,867	,055	,423	,027	
	N	107	107	107	107	107	107	107	107	107	107	

\*. The correlation is significant for  $p < 0,05$  (2-sides).

\*\*.. The correlation is significant for  $p < 0,01$  (2-seitig).

Table 2. Correlation Analyses

#### 4.1 Limitations

Due to the research design our approach is limited through some facts. We might have found not all articles including subjective norm in our scientometric study because of the search mode we conducted within the literature databases. Furthermore the results of the correlation analysis for our second research question must be a little toned down as the significant antecedent subjective norm as for intention is not only negatively correlated with the significant antecedent subjective norm on other endogenous variables but also with the non significant antecedent subjective norm.

## 5 DISCUSSION

In a current research article analyzing the social influence of workplace referents on an individual's IT adoption and non-adoption the authors sum up that a single cumulative subjective norm measure might be too naïve (Eckhardt et al. 2009). With regard to our results (see Table 3) this statement can be supported as we found a significant negative relationship between a significant impact of subjective norm and the original measurement of important others in the Theory of Reasoned Action (Fishbein and Ajzen 1975). Hence researchers using this theory or one of its numerous advanced versions need

to take into account that individuals perceive the influences, behavioral patterns and actions of their social environment quite differently as opinions and suggestions of their life partner, parents, children, etc. could not be equally treated to these of superiors, peers or subordinates. Comparable to the differences between regular IT adoption and household adoption social influence of referent groups differs according to the respective environment. A first step could be a classification of referent social environment in private, job and public environment like we did in our approach. Nevertheless a precise social environment analysis before empirical surveys will be a necessary precondition for future approaches in technology adoption containing a construct for social influence.

<b>Research Question</b>	<b>Result</b>	<b>Implication</b>
<b>Is there a correlation between how Subjective Norm is measured and the significance of the impact?</b>	Significant negative correlation between the original measure “important others” and a significant impact	Several individual social influences instead of one collective subjective norm implying the item of important others need to be measured
<b>Are there any correlations between the influence of subjective norm on behavioral intention and the influence on other endogenous variables?</b>	Significant impact of subjective norm on behavioral intention is significantly negative correlated with the significant impact of subjective norm on other endogenous variables	Rethinking the general role of subjective norm in IT adoption its interdependencies and causal relationships

*Table 3. Research Results and Implications*

## 6 IMPLICATIONS FOR FUTURE RESEARCH

We motivated our approach in the beginning with the results and implications for further research by other researchers and can conclude in the end that there is still a distinct need to measure, define and use the parameter in IS research in the appropriate way. Our scientometric study of subjective norm in IS top-journals over the last two decades revealed that this factor is just in seven of ten cases a significant antecedent for behavioral intention or other endogenous variables. Compared to other regular parameters of predominately empirical adoption models as attitude, perceived usefulness or perceived ease this represents a comparatively low percentage (Wetzels and Schepers 2007; Ma and Liu 2004; King and He 2006). In order to clarify the understanding of social influence in IS research and to solve the problem of a frequent insignificance of subjective norm we adapted ideas and suggestions of social psychology and marketing researchers and analyzed the measurement and dependence of this parameter. Based on the data of 113 empirical and conceptual research models including subjective norm we conducted a correlation analysis to answer our research questions regarding measurement and dependence of subjective norm. The results showed a significant negative correlation between a significant impact of subjective norm on behavioral intention and the original measurement of important others by Fishbein and Ajzen (1975). Although we have not found a significant correlation between insignificant results for subjective norm and the measurement of important others, the results reveal that the general idea of the basic measurement detractors (e.g. Ahtola 1976; Miniard and Cohen 1983; Liska 1984) seem to constitute a reasonable start for further research. A further result based on the thoughts of social psychology and marketing researchers concerning our second research question reveals that a significant impact of subjective norm on behavioral intention is significantly negative correlated with the significant impact of subjective norm on other endogenous variables. This implies that there might be interdependencies between subjective norm and other parameters as attitude (Liska 1984; Miniard and Cohen 1983). Further research needs to clearly examine in this point how subjective norm or social influence could be formed without interdependences to explain and affect an individual’s intention and within his actual behavior.

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