Association for Information Systems
AIS Electronic Library (AISeL)

AMCIS 2012 Proceedings | Proceedings

When Routine Work Becomes Social: How Virtual Social Facilitation Increases Performance on Simple IT-Based Tasks

Björn Niehaves
University of Muenster, Muenster, Germany., bjoern.niehaves@ercis.uni-muenster.de

Asin Tavakoli
ERCIS, University of Münster, Muenster, Germany., asin.tavakoli@uni-muenster.de

When Routine Work Becomes Social: How Virtual Social Facilitation Increases Performance on Simple IT-Based Tasks

Björn Niehaves
University of Siegen
niehaves@wi-inf.wiwi.uni-siegen.de

Asin Tavakoli
University of Münster
asin.tavakoli@uni-muenster.de

ABSTRACT

With the advent of social applications, the question arises of how organizations can utilize such technology for improving task performance. While social applications certainly bear the potential to trigger the development of radically new business models and business processes, we seek to study how the enrichment of IT-based routine work (simple tasks) by complementing social features (audience condition) may advance performance. In 280 experiments with altogether 40 participants, we investigate the impact of a) monitoring, b) measurement, and c) feedback dialogs on performance of simple IT-based tasks. We compare the effects of these three treatments in a setting of physical presence and in a setting of virtual presence. The results show that monitoring has the strongest effect in the physical presence setting while, in the virtual presence setting, both monitoring and feedback dialogs can improve task performance significantly. Theory-wise, we draw on social psychology and develop a (design) theory of virtual social facilitation that bears major implications for designing routine work information systems and technology.

Keywords

Social Facilitation, Performance, Routine Work, Social Media, Experiment, Multiple Regression Analysis.

INTRODUCTION

Enterprise IT is paradigmatically diversifying. On one side, systems of record (Moore, 2011) are an organizations core IT systems enabling daily business. Systems of record can also be seen as infrastructural and transactional IT systems (Weill and Broadbent, 1998). These backbones of the organization can be characterized by a high maturity level, respectively being complete, but not perfect. On this root level, IT is seen as being commoditized; often it does not provide competitive advantage on its own anymore (Carr, 2003; Powell and Dent-Micallef, 1997). Thus, the last decade mainly focused on optimization, for instance via virtualization, cloud computing, or outsourcing. On the other side, new types of systems have emerged, for instance systems of engagement, enabled through Web 2.0 and its accompanying technologies (Cook, 2008; Moore, 2011). Web 2.0 has been coined in 2005 as a new internet paradigm with a shift from information consumption to more user participation. Users are seen as the major contributors (O'Reilly, 2005). This paradigm with all the accompanying technologies enables social media, a means for social collaboration, communication and knowledge sharing.

The question arises of how systems of engagement find their way into the enterprise. With the advent of these paradigms and technologies, companies started using them to support daily work. In this context, it is often referred to Enterprise 2.0, the application of social media within organizations (McAfee, 2006). Web 2.0 in general and social media in particular are often characterized by bearing the potential to trigger the innovation of an organization's business processes (for instance, Kaplan and Haenlein, 2010). Here, Moore (2011) argues that social media, as the incarnation of systems of engagement, will overlay and complement existing systems of record rather than substituting them. Social media operate on top of and in touch with existing core systems and will co-evolve (Moore, 2011; Richter and Riemer, 2009). In this vein, we see social applications as a complement to existing IT-supported business processes. Despite the importance of this phenomenon, it has been under-researched so far. This paper pursues the objective to study how the enrichment of common IT-based routine work by complementing social features may advance work performance.

In order to achieve this research objective and to investigate the effects of social applications on routine work performance, we draw on social psychology and social facilitation theory in particular. In 2001, Aiello and Douthitt argue that social facilitation theory can be useful for understanding new kinds of presence, for instance created by emerging technologies such as social media. The theory could be used as a foundation for research on emerging technologies in a performance context (see Aiello and Douthitt, 2001; Feinberg and Aiello, 2006). However, social facilitation literature does not yet provide sufficient explanation of how IT artifact design choices may impact IT-based routine work performance.

The remainder of this paper is structured as follows. In the next section, we set out related work and conduct a theory review of the workings of social facilitation in an IT setting. Then, our research model, introducing the dependent and independent variables, is presented. We subsequently lay out our research design and discuss the experiment setup, data collection, and data analysis. Based on this, we present the results of a multiple regression analysis that takes into account data of 280 experiments. We conclude with a discussion of our findings highlighting implications for future theory development and design.

THEORY BACKGROUND

Social facilitation goes back to 1898 when Triplett analyzed the performance of bicycle racers. He discovered that racers performed faster under conditions of time measurement and competition in comparison to racing alone (Triplett, 1989). Since then, social facilitation has been defined as a psychological effect occurring in an audience or coaction condition (Chapman 1973). According to the Yerkes-Dodson-law (1908), task performance on novel or complex tasks may be hampered through the presence of others, while learned or simple tasks are performed better (Bond and Titus, 1983; Feinberg and Aiello, 2006; Zajonc 1965). Different theories have been presented to explain this effect. Zajonc (1965) reactivated research on social facilitation after a period of stagnation within the field. He explained the effect with the following train of thought: Mere presence of others leads to increased arousal (preparedness for the unexpected) of the individual. Arousal in turn enhances dominant responses and impairs non-dominant responses. As a result, well-learned and simple task performance (dominant response) is increased. This process has also been termed as drive theory. Cottrell, Wack, Sekerak, and Rittle(1968) on the other hand argue that arousal is not biologically given, but created through social experience. They propose that increased "learned drive" rather than generalized drive leads to a social facilitation effect. This means that only audience who has the power to evaluate increases arousal of the affected individual. Non-evaluating audience (e.g. blindfolded) was not able to produce the effect. In contrast to these rather related theories focusing on activation, researchers proposed more attention focused theories during the 1970s. Duval and Wicklund (1972) proposed that an individual's self-awareness is raised through the presence of an audience. This leads to comparisons between self-performance and the ideal performance. Depending on the level of discrepancies, task performance is either impaired or increased. Extending this theory, Carver and Scheier (1981) termed the feedback-loop model, stating that the comparisons to the ideal are performed via feedback loops. If enough time is available for a multiplicity of feedback loops, the theory explains performance increments caused by an audience.

Against this background of theoretical work, several experiments have been conducted to identify factors influencing task performance in a social facilitation environment. Although, many of these can be found within the social psychology discipline, IT is becoming an increasingly important building block. Accordingly, also IS research has taken up this stream and provides a number of insights into the workings of social facilitation in the IT context (see Table 1 for a systematic overview over related work).

Authors	Description	Dependent Variable		Independent Variable(s)		Experiment Condition (Chapman 1973)
		Task Complexity	IT-based Task	Treatments (underlined if significant)	IT-based Treatment	
Aiello & Kolb 1995	Experiment study on the impact of electronic performance monitoring on productivity and stress by using a data-entry task and group brainstorming.	Low	Yes	1-Monitoring (positive) 2-Social Context	Yes	Audience and Coaction Condition
Kolb & Aiello 1997	Experiment study on the effects of computer-based performance monitoring on work productivity by using a data-entry task and a moderate vowel/consonant identification task.	Low and moderate	Yes	1-Monitoring 2-Task Order	Yes	Audience Condition
Davidson & Henderson 2000	Laboratory experiment on the effects of electronic performance monitoring on performance, mood state and stress levels by using an anagram-solving task.	Low and high	Yes	1-Monitoring 2-Visualized task complexity	Yes	Audience Condition
Rafaeli & Noy 2002	Experiment study on the effects of virtual availability (none, text chat, pictures from other participants) and feedback (winner of auction) on behavior and performance in Dutch auctions.	Low	Yes	1-Virtual availability 2-Feedback	Yes	Coaction Condition
Zanbaka et al. 2004	Experiment study on the effects of virtual human presence on task performance by using a pattern recognition and categorization task.	Low and high	Yes	1-Monitoring 2-Task Type	Yes (both physical and virtual settings)	Audience Condition
Feinberg & Aiello 2006	Study on evaluation-apprehension and distraction conflict theories explaining the social facilitation effect by using a word-pair task. Monitoring has been realized through presence of a person, measurement varied by the expertise (instructor, assistant). Distraction was realized via a dual-task environment.	Low and high	Yes	1-Monitoring 2-Measurement 3-Distraction (low: not sign.; high: sign.)	Yes	Audience Condition
Park & Catrambone 2007	Experiment study on the effects of presence by virtual humans on task performance by using different tasks: anagrams, mazes, and modular arithmetic.	Low and high	Yes	1-Monitoring	Yes (both physical and virtual settings)	Audience Condition
Balijepalli et al. 2009	Experiment study on the effects of collaborative pair programming on performance.	Low and high	Yes	1-Monitoring (low: positive; high: negative)	No	Coaction Condition
Our Study	Experiment study of the effect of monitoring, measurement, and feedback dialogs - in both a physical and virtual presence setting - on IT-based anagram solving.	Low	Yes	1-Monitoring 2-Measurement 3-Feedback Dialogs	Yes (both physical and virtual presence setting)	Audience Condition

Table 1. Related Work

According to Chapman (1973) three different experiment conditions were distinguished. In the 'alone' condition the participant is the only person in the experiment room, this is often regarded as the control situation. As for the 'audience' condition (other people are inactive or just observers) and the 'coaction' condition (active participation) other people are present. In addition, all identified related studies explicitly characterized the task complexity (low, moderate, high; see Table 1, column 3) allowing for a differentiated view on the social facilitation setting. The most commonly used treatment is monitoring. Nearly all studies were able to reproduce a positive performance effect on low complexity tasks and a negative

effect on high complexity tasks. Measurement in a wider sense could only be identified in one related study. Rafaeli and Noy (2002) used feedback only implicitly by showing the Dutch auction performance of other participants. Feedback dialogs, where a supervisor provides continuous feedback during an experiment, have not been analyzed so far. In addition, an integrated model and analysis of monitoring, measurement, and feedback dialogs is not found either. Against the background of this research gap, we seek to address the following research question: *Which social features (implemented social facilitation treatments) can improve performance on simple IT-based tasks?*

RESEARCH MODEL

Drawing on the underlying social facilitation theories, we identify three treatments as being potentially relevant for social applications within this study: monitoring, measurement, and feedback dialogs. While monitoring (presence of another person) can be found in all identified related works, measurement specifically draws in on social facilitation theory proposed by Cottrell et al. (1968), feedback, on the other hand, is related to the proposed feedback-loop model by Carver and Scheier (1981). Table 2 gives an overview about the detailed variable descriptions.

Variables		Description	Original/Related Work
Dependent Variable	Performance: PERFORM	Existing studies used a single performance measure, e.g. number of correctly solved tasks, or completion time. In this study, performance is defined as the performance gain/loss in comparison to the control situation, using a combined performance measure, taking correct and wrong answers as well as completion times into account.	Aiello & Svec 1993; Davidson & Henderson 2000; Park & Catrambone 2007
Independent Variables (Treatments)	Monitoring: MONITOR	Monitoring describes the presence of the supervisor. In the physical test setting, this is understood as mere presence of the supervisor, sitting next to the participant and being able to see the computer screen. In the virtual presence setting, the participants are told that IT is used to monitor their doings, e.g. via screensharing.	Physical: e.g. Aiello & Kolb 1995; Feinberg & Aiello 2006 Virtual: Bradner & Mark 2001
	Measurement: MEASURE	The variable MEASURE describes the fact, that work performance is explicitly measured and evaluated. In the physical test setting, this can be realized by taking notes about specific performance measures. During a virtual test setting, IT can used to record performance.	Cf. Aiello & Svec 1993; Feinberg & Aiello 2006
	Feedback: FEEDBCK	Feedback is used to inform the participants about their performance, while the test is in progress. We define feedback twofold: (1) Continuous feedback of measured performance throughout the experiment at given times and (2) a comparison of the participants performance to a peer group.	Cf. Carver & Scheier 1981; Rafaeli & Noy 2002

Table 2. Experiment variables

Based on this research model, we hypothesize that monitoring (H1), measurement (H2), and feedback dialogs (H3) have a positive impact on simple task performance both, in the physical presence setting (H1-3a) and the virtual presence setting (H1-3b).

RESEARCH DESIGN

Method Choice and Background. In order to control for the relevant variables, we conducted an experiment study in 2011. The approach has been proven fruitful in prior research focusing on effects on task performance (cf. Bond and Titus, 1983; cf. Table 1 for specific experiment research on social facilitation). Participants were 40 individuals (average age: 22.75 years, 16 females, 24 males) who received a small monetary compensation for their effort.

Dependent Variable Measurement. In our study, we measured simple task performance with the help of an IT-based anagram test. Anagram-solving involves rearranging the letters of a five-letter nonsense word in a way that a simple five-letter word is formed. Earlier studies (Aiello and Svec, 1993; Davidson and Henderson, 2000; Park and Catrambone, 2007) used five letter anagrams within their test scenarios and found this approach to be feasible to perform research on simple task performance. We conducted a pre-study with 14 participants in order to determine a set of 160 feasible and comparable anagrams for our study. Raw performance for each test variant was measured in each test variant by calculating the median over the respective response times per participant, while wrong answers have been replaced with a response time of 99 seconds. The actual dependent variable PERFORM is then the relative gain in raw performance in a test setting in comparison to the control

situation (e.g., raw performance mean of 6.5 in CTRL and raw performance mean of 4.5 in SF1 leads to PERFORM of 2.0 for that individual under the given SF1-treatment conditions (here: monitoring in a physical presence setting)).

Experiment Procedure. All participants performed a simple task in different test variants while every participant run the test settings individually on a personal computer located in an office room (no coaction condition). The experiment started with introducing the participant into the test tool, solving the first set of 20 anagrams (for practicing purposes). After open questions related to the test tool were discussed, seven follow-up test variants were conducted. These were divided into three test settings: control situation (CTRL), physical presence setting (PHYSICAL), and virtual presence setting (VIRTUAL). Directly after the initial tool introduction, the control situation has been conducted. In the physical test settings, we implemented the treatments in a physical way, in this case: the supervisor is sitting next the participant (MONITOR), the supervisor measuring the results by help of pen, paper and a laptop (MEASURE), as well as delivering verbal performance feedback in person (FEEDBCK). In the virtual test setting on the other hand, presence has been implemented by means of screensharing (MONITOR), MEASURE through telling the participant that the system records the results, and FEEDBCK by using a text chat tool after each 25% of task completion. To create awareness about the current test variant, the participant has been explicitly introduced to the treatment condition. In addition, the test tool featured small icons that informed the participants about which treatment was active at that time (see Table 3 for an overview about the experiment settings and corresponding performance statistics).

Setting	Variant	Treatments			N	Task performance	
		MONITOR	MEASURE	FEEDBCK		Mean (in Seconds)	Standard Deviation
Control Situation (CTRL)		No: Participants unaware of monitoring	No: Participants unaware of measurement	No.	40	6.535	2.810
Physical Presence Setting (H1-3a)	SF1	Yes: Supervisor was sitting next to the participant	No: Participants unaware of measurement	No.	40	4.547	1.424
	SF2	Yes: Supervisor was sitting next to the participant)	Yes: Supervisor was making notes on a piece of paper and announced the results at the end	No.	40	4.578	1.621
	SF3	Yes: Supervisor was sitting next to the participant	Yes: Supervisor was making notes on a piece of paper	Yes: Supervisor talked to the participants about their performance (after every 25% of task completion)	40	3.963	1.096
Virtual Presence Setting (H1-3b)	VSF1	Yes: Supervisor used a screen sharing tool	No: Participants unaware of measurement	No.	40	5.561	1.934
	VSF2	Yes: Supervisor used a screen sharing tool	Yes: Participants were told that their results are measured	No.	40	5.098	1.603
	VSF3	Yes: Supervisor used a screen sharing tool	Yes: Participants were told that their results are measured	Yes: Supervisor used a chat tool to provide feedback (after every 25% of task completion)	40	4.186	1.198

Table 3. Experiment design

Data Analysis. In order to analyze the collected data, a statistical linear model was used to make inferences about the linear relationship between the dependent and independent variables. To benefit from and to tie in with earlier social facilitation studies (Aiello and Kolb, 1995; Cottrell et al., 1968; Kolb and Aiello, 1997) we conducted a multiple regression analysis. The approach is taken to quantitatively describe the relationship between the dependent variable PERFORM and the independent variables MONITOR, MEASURE, and FEEDBCK. The following regression formula therefore needs to be solved twice, once for the physical presence setting, and again for the virtual presence setting.

$$PERFORM_i = \beta_0 + \beta_{MONITOR}MONITOR_i + \beta_{MEASURE}MEASURE_i + \beta_{FEEDBCK}FEEDBCK_i$$

RESULTS

The analysis reveals that selected social features (social facilitation treatments) exert significant influence on simple task performance. The following paragraphs shortly describe the detailed results of the MRA, first for the PHYSICAL test setting and then for the VIRTUAL test setting.

F / Sig.	11.037 / .000			
R^2 / adjusted R^2	.175 / .159			
Var	B	β	t	p-value (sig.)
MONITOR	1.985	.371	4.161	.000
MEASURE	-.031	-.007	-.065	.948
FEEDBCK	.615	.115	1.287	.200
p-values below .1 can be considered as significant.				

Table 4. Regression analysis of PHYSICAL test section

In the physical presence setting, the adjusted coefficient of determination, adjusted R^2, shows that around 16% of the variance can be explained with the three independent variables. MONITOR has the highest impact on task performance, MEASURE can be regarded as irrelevant while FEEDBCK has an impact on task performance as well. The analysis reveals, however, that only MONITOR has a significant impact. The regression formula for the physical presence settings looks as follows:

$$PERFORM_{PHYSICAL} = -2.828E\text{-}15 + 1.989 * MONITOR - 0.031 * MEASURE + 0.615 * FEEDBCK$$

In the virtual presence setting, on the other hand, the adjusted R^2 is only slightly lower than in the PHYSICAL settings (around 12%). Again, MONITOR has the highest impact on task performance, followed by FEEDBCK. In this setting, however, both are regarded significant. Similar to the PHYSICAL settings, MEASURE shows the lowest impact on task performance and again is not significant.

F / Sig.	8.001 / .000			
R^2 / adjusted R^2	.133 / .117			
Var	B	β	t	p-value (sig.)
MONITOR	.975	.182	1.995	.048
MEASURE	.463	.100	.946	.345
FEEDBCK	.912	.170	1.865	.064
p-values below .1 can be considered as significant.				

Table 5. Regression analysis of VIRTUAL test section

The regression formula for the VIRTUAL test settings looks as follows:

$$PERFORM_{VIRTUAL} = -3.858E\text{-}15 + 0.975 * MONITOR - 0.463 * MEASURE + 0.912 * FEEDBCK$$

As a result, hypothesis H2a and H2b cannot be confirmed, MEASURE has neither proven to exert significant influence in the physical nor in the virtual presence setting. Further, FEEDBCK has not proven to impact on performance in the physical presence setting and, accordingly, H3a cannot be confirmed. However, MONITOR impacts significantly on simple task performance in both settings leading us to confirm the hypotheses H1a and H1b. FEEDBCK influences task performance significantly only in the virtual presence setting confirming our hypothesis H3b (see Figure 1).

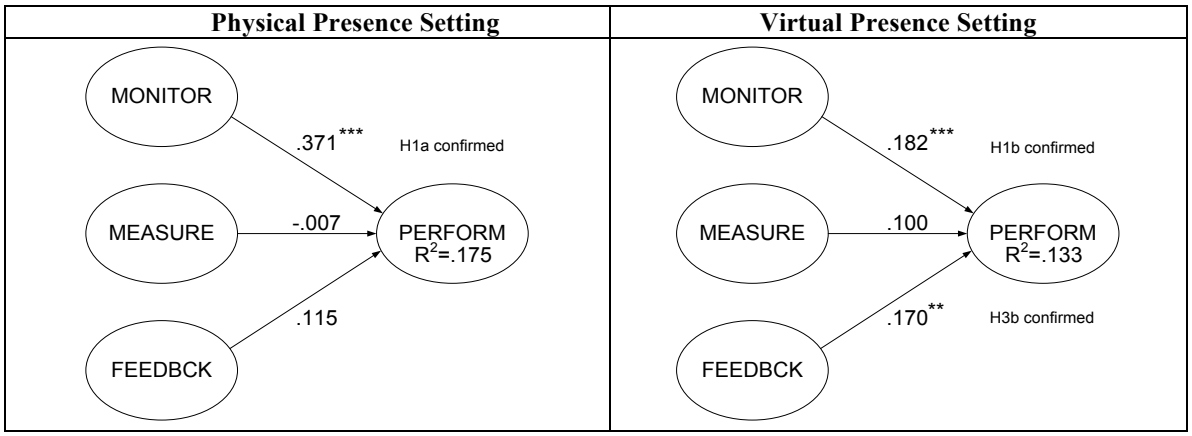

Figure 1. Overview over MRA results

DISCUSSION

Virtual Social Facilitation can indeed increase performance on simple IT-based tasks. Which specific social features (implemented social facilitation treatments) can improve performance? Monitoring (MONITOR) and feedback (FEEDBCK) can. The positive effect of monitoring in the virtual presence setting resembles the findings in the physical presence setting. Feedback however is different in that regard. Its influence can be considered significant only in the virtual presence setting. Measurement – as part of an integrated model/test with the two other treatments – does not increase performance in either setting. "What gets measured gets done better" is a statement that cannot be supported by our study.

Implications for IS design. Systems of engagement, spearheaded by social media, bear the potential to fundamentally change business models and processes in organizations. While the development of radically new processes is without doubt an important direction (Kaplan and Haenlein, 2010), it may not be the only one. Instead, social media can be utilized to complement existing IT-supported business processes. Moore (2011) calls for an improved understanding of the possibilities, how social media can operate on top of and in touch with existing core systems. With the help of our study, we are now able to respond to this call. IT systems that represent simple tasks/routine work can be complemented by social features with the effect of increased work performance. Screensharing, that is how we implemented and measured monitoring, can be one possible way to stimulate the monitoring effect through IS design. While monitoring is a well accepted treatment in social facilitation research, we however have to acknowledge that it might, in such crude manner, have a negative connotation in a real-life organizational setting (depending on the cultural background). Our study however reveals an additional effective social feature that may overcome this challenge. Feedback dialogs, in our study technically implemented through a text chat tool, can increase simple task performance as well. While the performance data underlying to feedback dialogs was automatically reported to the supervisor in our system design, we look forward to future research that examines how a setting of deliberate/active performance reporting is able to confirm our findings. Overall, our study suggests that social media integration into simple IT-based business processes can prove fruitful for performance. It calls for studying the effects of other design choices than screensharing and text chat tools.

Implications for theory. With regard to theory development in social facilitation (our "kernel theory"; see Kuechler and Vaishnavi, 2008), we can contribute insights into the comparative effects of our different treatments. We studied a simple task performance under audience condition in comparison to the participants' alone condition (control situation). We find, first, that our research confirms insights into the positive effect of monitoring on low complexity task performance (see again Table 1; for instance, Feinberg and Aiello, 2006; Park and Catrambone, 2007). Second, we contribute to the unresolved debate over the influence of measurement on performance (Aiello and Svec, 1993; Feinberg and Aiello, 2006). Being part of a larger set of treatments, measurement did neither exert significant influence in the physical nor in the virtual presence setting. We interpret that feedback – which logically entails certain measurement/evaluative aspects – may have absorbed its effect. We see potential for future studies that take a close look into the separate and the joint effects of these two treatments. Third, we find a positive effect of feedback which is, however, significant only in the virtual presence setting. The revelation

of this difference calls for future studies, including IS research, that investigates into the different workings of social facilitation in physical and virtual presence settings. Virtuality might be more than an incidental remark and open up for own stream of dedicated research. Against this background, we see our study as a step towards a (design) theory of virtual social facilitation that attempts to not only explain but also to provide effective guidance for IT artifact design (Gregor, 2006: theory type V; see also Kuechler and Vaishnavi, 2008). We opted for the following design choices to affect routine work performance: screensharing for monitoring and a text chat tool for feedback. Both can be regarded as add-ons to an existing IT-based task system. We regard it as a potentially very fruitful avenue for future IS design science research to invent and to study the workings of alternative design choices to stimulate relevant social facilitation effects (see Niehaves et al. 2012).

Limitations and Outlook. Future research can address some particular shortcomings that exist in our study. First, we suggest that subsequent experiments factor in socio-demographic variables (e.g., gender, age, or education) as these might moderate the effects of our treatments on task performance. Moreover, relevant psychological variables, such as test anxiety, should be controlled for. Second, in order to connect to prior work in this field, we opted for a well-established simple task: anagram solving. Since we were now able to show virtual social facilitation effects here, future studies might replace anagram solving by other IT-based task systems, potentially closer to real life IT (e.g., by certain simple ERP functions). Third, our experiment study entails 280 data points (CRTL, SF1-3, VSF1-3) that stem from altogether 40 participants. While such amount is statistically sufficient for the model presented, future research may increase model complexity (e.g., controlling for socio-demographic or psychological variables) and thus require a larger quantity of data.

ACKNOWLEDGMENTS

This paper was written in the context of the research project WeChange (promotional reference 01HH11059) funded by the German Federal Ministry of Education and Research.

REFERENCES

Aiello, J. R. and Douthitt, E. A. (2001) Social facilitation from Triplett to electronic performance monitoring, *Group Dynamics: Theory, Research, and Practice,* 5 (3), 163-180.

Aiello, J. R. and & Kolb, K. J. (1995) Electronic performance monitoring and social context: impact on productivity and stress, *The Journal of applied psychology*, 80(3), 339-353.

Aiello, J. R. and Svec, C. M. (1993) Computer monitoring of work performance: Extending the social facilitation framework to electronic presence, *Journal of Applied Social Psychology*, 23(7), 537-548.

Balijepally, V., Mahapatra, R., Nerur, S. and Price, K. H. (2009) Are two heads better than one for software development? The productivity paradox of pair programming, *MIS Quarterly*, 33(1), 91-118.

Bond, C. F. and Titus, L. J. (1983) Social facilitation: a meta-analysis of 241 studies, *Psychological bulletin*, 94(2), 265-92.

Bradner, E. and Mark, G. (2001) Social presence with video and application sharing, *Proceedings of the 2001 International ACM SIGGROUP Conference on Supporting Group Work - GROUP '01*, New York, USA, ACM Press, 154-161.

Carr, N. G. (2003) IT doesn't matter, *Harvard Business Review*, May 2003, 41-49.

Carver, C. S. and Scheier, A. F. (1981) The self-attention-induced feedback loop and social facilitation, *Journal of Experimental Social Psychology*, 17, 545-568.

Chapman, A. J. (1973) Social facilitation of laughter in children, *Journal of Experimental Social Psychology*, 9.6, 528-41.

Cook, N. (2008) Enterprise 2.0: How social software will change the future of work. Ashgate Publishing, Surrey.

Cottrell, N. B., Wack, D. L., Sekerak, G. J. and Rittle, R. H. (1968) Social facilitation of dominant responses by the presence of an audience and the mere presence of others, *Journal of Personality and Social Psychology*, 9(3), 245-250.

Davidson, R. and Henderson, R. (2000) Electronic performance monitoring : A laboratory investigation of the influence of monitoring and difficulty on task performance, mood state, and self-reported stress levels, *Journal of Applied Social Psychology*, 30(5), 906-920.

Duval, S. and Wicklund, R. A. (1972) A theory of objective self awareness, Academic Press, Oxford.

Feinberg, J. M. and Aiello, J. R. (2006) Social facilitation: A test of competing theories, *Journal of Applied Social Psychology*, 36(5), 1087-1109.

Gregor, S. (2006) The nature of theory in information systems, *MIS Quarterly*, 30, 3, 611–42.

Kaplan, A. M. and Haenlein, M. (2010) Users of the world, unite! The challenges and opportunities of Social Media, *Business Horizons*, 53(1), 59-68.

Kolb, K. J. and Aiello, J. R. (1997) Computer-based performance monitoring and productivity in a multiple task environment, *Journal of Business and Psychology*, 12(2), 189-204.

Kuechler W. L. and Vaishnavi, V. K. (2008) On theory development in design science research: Anatomy of a research project. *European Journal of Information Systems*, 17(5), 489-504.

McAfee (2006) Enterprise 2.0: The dawn of emergent collaboration, *MIT Sloan management review*, 47, 3, 21-28.

Moore, G. (2011) Systems of engagement and the future of enterprise IT – A sea change in enterprise IT, White Paper, Association for Information and Image Management.

Niehaves, B., Ortbach, K. and Tavakoli, A. (2012) On the Relationship between the IT Artifact and Design Theory: The Case of Virtual Social Facilitation. In: *Proceedings of the DESRIST 2012*, LNCS 7286, Las Vegas, NV, USA, 354-370.

O'Reilly, T. (2005) What IsWeb 2.0. http://oreilly.com/web2/archive/what-is-web-20.html. Retrieved 18.01.2012.

Park, S. and Catrambone, R. (2007) Social facilitation effects of virtual humans, *The Journal of the Human Factors and Ergonomics Society*, 49(6), 1054-1060.

Powell, T. C. and Dent-Micallef, A. (1997) Information Technology as competitive advantage: The role of human, business, and technology resources. *Strategic Management Journal*, 18, 5, 375-405.

Rafaeli, S. and Noy, A. (2002) Online auctions, messaging, communication and social facilitation: A simulation and experimental evidence, *European Journal of Information Systems*, 11(3), 196-207.

Richter, A. and Riemer, K. (2009) Corporate social networking sites–Modes of use and appropriation through co-evolution, *Proceedings of the 20th Australasian Conference on Information Systems*. Melbourne, Australia.

Triplett, N. (1898) The dynamogenic factors in pacemaking and competition. *The American Journal of Psychology*, 9(4), 507-533.

Weill, P. and Broadbent, M. (1998) Leveraging the *New Infrastructure*: How market leaders capitalize on information technology. Harvard Business School Press, Boston.

Yerkes, R. M. and Dodson, J. D. (1908) The relation of strength of stimulus to rapidity of habit-formation, *Journal of Comparative Neurology and Psychology*, 18, 459–482.

Zajonc, R. B. (1965) Social Facilitation. Science, 149(3681), 269–274.

Zanbaka, C., Ulinski, A., Goolkasian, P. and Hodges, L. F. (2004) Effects of virtual human presence on task performance. *Proceedings of the International Conference Artificial Reality Telexistence*.