

Table of Contents

Acknowledgments V

List of TablesXII

List of Figures.....XVII

Abstract..... XXIII

Abbreviations XXV

1 Introduction..... 1

1.1 On the relevancy of ubiquitous information systems 1

1.2 In situ responses to UIS stimuli by electrodermal activity 2

1.3 Research questions and contributions to NeuroIS research 5

1.4 Theoretical framework 11

1.5 Mixed methods in design science research 13

1.6 Structure and logic of the remaining chapters 14

1.7 Summary..... 14

| | | |
|----------|---|------------|
| 2 | Related Work | 17 |
| 2.1 | Ubiquitous Information Systems | 17 |
| 2.2 | Design science research..... | 20 |
| 2.3 | Perceived characteristics of information technology | 23 |
| 2.4 | Neuro-Information-Systems research..... | 27 |
| 2.5 | Electrodermal activity in homeostatic regulation | 33 |
| 2.6 | Measurement and parameters of electrodermal activity..... | 37 |
| 2.7 | Review of related work utilizing electrodermal activity | 44 |
| 2.8 | Summary..... | 62 |
| 3 | Research Model and Hypotheses..... | 65 |
| 3.1 | Stimulus-Organism-Response paradigm | 66 |
| 3.2 | Two-systems view of cognitive processing..... | 71 |
| 3.3 | The stimulus: breakdown of a UIS service..... | 79 |
| 3.4 | Physiological arousal and the generalization effect | 88 |
| 3.5 | Perceived ease of use and physiological arousal | 92 |
| 3.6 | The behavioral response: task performance | 95 |
| 3.7 | Summary..... | 98 |
| 4 | Method | 101 |

4.1 IKS, SiDIS and the evaluation of UIS services 101

4.2 Identifying the ticket order service as the focal UIS service..... 105

4.3 Making the case for three similar ticket order services 110

4.4 Procedure of the single- and repeated-exposure studies..... 115

4.5 Observational, physiological and psychological measures 125

4.6 Summary..... 130

5 Results 133

5.1 Pretest, data quality, problematic cases and outliers 133

5.2 Demographics and descriptive statistics..... 135

5.3 Internal validity of instruments and empirical data 139

5.4 External validity with respect to gender and age differences..... 147

5.5 PLS-SEM, sample size considerations and planned analyses 156

5.6 Assessment of the measurement models 161

5.7 Evaluation of the structural model and hypotheses 165

5.8 Assessing the higher-order construct ease of use 175

5.9 Summary..... 188

6 Discussion 191

6.1 Sensitivity of electrodermal activity..... 191

| | | |
|---|---|------------|
| 6.2 | Reliability threat because of generalization effects..... | 197 |
| 6.3 | Conceptualizing electrodermal activity as physiological arousal | 202 |
| 6.4 | Physiological arousal complementing perceived ease of use..... | 208 |
| 6.5 | Limitations of the current work..... | 214 |
| 6.6 | Future research | 217 |
| 6.7 | Summary..... | 221 |
| Bibliography | | 229 |
| Appendix A: List of publications from NeuroIS.org | | 283 |
| Appendix B: Publications utilizing parameters of electrodermal activity as a result of the literature review | | 293 |
| Appendix C: Promotion cards of the studies..... | | 301 |
| Appendix D: Instructions for the supervisor of the studies | | 303 |
| Appendix E: Study information for participants..... | | 309 |
| Appendix F: Constructs and questionnaire items | | 313 |

**Appendix G: Extraction of SCR amplitudes by means of nonnegative
deconvolution317**

**Appendix H: Rotated factor matrix for perceived ease of use and
technology affinity.....319**

Curriculum Vitae.....321