

Table of Contents

| | | |
|----------|--|-----------|
| 1 | Introduction | 1 |
| 1.1 | Problem Statement..... | 1 |
| 1.2 | Solution Statement and Research Questions..... | 4 |
| 1.3 | Structure of the Dissertation | 8 |
| 2 | Theoretical Background | 11 |
| 2.1 | Ubiquitous Information Systems | 11 |
| 2.1.1 | Context-Adaptive Systems | 14 |
| 2.1.2 | Socio-Technical System Design..... | 16 |
| 2.2 | The Interplay Between Behavioral and Design Research | 17 |
| 2.3 | Research on Information Systems Acceptance | 18 |
| 2.3.1 | Theory of Reasoned Action | 19 |
| 2.3.2 | Theory of Planned Behavior | 21 |
| 2.3.3 | The Innovation-Decision Process..... | 23 |
| 2.3.4 | Technology Acceptance Model | 27 |
| 2.3.5 | Trust-TAM..... | 29 |
| 2.4 | Trust Theory..... | 31 |
| 2.4.1 | Definition of Trust | 31 |
| 2.4.2 | IT Artifacts and Trust Relationships | 33 |
| 2.4.3 | Interpersonal Trust..... | 37 |
| 2.4.4 | Trust in Automation..... | 39 |
| 2.4.5 | Institution-based Trust | 40 |
| 2.4.6 | Multifoci Trust..... | 41 |
| 2.4.7 | Trust Support | 43 |
| 3 | Methodological Background | 45 |
| 3.1 | Literature Review | 45 |
| 3.2 | Laboratory Experimentation | 47 |
| 3.2.1 | Standard Laboratory Experiment..... | 48 |
| 3.2.2 | Free Simulation Experiments | 49 |

| | | |
|------------|--|-----------|
| 3.3 | Structural Equation Modeling..... | 50 |
| 3.3.1 | Defining the Measurement Models | 52 |
| 3.3.2 | Model Evaluation..... | 60 |
| 3.3.3 | Quality Criteria for Reflective Measurement Models | 60 |
| 3.3.4 | Quality Criteria for Formative Measurement Models | 62 |
| 3.3.5 | Quality Criteria for the Structural Model | 65 |
| 3.3.6 | Common Method Variance | 67 |
| 3.4 | Design Research | 70 |
| 4 | Literature Review on Existing Insights Helping to Derive Trust Supporting Components for Ubiquitous Information Systems | 73 |
| 4.1 | Introduction | 73 |
| 4.2 | Combining Trust and Measurement Theory | 74 |
| 4.3 | Methodology of the Literature Review | 75 |
| 4.4 | Results | 79 |
| 4.4.1 | Trustees Studied in the Information Systems Literature | 79 |
| 4.4.2 | Multifoci Trust Studies in the Information Systems Literature..... | 81 |
| 4.4.3 | Conceptualizations Used for Studying Trust in IT Artifacts..... | 82 |
| 4.4.4 | Antecedents of Trust Identified in the Information Systems Literature. | 82 |
| 4.4.5 | Reliability of the Reported Results according to Measurement Theory | 85 |
| 4.4.6 | Trust and IT Artifact Design | 90 |
| 4.5 | Discussion..... | 90 |
| 4.6 | Limitations | 91 |
| 4.7 | Conclusion..... | 92 |
| 5 | Different Measurement Models for Trust – The Effect on Understanding the Formation of Trust | 95 |
| 5.1 | Introduction | 95 |
| 5.2 | Towards a Formative Measurement Model for Trust..... | 96 |
| 5.3 | Research Method..... | 97 |
| 5.4 | Results Obtained Using the Reflective Measurement Model for Trust.. | 98 |
| 5.5 | Results Obtained Using the Formative Measurement Model for Trust | 100 |
| 5.6 | Discussion..... | 103 |

| | | |
|-------|--|-----|
| 5.7 | Conclusion..... | 105 |
| 6 | The Impact of Different Foci of Trust in Ubiquitous Information Systems Adoption..... | 107 |
| 6.1 | Introduction | 107 |
| 6.2 | Network of Trust for Ubiquitous Information Systems | 108 |
| 6.3 | Hypotheses Development..... | 111 |
| 6.4 | Research Method..... | 116 |
| 6.4.1 | The Ubiquitous Information System Used in the Study..... | 117 |
| 6.4.2 | Data Collection and Analysis Techniques..... | 119 |
| 6.4.3 | Instrument Development | 119 |
| 6.5 | Results | 120 |
| 6.6 | Discussion..... | 126 |
| 6.7 | Limitations | 130 |
| 6.8 | Conclusion..... | 132 |
| 7 | Understanding the Formation of Trust in a Ubiquitous Information System .. | 133 |
| 7.1 | Introduction | 133 |
| 7.2 | Formation of Trust in a Ubiquitous Information System | 134 |
| 7.3 | Research Method..... | 138 |
| 7.3.1 | Data Collection and Analysis Techniques..... | 139 |
| 7.3.2 | Instrument Development | 139 |
| 7.4 | Results | 140 |
| 7.5 | Discussion..... | 143 |
| 7.6 | Limitations | 145 |
| 7.7 | Conclusion..... | 147 |
| 8 | A Method for Deriving Trust Supporting Components in Ubiquitous Information Systems..... | 149 |
| 8.1 | Introduction | 149 |
| 8.2 | Developing the Method | 150 |

| | | |
|------------|--|------------|
| 8.2.1 | Identifying and Prioritizing Uncertainties | 151 |
| 8.2.2 | Identifying Suitable Trust Dimensions..... | 153 |
| 8.2.3 | Identifying Suitable Trust Antecedents | 154 |
| 8.2.4 | Deriving Trust-related Functional Requirements | 155 |
| 8.2.5 | Deriving Trust Supporting Components..... | 156 |
| 8.3 | Application of the Method – The Case of DinnerNow..... | 158 |
| 8.3.1 | Identifying and Prioritizing Uncertainties | 159 |
| 8.3.2 | Identifying Suitable Trust Dimensions..... | 163 |
| 8.3.3 | Identifying Suitable Trust Antecedents | 164 |
| 8.3.4 | Deriving Trust-related Functional Requirements | 165 |
| 8.3.5 | Deriving Trust Supporting Components..... | 167 |
| 8.4 | Evaluation | 168 |
| 8.4.1 | Results of the Laboratory Experiment..... | 169 |
| 8.4.2 | Limitations..... | 172 |
| 8.5 | Conclusion..... | 172 |
| 9 | Summary of Contributions and Areas for Future Research..... | 175 |
| 9.1 | Theoretical Contributions of the Dissertation..... | 175 |
| 9.1.1 | Assessing the Readiness of Information Systems Research on Trust for Supporting the Development of More Trustworthy Ubiquitous Information Systems | 175 |
| 9.1.2 | Assessing the Value of Using a Formative Measurement Approach for Trust for IT Artifact Design | 176 |
| 9.1.3 | Identification of Different Foci of Trust and Evaluation of their Impact in the Context of Ubiquitous Information Systems Adoption..... | 176 |
| 9.1.4 | Development and Evaluation of a Theory of the Formation of Trust in a Ubiquitous Information System | 177 |
| 9.1.5 | Development, Application and Evaluation of a Method for Deriving Trust Supporting Components for Ubiquitous Information Systems..... | 178 |
| 9.2 | Practical Contributions of the Dissertation..... | 179 |
| 9.2.1 | Measurement Instruments..... | 179 |
| 9.2.2 | Identification of the Importance of Trust in the Providers of Ubiquitous Information Systems in the Context of their Adoption..... | 180 |

| | | |
|-------|---|------------|
| 9.2.3 | Antecedents of Trust in the Context of Ubiquitous Information Systems Adoption..... | 181 |
| 9.2.4 | Method for Deriving Trust Supporting Components for Ubiquitous Information Systems..... | 181 |
| 9.2.5 | Trust Supporting Components for Ubiquitous Information Systems... | 182 |
| 9.3 | Areas for Future Research | 182 |
| 9.3.1 | Understanding the Formation of Trust in the Provider of Ubiquitous Information Systems..... | 182 |
| 9.3.2 | Understanding the Interplay between Trust in an IT Artifact and Trust in the Provider of the IT Artifact..... | 182 |
| 9.3.3 | Refining the Theory on the Formation of Trust in Ubiquitous Information Systems..... | 183 |
| 9.3.4 | Refining the Method for Deriving Trust Supporting Components for Ubiquitous Information Systems..... | 184 |
| 9.3.5 | Developing Trust-related Requirement and Design Patterns | 185 |
| 9.3.6 | Investigating the Adaptability of the Developed Method to other Classes of Systems, other Types of Trust Relationships and other Psychological Constructs | 186 |
| 9.3.7 | Understanding the Process of Trust Building..... | 187 |
| 9.3.8 | Understanding the Importance of Trust in Other Phases of the Innovation-Decision Process | 187 |
| | References | 189 |
| | Appendix | 209 |