MIS Quarterly

RESEARCH ARTICLE

# COMPARING POTENTIAL AND ACTUAL INNOVATORS: AN EMPIRICAL STUDY OF MOBILE DATA SERVICES INNOVATION

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# Appendix A

## Literature Summary and Model Constructs

**Table A1. Previous Empirical Research Related to User Product Innovation (Studies arranged by date within each category)**

| DV | Study | Constructs | Method | Key Findings |
|---|---|---|---|---|
| DV is aspects of User Innovation | Lüthje (2004) | Independent variables<br>• Innovation related core benefits<br>• Product knowledge<br>• Fun by dealing with innovation<br>• Expected financial compensation<br>Dependent variable<br>• Innovation effort | Survey of 153 consumers of two outdoor product manufacturers. Outdoor consumers are end users who buy and/or use these products<br><br>**Unit of analysis**: User level | Innovation related core benefits (facing new needs, dissatisfaction with existing products) and expertise in product use (product knowledge, use experience, and fun by dealing with innovation) positively affect user innovation effort, while financial related benefits does not affect the DV. |
| | Jeppesen and Frederiksen (2006) | Independent variables<br>• Lead userness<br>• Firm and peer recognition<br>• Enhance career opportunities<br>Dependent variable<br>• User innovation | Survey of 345 users in a computer controlled music instrument innovation community<br><br>**Unit of analysis**: User level | Lead userness and firm recognition positively affect user innovation behaviors in the community. |

**Table A1. Previous Empirical Research Related to User Product Innovation (Continued)**
**(Studies arranged by date within each category)**

| DV | Study | Constructs | Method | Key Findings |
|---|---|---|---|---|
| DV is aspects of User Innovation (continued) | Franke et al. (2006) | Independent variables<br>• Ahead of trend<br>• High benefit expected<br>• Technical Expertise<br>Dependent variables<br>• User innovation probability<br>• Innovation attractiveness | Survey of 456 users in kite surfing communities<br><br>**Unit of analysis**: User level | High benefit expected positively affects the probability of user innovation while ahead of trend positively affects the probability of user innovation and the attractiveness of user innovation. |
| | Franke et al. (2008) | Independent variable<br>• User toolkit feature: Having access to other users' designs versus no access<br>Dependent variables<br>• Integration of existing solution chunks<br>• Quality of self-designed skis | Experiment with 191 subjects on use of toolkits to develop personal skis<br><br>**Unit of analysis**: User level | Having access to other users' designs stimulates the integration of existing solution chunks into the problem-solving process, which enhance the quality of self-designed skis. |
| DV is Lead Userness or Lead Userness is a mediator | Schreier and Prugl (2008) | Independent variables<br>• Consumer knowledge<br>• Use experience<br>• Locus of control<br>• Innovativeness personality<br>• Mediators<br>• Lead userness: Trend position; Expected benefits from innovation<br>Dependent variables<br>• New product adoption<br>• Replacement rate | Examine the antecedences and consequence of lead userness for extreme sports, e.g., sail planning, technical diving, kite surfers<br><br>Survey of 461 users in 3 samples on sport-related product innovation<br><br>**Unit of analysis**: User level | Consumer knowledge, use experience, locus of control, and innovativeness personality significantly enhance lead userness, which positively affects the number of new products adopted, yearly spending on kite surfing equipment, and the replacement rate for major equipment. |
| | Kratzer and Lettl (2009) | Independent variable<br>• Betweenness centrality<br>Dependent variable<br>• Lead userness | Survey of 537 children in 23 school classes on toy design<br><br>**Unit of analysis**: User level | Betweenness centrality positively affects the lead userness of children. |
| | Faullant et al. (2012) | Independent variables<br>• Divergent thinking<br>• Use experience<br>• Product knowledge<br>Dependent variables<br>• Ahead of trend<br>• Expected benefits | Survey of 146 product testers for small kitchen appliances<br><br>**Unit of analysis**: User level | Divergent thinking, product knowledge, and use experience positively affect the ahead of trend and expected benefit dimensions of lead userness. |

**Table A2. Previous Empirical Research Related to User Service Innovation (Studies arranged by date within each category)**

| Unit of Analysis | Study | Constructs | Method | Key Findings |
|---|---|---|---|---|
| Organization Level | Chen et al. (2009) | Independent variables<br>• Innovation orientation<br>• IT capability<br>• External partner collaboration<br>Dependent variable<br>• Service delivery innovation | Survey of 420 Taiwanese financial firms<br><br>**Unit of analysis**: Organizational level | Innovation orientation and IT capability positively affect service delivery innovation while external partner collaboration does not. |
| | Carbonell et al. (2009) | Independent variables<br>• Technical novelty<br>• Technical turbulence<br>• Mediator<br>• Customer involvement<br>Dependent variables<br>• Innovation speed<br>• Technical quality of innovation<br>• Competitive advantage<br>• Sales performance | Survey of 102 Spanish service firms<br><br>**Unit of analysis**: Organizational level | Customer involvement positively affects technical quality of innovation, and innovation speed but does not affect sales and competitive advantage.<br><br>Technical novelty and technical turbulence positively affect customer involvement. |
| | Ordanini and Parasuraman (2011) | Independent variables<br>• Customer collaboration<br>• Employee collaboration<br>• Business partner collaboration<br>• Knowledge integration mechanisms<br>• Customer orientation<br>Dependent variables<br>• Innovation radicalness<br>• Innovation volume | Survey of 91 five star hotels in Italy<br><br>**Unit of analysis**: Organizational level | Customer collaboration and employee collaboration positively affect the volume of service innovation while business partner collaboration, employee collaboration, knowledge integration mechanisms, and customer orientation positively affect the radicalness of service innovation. |
| User Level | Morrison et al. (2000) | Independent variables<br>• Leading-edge status<br>• In-house technical capabilities<br>Dependent variable<br>• Probability of user innovation behavior | Survey of 122 users of library information systems OPAC<br><br>**Unit of analysis**: User level | Leading-edge status and in-house technical capabilities positively affect user innovation behavior. |
| | Magnusson et al. (2003) | • Comparing ordinary users, consulting users versus professionals<br>Dependent variables<br>• Originality<br>• Reproducible<br>• User value of ideas for service innovation | Experiment on 12 professional employees in a Swedish mobile telephony operator, 19 ordinary users, and 20 consulting users<br><br>**Unit of analysis**: User level | Ordinary users and consulting users can generate ideas of higher originality and user value but of less producibility than professional employees. |
| | Matthing et al. (2004) | • Comparing consumers versus professionals<br>Dependent variables<br>• Originality<br>• User value of service innovation idea | Experiment on 86 Sweden end-users to generate ideas for mobile phone services<br><br>**Unit of analysis**: User level | Consumer generated service ideas are found to be more innovative, in terms of originality and user value, than those of professionals. |

**Table A2. Previous Empirical Research Related to User Service Innovation (Continued) (Studies arranged by date within each category)**

| Unit of Analysis | Study | Constructs | Method | Key Findings |
|---|---|---|---|---|
| User Level | Matthing et al. (2006) | Independent variable<br>• Technology readiness<br>Dependent variables<br>• Propensity to adopt new tech-based services<br>• Seek new tech and solve related problems<br>• Willingness to participate in new tech-based service development<br>• Originality<br>• User value of service innovation idea | Survey of 1004 Swedish users of telecom services, followed by experiment with 52 users<br><br>**Unit of analysis**: User level | Technology readiness is positively related to propensity to adopt new tech-based services, actively seek new technologies and solve problems related to them, and be willing to participate in new technology-based service development. Potential "lead users," are capable of actually generating a large, diverse and original set of new service ideas. |
| | Kratzer and Lettl (2008) | Independent variable<br>• Betweenness centrality<br>Dependent variables<br>• Lead userness<br>• Creativity | Experiment with 366 children in 16 school-groups to develop ideas on improving an online application, 'CineKidStudio', for their personal use<br><br>**Unit of analysis**: User level | Betweenness centrality positively affects the lead userness and creativity of children. |
| | Franke and von Hippel (2003) | Independent variables<br>• Heterogeneity of user needs<br>• Innovation toolkits<br>Dependent variables<br>• User innovation<br>• User satisfaction | Survey of 131 individual users for open source Apache security software (no regression)<br><br>**Unit of analysis**: User level | Innovation toolkits can better serve heterogeneous needs. Heterogeneous needs lead users to customize their software.<br><br>User who customize their software with the help of innovation toolkits are more satisfied than those who did not customize. |

**Table A3. Antecedents and Controls for our Model mapped from Previous Literature**

| Variables | Constructs in Our Model | | | Constructs Previously Studied | Studies |
|---|---|---|---|---|---|
| **Antecedents** | **Lead Userness** | | | Lead user | Jeppesen and Frederiksen (2006) |
| | | | | Lead userness | Franke et al. (2006) |
| | | **Trend Leadership** | | Leading-edge status | Morrison et al. (2000) |
| | | | | Technology readiness | Matthing et al. (2006) |
| | | | | Innovation related core benefits (facing new needs, dissatisfaction with existing products) | Lüthje (2004) |
| | | **Expected Benefit** (Franke et al 2006) | **Anticipated Extrinsic Reward** | Expected financial compensation | Lüthje (2004) |
| | | | | Enhance career opportunities | Jeppesen and Frederiksen (2006) |
| | | | **Anticipated Enjoyment** | Fun by dealing with innovation | Lüthje (2004) |
| | | | **Anticipated Recognition** | Peer recognition and firm recognition | Jeppesen and Frederiksen (2006) |
| **Controls** | **Tenure** | | | Product knowledge | Lüthje (2004) |
| | **Programming Skill** | | | In-house technical capabilities | Morrison et al. (2000) |
| | | | | Technical expertise | Franke et al. (2006) |
| **Not included** | Antecedents of **lead userness**, which is already included in our model | | | Consumer knowledge | Schreier and Prugl (2008) |
| | | | | Locus of control | Schreier and Prugl (2008) |
| | | | | Innovativeness | Schreier and Prugl (2008) |
| | | | | Use experience | Schreier and Prugl (2008)<br>Faullant et al. (2012) |
| | | | | Divergent thinking | Faullant et al. (2012) |
| | | | | Betweenness centrality | Kratzer and Lettl (2009) |

**Table A4. Previous Research Related to Toolkit Support (Studies arranged by date)**

| Study | Constructs | Method | Key Findings |
|---|---|---|---|
| Von Hippel and Katz (2002) | | **Conceptual** | Effective toolkits for user innovation should include the following features<br>• Offer users a "solution space"<br>• User friendly, easy for novices to use<br>• Contain libraries of commonly used modules<br>• Facilitate trial and error learning<br>• Translate user design for production |
| Franke and von Hippel (2003) | Independent variables<br>• Heterogeneity of user needs<br>• Innovation toolkits<br>Dependent variables<br>• User innovation<br>• User satisfaction | **Survey** of 131 individual users for open source Apache security software (no regression)<br>**Unit of analysis**: User level | Innovation toolkits can better serve heterogeneous needs. Heterogeneous needs lead users to customize their software.<br>User who customize their software with the help of innovation toolkits are more satisfied than those who did not customize. |
| Franke and Piller (2004) | • Toolkit use: module library, solution spaces<br>Dependent variables<br>• Heterogeneity of design result<br>• Willingness to pay for the watch designed | **Four Experiments** on user innovation in watch design using the toolkit of Idtown<br>**Unit of analysis**: User level | Users who use toolkits to self-design watches are significantly more willing to buy the watches. The self-designed watches vary quite widely.<br>Toolkits can support users for trial and error learning, experimentation. |
| Piller et al. (2004) | • Toolkit function | **Case Study** of user tool *Game Creator* for mobile game | As a module of *Game Creator*, the *Component Creator* has functions enabling users to save components in the library and search for and build upon existing components in the library. |
| Jeppesen (2005) | • Toolkit support for peer/user-to-user communication<br>• The costs of consumer involvement | **Case study** of user innovation in computer games by Westwood Studios<br>Use toolkits (Final Alert 2—a 2D graphics editor) for game innovation | Toolkit use extends the product lifetime -computer games can stay popular longer when additional product content that adds to the consumption experience is produced on a continuing basis.<br>Toolkits can reduce the costs (time and effort) of involvement through peer support. |
| Shneiderman (2007) | • Tool features to support creative activities | **Conceptual** | Tool features that can accelerate innovation:<br>• support exploratory search<br>• enable collaboration<br>• provide rich history-keeping<br>• easy for novices to get started with |
| Franke et al. (2008) | Independent variable<br>• User toolkit feature: Having access to other users' designs versus no access<br>Dependent variables<br>• Integration of existing solution chunks<br>• Quality of self-designed skis | **Experiment** with 191 subjects on use of toolkits to develop personal skis<br><br>**Unit of analysis**: User level | Having access to other users' designs stimulates the integration of existing solution chunks into the problem-solving process, which enhance the quality of self-designed skis. |

**Table A5. Toolkit Support Dimensions Mapped to Previous Literature**

| Dimensions in Our Model | Features Previously Studied | Studies |
|---|---|---|
| **Exploration** | Experimentation<br>Trial and error learning | Franke and Piller (2004),<br>Von Hippel and Katz (2002) |
| | Having access to other users' designs | Franke et al. (2008) |
| | Support exploratory search | Shneiderman (2007) |
| | Appropriate solution space | Von Hippel and Katz (2002) |
| **Ease of effort** | Module library | Franke and Piller (2004)<br>Von Hippel and Katz (2002) |
| | Component library save and search | Piller et al. (2004) |
| | Provide rich history-keeping | Shneiderman (2007) |
| | Reduce the costs of consumer involvement<br>Increase ease of use<br>User friendly | Jeppesen (2005)<br>Shneiderman (2007)<br>Von Hippel and Katz (2002) |
| **Not applicable in study context** | Enable user communication and collaboration | Jeppesen (2005)<br>Shneiderman (2007) |
| | Translate user design for production | Von Hippel and Katz (2002) |

**Table A6. Definitions of Constructs in the Model**

| Constructs | Definition | Source |
|---|---|---|
| Anticipated Extrinsic Reward | The degree to which users believe that they will receive monetary incentives if they create new MDS applications | Adapted from Bock et al. (2005) |
| Anticipated Recognition | The degree to which users believe that their recognition will increase if they create new MDS applications | Adapted from Jeppesen and Frederiksen (2006) |
| Anticipated Enjoyment | The degree to which users believe they will obtain pleasure if they create new MDS applications | Adapted from Lakhani and Wolf (2005) |
| Trend Leadership | The degree to which users have ahead of trend needs | Adapted from Franke et al.(2006); Lüthje (2004) |
| Toolkit Support | The expected extent to which users believe that toolkits will support their MDS innovation by reducing effort and facilitating exploration | Adapted from Shneiderman (2007); Franke et al. (2008) |
| Intention to Innovate | The degree to which users believe that they will engage in creating new MDS application in future | Adapted from Agarwal and Karahanna (2000) |
| Mobile data services | Digital data services available on or accessible via mobile devices | Lee et al. (2009) |

**Table A7. Operationalization of Constructs**

| Construct | Items | | Sources |
|---|---|---|---|
| **Trend Leadership** | **TLS1** | I need to create service applications that better facilitate my daily work or entertainment *(unique need)* | Adapted from Franke et al. (2006); Kratzer and Lettl (2009) |
| | **TLS2** | I always need new service applications *(unique need)* | |
| | **TLS3** | I am always the first one to adopt new service applications *(leadership)* | |
| **Anticipated Enjoyment** | **AEJ1** | I will have fun creating a new service application | Adapted from Agarwal and Karahanna (2000); Fuller et al. (2009) |
| | **AEJ2** | Creating a service application will provide me with a lot of enjoyment | |
| | **AEJ3** | I will enjoy the process of materializing my ideas into service applications | |
| **Anticipated Extrinsic Reward** | **AER1** | I expect to receive monetary rewards in return for my service application created | Adapted from Bock et al. (2005) |
| | **AER2** | It is important for me to get monetary rewards in return for creating new service applications | |
| | **AER3** | I expect to gain enhanced career prospects in return for creating new service applications | |
| | **AER4** | It is important for me to improve career prospects through participating in new service application creation activities | |
| **Anticipated Recognition** | **REG1** | Recognition from others is a great reward for creating new service applications | Adapted from Jeppesen and Frederiksen (2006); Wasko and Faraj (2005) |
| | **REG2** | Creating new service applications in the platform enhances my status | |
| | **REG3** | Creating new service applications improves my image | |
| **Ease of Effort** | **EOE1** | The development tools help me save a lot of effort for collecting information and designing new service applications for the market | Self-developed |
| | **EOE2** | With the help of the development tools, it is easy to collect information and design applications for the market | |
| | **EOE3** | With the help of the development tools, it is easy to use component library for service application design | |
| **Exploration** | **EXP1** | The development tools enable me to extensively explore service applications in the market | |
| | **EXP2** | The development tools help me explore my peers' latest developed applications | |
| | **EXP3** | With the help of the development tools, I can experiment with (ideas of) creating service applications | |
| **Intention to Innovate** | **ITI1** | I will create service applications in the next 6 months | Developed from Agarwal and Karahanna (2000) |
| | **ITI2** | I am likely to develop service applications in the next 6 months | |
| | **ITI3** | I am contemplating to create service applications in the next 6 months | |

# Appendix B

## Supporting Data Analyses

**Table B1. Demographics of Respondents**

| Demographic Variables | | Actual Innovators' Frequency and Percentage (N = 101) | | Potential Innovators' Frequency and Percentage (N = 111) | |
|---|---|---|---|---|---|
| **Gender** | Male | 72 | 71.3% | 86 | 77.5% |
| | Female | 29 | 28.7% | 25 | 22.5% |
| **Age** | ≤20 | 24 | 23.7% | 3 | 2.7% |
| | 21–25 | 30 | 29.7% | 75 | 67.6% |
| | 26–30 | 30 | 29.7% | 30 | 27.0% |
| | 31–35 | 12 | 11.9% | 2 | 1.8% |
| | 36–40 | 2 | 2.0% | 0 | 0.0% |
| | > 40 | 3 | 3.0% | 1 | 0.9% |
| **Educational Level** | High School | 0 | 0.0% | 42 | 37.8% |
| | Diploma | 6 | 5.9% | 42 | 37.8% |
| | Bachelors | 34 | 33.6% | 24 | 21.7% |
| | Masters | 53 | 52.5% | 3 | 2.7% |
| | Doctorate | 8 | 8.0% | 0 | 0.0% |
| **Platform** | iOS | 66 | 65.3% | 62 | 55.9% |
| | Android | 35 | 34.7 % | 49 | 44.1% |
| **Programming Skill** | 1 (Low) | 0 | 0.0% | 1 | 0.9% |
| | 2 | 1 | 1.0% | 3 | 2.7% |
| | 3 | 5 | 4.9% | 10 | 9.0% |
| | 4 (Medium) | 11 | 10.9% | 36 | 32.5% |
| | 5 | 29 | 28.7% | 33 | 29.7% |
| | 6 | 35 | 34.7% | 18 | 16.2% |
| | 7 (High) | 20 | 19.8% | 10 | 9.0% |
| **Tenure (Months)** | < 6 | 7 | 6.93% | - | - |
| | 6–12 | 32 | 31.68% | - | - |
| | 13–24 | 38 | 37.62% | - | - |
| | >24 | 24 | 23.76% | - | - |

**Table B2. Results of Factor Analysis (Actual | Potential)**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| **AER1** | **0.71\|0.75** | -0.14\|0.00 | 0.20\|0.12 | 0.12\|0.17 | -0.09\|0.12 | -0.01\|0.21 | 0.31\|0.23 |
| **AER2** | **0.82\|0.84** | 0.04\|0.13 | 0.19\|0.17 | 0.33\|0.26 | 0.11\|0.15 | 0.22\|0.31 | 0.25\|0.32 |
| **AER3** | **0.77\|0.78** | -0.02\|-0.08 | 0.24\|0.27 | 0.32\|0.20 | -0.05\|-0.05 | 0.03\|0.42 | 0.33\|0.24 |
| **AER4** | **0.74\|0.84** | -0.14\|0.09 | 0.21\|0.32 | 0.24\|0.28 | 0.03\|0.07 | 0.29\|0.22 | 0.30\|0.35 |
| **AEJ1** | 0.08\|0.03 | 0.18\|0.32 | 0.31\|0.23 | 0.11\|0.35 | **0.76\|0.79** | 0.05\|0.10 | 0.01\|0.02 |
| **AEJ2** | -0.03\|0.14 | 0.18\|0.41 | 0.21\|0.32 | 0.25\|0.54 | **0.90\|0.93** | 0.15\|0.08 | 0.05\|0.04 |
| **AEJ3** | 0.05\|0.06 | 0.18\|0.39 | 0.36\|0.33 | 0.22\|0.52 | **0.89\|0.92** | 0.18\|0.07 | 0.08\|0.10 |
| **TLS1** | -0.07\|0.07 | **0.93\|0.94** | 0.40\|0.43 | 0.19\|0.34 | 0.20\|0.40 | 0.10\|0.05 | 0.07\|0.15 |
| **TLS2** | 0.00\|0.06 | **0.79\|0.93** | 0.41\|0.12 | 0.10\|0.32 | -0.13\|0.37 | -0.01\|0.01 | 0.10\|0.13 |
| **TLS3** | -0.09\|0.02 | **0.73\|0.78** | 0.42\|0.23 | 0.03\|0.24 | -0.27\|0.36 | 0.11\|0.03 | 0.01\|0.02 |
| **EOE1** | 0.28\|0.17 | 0.03\|0.11 | **0.91\|0.87** | 0.42\|0.33 | 0.24\|0.11 | 0.37\|0.02 | 0.27\|0.12 |
| **EOE2** | 0.22\|0.23 | -0.08\|0.23 | **0.87\|0.78** | 0.35\|0.33 | 0.28\|0.01 | 0.41\|0.02 | 0.11\|0.12 |
| **EOE3** | 0.12\|0.20 | 0.02\|0.10 | **0.66\|0.68** | 0.21\|0.25 | 0.11\|0.15 | 0.32\|0.09 | 0.09\|0.10 |
| **EXP1** | 0.14\|0.37 | 0.05\|0.33 | 0.25\|0.27 | 0.32\|0.43 | 0.16\|0.01 | **0.86\|0.76** | 0.16\|0.11 |
| **EXP2** | 0.20\|0.17 | 0.08\|0.05 | 0.27\|0.34 | 0.35\|0.43 | 0.13\|0.21 | **0.88\|0.87** | 0.15\|0.20 |
| **EXP3** | 0.19\|0.08 | 0.01\|0.02 | 0.30\|0.24 | 0.26\|0.21 | 0.29\|0.18 | **0.67\|0.69** | 0.17\|0.09 |
| **REG1** | -0.06\|0.34 | 0.05\|0.06 | 0.05\|0.31 | 0.28\|0.23 | 0.14\|0.21 | 0.10\|0.27 | **0.80\|0.87** |
| **REG2** | -0.02\|0.02 | 0.00\|0.07 | 0.17\|0.21 | 0.26\|0.24 | 0.16\|0.17 | 0.13\|0.34 | **0.75\|0.81** |
| **REG3** | -0.04\|0.03 | 0.14\|0.05 | 0.18\|0.27 | 0.27\|0.34 | 0.14\|0.11 | 0.27\|0.33 | **0.77\|0.81** |
| **ITI1** | 0.34\|0.34 | 0.17\|0.33 | -0.01\|0.02 | **0.88\|0.95** | 0.22\|0.55 | 0.28\|0.33 | 0.38\|0.30 |
| **ITI2** | 0.26\|0.24 | 0.16\|0.35 | -0.05\|0.04 | **0.87\|0.96** | 0.26\|0.49 | 0.35\|0.23 | 0.25\|0.18 |
| **ITI3** | 0.35\|0.24 | 0.12\|0.29 | 0.02\|0.04 | **0.86\|0.94** | 0.26\|0.47 | 0.39\|0.27 | 0.18\|0.25 |
| **Eigen value** | 5.54\|6.76 | 4.01\|4.31 | 2.80\|3.01 | 2.52\|2.63 | 1.83\|1.95 | 1.38\|1.87 | 1.20\|1.08 |
| **Variance explained (%)** | 22.12\|23.06 | 16.06\|16.91 | 11.01\|11.89 | 9.21\|9.56 | 7.89\|8.23 | 7.01\|7.20 | 6.21\|5.70 |
| **Cumulative variance (%)** | 22.12\|23.06 | 38.18\|39.97 | 49.19\|51.86 | 58.40\|61.42 | 66.29\|69.65 | 73.03\|76.85 | 79.51\|82.55 |

**Table B3. Weights of Formative Dimensions**

| Construct | Group | Dimension | Weights | T-Value |
|---|---|---|---|---|
| Toolkit Support (TKS) | Actual User Innovator | Ease of Effort (EOE) | 0.59 | 13.21 |
| | | Exploration (EXP) | 0.54 | 12.98 |
| | Potential User Innovator | Ease of Effort (EOE) | 0.56 | 27.34 |
| | | Exploration (EXP) | 0.57 | 27.10 |

## *Common Method Bias Test*

Harman's single factor test was conducted by running an exploratory factor analysis with all variables included. The factor analysis produced neither a single factor nor one general factor that accounted for the majority of the variance (< 50%) as desired, suggesting no common method bias. We have also followed Liang et al. (2007) to test the common method bias (see Table B4). The analysis results show that only 4 of the 20 paths for actual innovators and 3 of 20 for potential innovators from the common method factor were significant, providing evidence that the study results were not affected by common method bias (Podsakoff et al. 2003).

**Table B4. Common Method Bias Analysis**

| Construct | Items | Substantive Factor Loading (R1) | | $R1^2$ | | T-value | | Method Factor Loading (R2) | | $R2^2$ | | T-value | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trend Leadership** | TLS1 | 0.88 | 0.93 | 0.77 | 0.86 | **56.47** | **92.02** | 0.01 | 0.04 | 0.00 | 0.00 | 1.52 | 1.89 |
| | TLS2 | 0.86 | 0.92 | 0.74 | 0.85 | **43.24** | **66.50** | 0.01 | 0.02 | 0.00 | 0.00 | 0.95 | 1.11 |
| | TLS3 | 0.61 | 0.82 | 0.37 | 0.67 | **7.18** | **28.68** | 0.02 | -0.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| **Anticipated Extrinsic Reward** | AER1 | 0.78 | 0.78 | 0.61 | 0.61 | **17.58** | **18.23** | 0.02 | 0.06 | 0.00 | 0.00 | 1.05 | 1.50 |
| | AER2 | 0.78 | 0.78 | 0.61 | 0.61 | **15.63** | **17.64** | -0.01 | 0.11 | 0.00 | 0.01 | 0.03 | **3.02** |
| | AER3 | 0.76 | 0.75 | 0.58 | 0.56 | **16.89** | **23.42** | 0.04 | 0.09 | 0.00 | 0.01 | 1.50 | 1.09 |
| | AER4 | 0.76 | 0.77 | 0.58 | 0.59 | **19.02** | **24.72** | 0.04 | 0.10 | 0.00 | 0.01 | 1.31 | 1.20 |
| **Anticipated Enjoyment** | AEJ1 | 0.77 | 0.77 | 0.59 | 0.59 | **16.07** | **23.45** | 0.10 | 0.08 | 0.01 | 0.01 | **2.31** | 1.28 |
| | AEJ2 | 0.89 | 0.89 | 0.79 | 0.79 | **49.82** | **30.61** | 0.10 | 0.10 | 0.01 | 0.01 | **2.58** | 1.02 |
| | AEJ3 | 0.90 | 0.90 | 0.81 | 0.81 | **44.59** | **30.31** | 0.04 | 0.10 | 0.00 | 0.01 | 1.64 | 1.64 |
| **Anticipated Recognition** | REG1 | 0.85 | 0.85 | 0.72 | 0.72 | **29.87** | **31.06** | 0.07 | 0.05 | 0.00 | 0.00 | 1.36 | 1.36 |
| | REG2 | 0.84 | 0.88 | 0.71 | 0.77 | **26.27** | **35.10** | 0.06 | 0.06 | 0.00 | 0.00 | 1.22 | 1.07 |
| | REG3 | 0.83 | 0.88 | 0.69 | 0.77 | **31.61** | **36.28** | 0.07 | 0.07 | 0.00 | 0.00 | 1.34 | 1.16 |
| **Ease of Effort** | EOE1 | 0.91 | 0.91 | 0.83 | 0.83 | **34.91** | **61.38** | 0.08 | 0.15 | 0.01 | 0.02 | **1.99** | **2.99** |
| | EOE2 | 0.90 | 0.90 | 0.81 | 0.81 | **56.17** | **47.43** | 0.07 | 0.14 | 0.00 | 0.02 | **1.94** | **2.71** |
| | EOE3 | 0.89 | 0.88 | 0.79 | 0.77 | **45.32** | **44.01** | 0.06 | 0.07 | 0.00 | 0.00 | 0.87 | 0.10 |
| **Exploration** | EXP1 | 0.90 | 0.93 | 0.81 | 0.86 | **53.28** | **90.47** | 0.05 | 0.12 | 0.00 | 0.01 | 1.06 | 1.06 |
| | EXP2 | 0.90 | 0.93 | 0.81 | 0.86 | **58.78** | **96.97** | 0.06 | 0.12 | 0.00 | 0.01 | 1.36 | 0.96 |
| | EXP3 | 0.88 | 0.90 | 0.77 | 0.81 | **54.10** | **70.26** | 0.10 | 0.09 | 0.01 | 0.01 | 1.10 | 0.97 |
| **Intention to Innovate** | ITI1 | 0.91 | 0.95 | 0.83 | 0.90 | **72.86** | **127.63** | 0.03 | 0.06 | 0.00 | 0.00 | 1.33 | 0.88 |
| | ITI2 | 0.92 | 0.96 | 0.85 | 0.92 | **73.47** | **154.86** | 0.05 | 0.07 | 0.00 | 0.00 | 1.40 | 1.32 |
| | ITI3 | 0.90 | 0.94 | 0.81 | 0.88 | **69.46** | **84.06** | 0.06 | 0.06 | 0.00 | 0.00 | 1.39 | 1.51 |

**Note:** Each pair of values represent actual | potential user innovator samples.

# Appendix C

## Measurement Invariance Test and *Post Hoc* Test

In order to compare the responses from potential and actual user innovators, we tested the measurement model and evaluated the measurement invariance (Cheung and Rensvold 2002). This test is performed to validate that any differences observed between the different samples of respondents (actual versus potential innovators) can be attributed to true attitudinal differences. Following previous literature using such analysis (e.g., Phang et al. 2009), we used LISREL 8.8 to conduct the invariance test. As per the previous literature (e.g., Milfont and Fischer 2010; Phang et al. 2009), we tested three required hierarchical levels of invariance: configural, metric, and scalar invariance test (Steenkamp and Baumgartner 1998). For the configural invariance, we found that the values of IFI, NNFI, and CFI of the combined model of two groups are above 0.90 and RMSEA below 0.08. Therefore, the configural invariance between the groups of potential innovators and actual innovators is established. Further, the difference between CFI in the configural model and the metric model ($\Delta$ CFI = 0.9211 – 0.9132 = 0.0079) is well below 0.01. According to the criteria in Cheung and Rensvold (2002), metric invariance is satisfied in our study. Moreover, the difference between CFI in the metric model and the scalar model ($\Delta$ CFI = 0.9132 – 0.9026 = 0.0106) marginally exceeds the 0.01 threshold. As per Hong et al. (2003), scalar invariance is largely satisfied in our model.

**Table C1. Results of Measurement Invariance Tests**

| Models | $X^2$ | df | IFI | NNFI | CFI | RMSEA |
|---|---|---|---|---|---|---|
| Actual | 122.3 | 80 | 0.93 | 0.91 | 0.92 | 0.072 |
| Potential | 169.8 | 80 | 0.92 | 0.94 | 0.92 | 0.079 |
| **Baseline (Configural)** | **292.2** | **160** | **0.92** | **0.92** | **0.9231** | **0.062** |
| **Metric** | **376.8** | **175** | **0.91** | **0.92** | **0.9168** | **0.070** |
| **Scalar** | **485.7** | **190** | **0.91** | **0.91** | **0.9066** | **0.081** |

We *post hoc* tested the influence of the independent variables on the number of MDS applications created and the average popularity of these MDS applications.

**Table C2. *Post Hoc* Test**

| DV | DV = Number of Innovations[†] | | DV = Log (MDS Popularity) | |
|---|---|---|---|---|
| **Variables** | **1** | **2** | **3** | **4** |
| **TLS** | 0.17* | 0.16* | 0.13* | 0.17** |
| **AEJ** | 0.07 | 0.06 | -0.11 | -0.18 |
| **AER** | 0.32** | 0.32** | 0.25*** | 0.26*** |
| **REG** | 0.13* | 0.12* | 0.11* | 0.10* |
| **TKS** | 0.35*** | 0.33** | 0.16* | 0.14* |
| **AEJ * TKS** | - | 0.14* | - | 0.22* |
| **$R^2$** | 0.52 | 0.58 | 0.32 | 0.38 |

*p < 0.05, **p < 0.01, ***p < 0.001

[†]We verified the accuracy of the number of applications reported by actual user innovators by checking the agreement of the reported values against the actual data listed in the two platforms. The correlations were high (r = 0.90, p < 0.001) and none of the means differences were significant (t = 1.06, p < 0.30).

# Appendix D

## Moderation Plots and Threshold Analysis

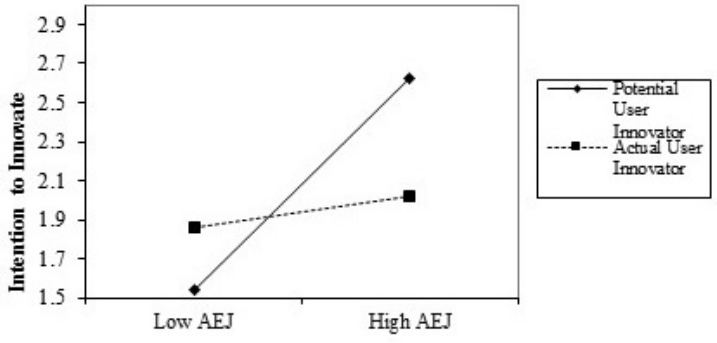


**Figure D1. Plot for H2c**

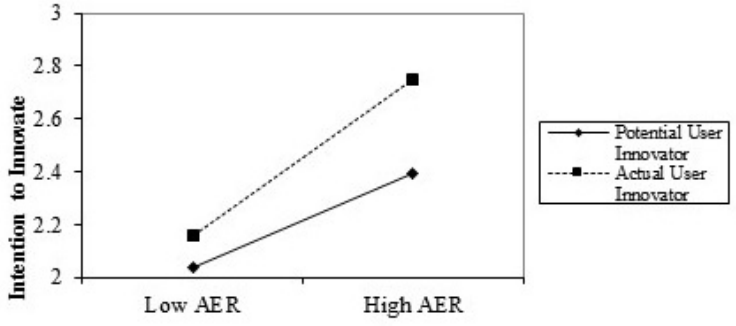


**Figure D2. Plot for H3c**

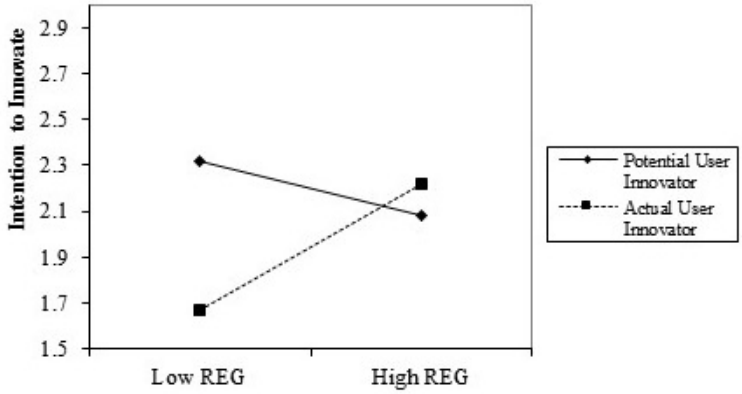


**Figure D3. Plot for H4c**

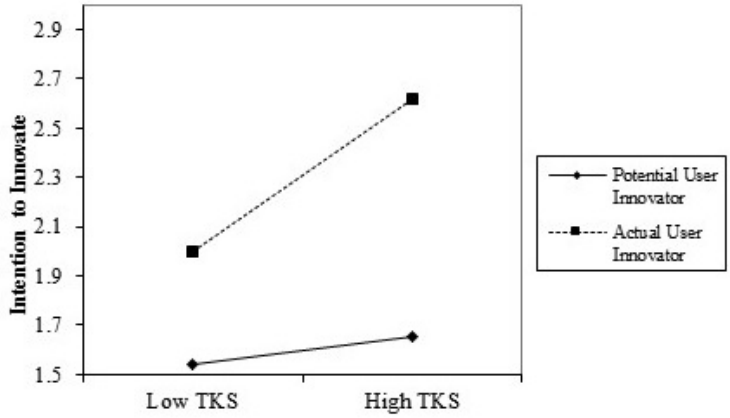


**Figure D4. Plot for H5c**

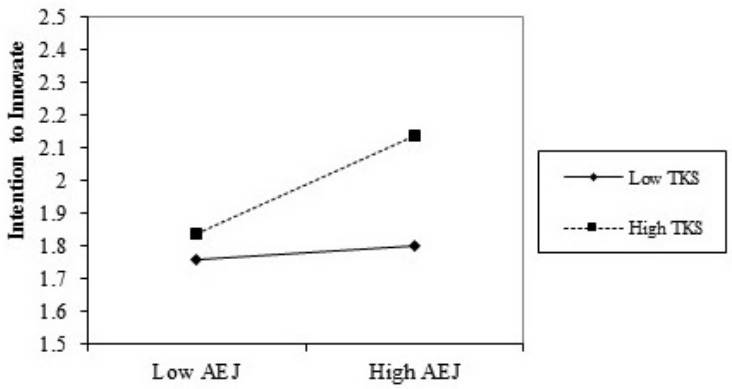


**Figure D5. Plot for H6a**

The plots in Figures D1-D4 show the differences between potential and actual user innovators as indicated in Table 3.

From the results in Table 2, we also see a moderation effect between AEJ and TKS on ITI for actual user innovators (H6a) but no direct effect of AEJ on ITI for this group (H2a). We could explain these two results in terms of the level of TKS. Specifically, when the level of TKS is low, we do not see an effect of AEJ on ITI. However, as TKS increases, there is a threshold beyond which the effect of AEJ on ITI becomes significant (see Figure D5). This is consistent with Baron and Kenny (1986), who noted one of the specifications of a moderator as a threshold beyond which the effect of the IV on the DV becomes significant. To obtain a rough estimate of the threshold, we split the actual user innovators sample into four quartiles based on the values of TKS and estimated the coefficient of AEJ on ITI for each quartile (see Table D1). As the coefficient is significant only in the fourth (highest) quartile, we further split this quartile into two to more precisely estimate the threshold. We found that the coefficient changes from insignificant to significant at the TKS value of 5.67. We could not split the sample further to more precisely determine the threshold since the sample size becomes too small to estimate the effects robustly. Baron and Kenny also state that theories in social psychology are usually not precise enough to specify the exact threshold at which the change occurs. However, our empirical analysis shows such a threshold.

We did a similar threshold analysis for potential user innovators as our results showed a negative interaction between AEJ and TKS for this group, but no main effect of TKS. Here, we split the sample by AEJ and observed that the effect TKS on ITI is significant for lower levels of AEJ but becomes insignificant for higher levels of AEJ (see Table D2). We found that the coefficient changes from significant to insignificant at the AEJ value of 5.57 (i.e., between the second and third quartiles).

**Table D1. Threshold Analysis for Actual User Innovators AEJ*TKS**

| TKS | First Quartile | Second Quartile | Third Quartile | Fourth Quartile | |
|---|---|---|---|---|---|
| Coefficient of AEJ on ITI | 0.01 | 0.04 | 0.10 | 0.24** | |
| Split by two | | | | 0.11 | 0.20* |

**Table D2. Threshold Analysis for Potential User Innovators AEJ * TKS**

| AEJ | First Quartile | Second Quartile | Third Quartile | Fourth Quartile |
|---|---|---|---|---|
| Coefficient of TKS on ITI | 0.34* | 0.12* | -0.01 | -0.10 |

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