

CARNEGIE MELLON UNIVERSITY

**95-842 – TECHNOLOGY ACCEPTANCE AND INNOVATIONS MANAGEMENT**

Fall 2006 – Mini 1

Tuesday and Thursday 10:30 – 11:50 HBH 1004

**INSTRUCTOR**

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**LITERATURE**

Required: Lecture slides and articles posted on the blackboard or handed out as photocopies during class

Recommended  
Books:

Everett M. Rogers, “Diffusion of Innovations”, The Free Press, New York, 1995

Batya Friedman, “Human Values and the Design of Computer Systems”, Cambridge University Press, Stanford, 1997

Dov Te’eni, Jane Carey & Ping Zhang, “Human-Computer Interaction: Developing Effective Organizational Information Systems”, 2007

**OBJECTIVE**

The course aims to provide a holistic view on the diverse factors driving the market success of high-tech products and services. Innovation diffusion theory, human-centred system design and marketing strategies are combined to provide course participants with a broad perspective on the myriad factors relevant for building, marketing or simply judging on new technologies.

## COURSE DESCRIPTION

The course starts out with an overview of current product and service innovations arising in the realm of ubiquitous/pervasive computing. This introduction is followed by a thorough presentation of innovation theory, in particular the theory of innovation diffusion. Theoretical frameworks are presented to characterize product and service innovations as well as the triggers of their success: relative advantage, compatibility and complexity.

On the background of this introduction, a more detailed look is then taken at concrete characteristics of successful digital products and services. **What's important when engineering digital products for broader market acceptance? And what does one have to watch out for when judging on the quality of new product and service proposals?** To answer these questions, human-centred technical designs as well as economic factors need to be considered.

Human-centred technical design involves not only an understanding of adjusted and more human-centred system development life-cycles, but also insights into the long history of research in technology acceptance models. Here, usability issues are playing a role (i.e. affective, cognitive and physical engineering), but equally important are more general factors of system acceptability such as trust, social compatibility, culture and personality as well as the respect of human values in the design of systems (such as the desire for privacy, control or autonomy).

The economic perspective, in contrast, covers a selected number of those market forces which are relevant for system acceptance and success regardless of product appeal: in particular pricing, standardization and network effects.

## GRADING

The course is a combination of a lecture and in-class student presentations and discussion.

Every student (or teams of two) is required to prepare one presentation for the class during the term which covers one or two case-studies related to the course's theory (accompanied by a 5-page text exposé).

In addition, all students are required to prepare a 10 min presentation (accompanied by a 3-page exposé) for the very last class of October 16<sup>th</sup> on cultural differences in the perception of technology. Preparation is supposed to be done by teams of two who are not having the same cultural background.

Grades depend on:

- |   |     |
|---|-----|
| 1. Class attendance and participation   | 10% |
| 2. Presentation case study              | 30% |
| 3. Presentation of cultural differences | 10% |
| 3. Exam                                 | 50% |

## **COURSE SCHEDULE AND TOPICS**

### **Lecture 1 (Tuesday, August 29<sup>th</sup>)**

Topic: Technology Acceptance & The Future of Products and Services -  
Pervasive Ubiquitous Computing, Motivation for Studying Acceptance Factors

Recommended Reading:

- Kang, J. / Cuff, D.: Pervasive Computing: Embedding the Public Sphere, Public Law & Legal Theory Research Paper Series, Los Angeles, US, University of California, Los Angeles School of Law, 62, 2005

### **Lecture 2 (Thursday, August 31<sup>st</sup>)**

Topic: Innovation Diffusion I – The Innovation Diffusion Process, Adopter Categories,  
Attributes of Successful Innovation (Relative Advantage, Complexity, Compatibility)

Recommended Reading:

- Tornatzky, L., Klein, K., “Innovation Characteristics and Innovation Adoption-Implementation: A Meta-Analysis of Findings”, IEEE Transactions on Engineering Management, Vol. 29, No. 1, February 1982
- Mick, D.G., Fournier, S., “Paradoxes of Technology: Consumer Cognizance, Emotions, and Coping Strategies”, Journal of Consumer Research, Vol. 25, 1998
- Everett M. Rogers, “Diffusion of Innovations”, The Free Press, New York, 1995

### **Lecture 3 (Tuesday, September 5<sup>th</sup>)**

Topic: Innovation Diffusion II – Diffusion Networks, Change Agents, Innovation in  
Organizations

Recommended Reading:

- Tyre, M., Orlikowski, W., “Windows of Opportunity: Temporal Patterns of Technological Adaptation in Organizations”, Organizational Science, Vol.5, No.1, 1994
- Everett M. Rogers, “Diffusion of Innovations”, The Free Press, New York, 1995

#### **Lecture 4 (Thursday, September 7<sup>th</sup>)**

Topic: Relative Advantage I – Why do people intent to use one system rather than another?

Student Presentation 1:

Usefulness in products and services – What makes Google, Skype and iPods more successful than their competitors?

Recommended Readings:

- Venkatesh, V., M. G. Morris, et al. (2003). "User Acceptance of Information Technology: Toward a Unified View." MIS Quarterly **27**(3): 425-478

#### **Lecture 5 (Tuesday, September 12<sup>th</sup>)**

Topic: Ensuring Relative Advantage II - About the Role of Standards, Network Effects and Timing for Innovation Success

Student Presentation 2:

2 cases that demonstrate the power of standardisation and network effects

Recommended Reading:

- Katz., M., Shapiro, C., “System Competition and Network Effects”, The Journal of Economic Perspectives, Vol. 8, No.2, 1994
- Case Study: “Instant Messaging”, HBS 9-704-502 by David Yoffie

#### **Lecture 6 (Thursday, September 14<sup>th</sup>)**

Topic: Minimizing Complexity – How to design for Usability and Ease-of-Use

Student Presentation 3:

2 cases: one system which worked really well and another which did not at all; present the systems and the logic of their success and failure

Recommended Reading:

- Dov Te'eni, Jane Carey & Ping Zhang, “Human-Computer Interaction: Developing Effective Organizational Information Systems”, 2007
- Ben Shneiderman, “Universal Usability”, Communications of the ACM, Vol. 43, No. 5, May 2000

## **Lecture 7 (Tuesday, September 19<sup>th</sup>)**

Topic: Ensuring Compatibility I – About the Role of Affect and Social Compatibility in System Design

Student Presentation 4:

2 cases of systems that are successful in making people happy; present the systems and develop a logic for driving user happiness

Recommended Reading:

- Sun, H., Zhang, P., “The Role of Affect in Information Systems Research: A Critical Survey and A Research Model”, in: “Human-Computer Interaction in Management Information Systems: Foundations”, ed. by P.Zhang & D. Galletta, 2006
- Friedman, B., Part II of the Book “Human Values and the Design of Computer Technology”: “Computers as Personas?”, p.135 – 237, 1997
- Hans van Heijden et al., „User Acceptance of Hedonic Information Systems“, MIS Quarterly, Vol. 28, No. 4, 2004

## **Lecture 8 (Thursday, September 21<sup>st</sup>)**

Topic: Ensuring Compatibility II – About the Role of Personal Factors in System Design

Student Presentation 5:

2 cases of systems where personal factors may impede system usage (potentially relating also to digital gap factors); present the systems and the challenges and how these could be or are addressed

Recommended Reading:

- Jason Thatcher, Pamela Perrewé, “An Empirical Examination of Individual Traits as Antecedents to Computer Anxiety and Computer Self-Efficacy”, MIS Quarterly, Vol. 26, No. 4, 2002
- David Gefen et al., “Trust and TAM in Online Shopping: An Integrated Model”, MIS Quarterly, Vol. 27, No.1, 2003

## **Lecture 9 (Tuesday, September 26<sup>th</sup>)**

Topic: Ensuring Compatibility III – Values Relevant for System Design

Student Presentation 6:

2 cases of systems that provide different levels of user control and how people react to different levels of control (or automation)

Recommended Reading:

- Friedman, B., Part I of the Book “Human Values and the Design of Computer Technology”: “Conceptualizing Human Values in Design?”, p.19 – 135, 1997
- Solove, D. J. (2005). "A Taxonomy of Privacy." University of Pennsylvania Law Review 154.
- Sarah Spiekermann, “Perceived Control: Scales for Privacy in Ubiquitous Computing”, presented at the CHI’06, Workshop on Privacy and Personalization

## **Lecture 10 (Thursday, September 28<sup>th</sup>)**

Topic: Ensuring Compatibility IV – Social Compatibility and Value Sensitive Design

Student Presentation 7:

Present a privacy-enhancing technology and show how different parts of the architecture relate to different aspects of the privacy construct (potential privacy-enhancing technologies are Identity Cards in the new Microsoft VISTA or Privacy Bird)

Recommended Reading:

- Friedman, B., Kahn, P., Borning, A., “Value Sensitive Design and Information Systems”, in: Human-Computer Interaction in Management Information Systems: Foundations”, ed. by P. Zhang & D. Galletta, 2006

## **Lecture 11 (Tuesday, October 3<sup>rd</sup>)**

Topic: Acceptance Factors in Design – Ways to build Human-Centred Systems

Student Presentation 8:

Present 2 cases of systems where you believe no effort has been made to include usability requirements into the system or in contrast where you feel a particular effort has been made. Explain why you have come to these conclusions.

- Zhang, P., Carey, J., Te’eni, D., Tremaine, M., “Integrating Human-Computer Interaction Development into the System Development Life Cycle: A Methodology”, Communications of the Association of Information Systems, Vol. 5, 2005, p.512-543

## **Lecture 12 (Thursday, October 5<sup>th</sup> )**

Topic: Innovation Adoption – Forecasting Models

Student Presentation 9:

The skillMap is a new social software product launched soon into the market (<http://ioe-skillmap.hu-berlin.de> ). Try to project the success of this innovation with the help of a forecasting model.

Reading:

- Urban, G., Weinberg, B., Hausner, J., “Premarket Forecasting of Really-New Products”, Journal of Marketing, Vol. 60, 1996
- Bass, F., “A new Product Growth for Model Consumer Durables”, Management Science, Vol. 15, No. 5, 1959

## **Lecture 13 (Tuesday, October 10<sup>th</sup> )**

Topic: Cultural Differences in the Adoption and Perception of Technologies

Student Presentation 10:

Mobile services are earliest to market in Asian countries and they are typically adopted more quickly there. Taking a particular service, please try to develop an argument why Asian markets show this phenomenon.

Recommended Readings:

- Talukdar, D., Sudhir, K., Ainslie, A., “Investigating New Product Diffusion Across Products and Countries” Marketing Science, Vol. 21, No. 1, 2002
- Phillips, L., Calantone, R., Lee, M.T., “International Technology Adoption – Behavior Structure, Demand Certainty and Culture”, Journal of Business & Industrial Marketing, Vol. 9, No. 2, 1994

## **Lecture 14 (Thursday, October 12<sup>th</sup> )**

Topic: Cultural Differences in the Adoption and Perception of Technologies II

Student Presentations