

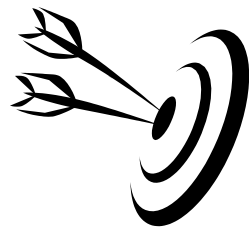
# Towards a Research Framework for Personal Data Transparency

1st Service Systems Forum on Service Research in the Personal Data Economy (SSF2015),  
27 May 2015

**Dirk Stelzer**

Professor of Information and Knowledge Management  
Director of the Institute for Business Information Systems Engineering  
Technische Universität Ilmenau

# Objectives



- to introduce the concept of Personal Data Transparency (PDT),
- to present a draft for a conceptual model of PDT, and
- to discuss research options for PDT in the Personal Data Economy.

# Some Phenomena in the Digital Economy ...

- online targeted advertising,
- digital price discrimination,
- smartphone apps disseminating sensitive information,
- data brokers collecting and monetizing personal data, and
- recent disclosures on government surveillance practices ...

... have led to the **Quest for Personal Data Transparency**

# US Federal Trade Commission (FTC 2012)

“... consumers’ lack of awareness of how, and for what purposes, companies collect, use, and share data,

the ... report called on companies to **improve the transparency of their data practices.**”

FTC: Protecting Consumer Privacy in an Era of Rapid Change: Recommendations for businesses and policy makers. FEDERAL TRADE COMMISSION. MARCH 2012. <http://www.ftc.gov/os/2012/03/120326privacyreport.pdf>.

# World Economic Forum (WEF 2014)

“... global anxiety over how personal data is used ...

**A deeper understanding of individuals’ sensitivities toward personal data is needed.**

- **What levels of transparency and control are needed to establish trust?**
- What types of data carry greater sensitivities?
- Which personal risks are the most sensitive?
- What are the proper metrics to help answer these questions?”

World Economic Forum: Rethinking Personal Data: A New Lens for Strengthening Trust. Cologny/Geneva 2014.  
[http://www3.weforum.org/docs/WEF\\_RethinkingPersonalData\\_ANewLens\\_Report\\_2014.pdf](http://www3.weforum.org/docs/WEF_RethinkingPersonalData_ANewLens_Report_2014.pdf)

# Sir Tim Berners-Lee (2014)

**“The data we create about ourselves should be owned by each of us, not by the large companies that harvest it.”**

**“If you give [people] the ability to see how [data is] used and you ban its misuse then people are much more happy to open up to their data being used.”**

Sir Tim Berners-Lee speaks out on data ownership, The Guardian, 8 Oct. 2014  
<http://www.theguardian.com/technology/2014/oct/08/sir-tim-berners-lee-speaks-out-on-data-ownership>

# Transparency is a key (privacy) principle

- EU Directive 95/46/EC - The Data Protection Directive 1995
- FTC 2012: Protecting Consumer Privacy in an Era of Rapid Change: Recommendations for businesses and policy makers. 2012
- OECD Privacy Framework. 2013

# Transparency becomes even more important in the emerging 'Personal Data Economy'

- Personal Data as '**commodities**' (Laudon 1996, Smith et al. 2011)
- Personal Data as a new '**asset class**' (WEF 2011)
- Emerging '**data lockers**' and '**personal data markets**' allow individuals to supply their personal data to third parties and to receive a portion of the proceeds when their data are used or sold (OECD 2013)
- **Personal Data Ecosystem** and Privacy by Design (Cavoukian 2013)
  - Personal Data Vaults
  - Data Analytics Services / personal information management services
  - Data Sharing Platforms



# However, ...

a clear understanding of how PDT can be

- conceptualized,
- implemented, and
- evaluated

has not yet emerged.

**Transparency [of processing personal data] is an ambiguous term.**

Hansen, M. (2008): Marrying Transparency Tools with User-Controlled Identity Management. In: Simone Fischer-Hübner, Penny Duquenoy, Albin Zuccato, Leonardo Martucci (Eds.): The Future of Identity in the Information Society - Proceedings of the Third IFIP WG 9.2, Heidelberg, pp. 199-220

# Method: Literature Review

## Search Keywords:

(transparent OR transparency) AND  
(privacy OR personal data OR personal information)

**2000 – 2014**

## In:

ACM Digital Library: <http://dl.acm.org/>

AIS Electronic Library (AISeL): <http://aisel.aisnet.org/>

EBSCO: <https://search.ebscohost.com/>

ELSEVIER ScienceDirect: <http://www.sciencedirect.com>

ELSEVIER Scopus <http://www.elsevier.com/online-tools/scopus>

IEEE Xplore Digital Library: <http://ieeexplore.ieee.org>

INFORMS PubsOnline <http://pubsonline.informs.org/>

Google Scholar: <http://scholar.google.de/>

Microsoft Academic Search: <http://academic.research.microsoft.com/>

Springer Link: <http://link.springer.com/>

Web of Science: <http://thomsonreuters.com/web-of-science-core-collection/>

## Backward & Forward Search

# Overview of Related Research Fields (examples)

## Information Privacy

- Privacy Paradox
- Disclosure Willingness
- Privacy Enhancing Technologies
- ...

## Acquisition and Utilization of Personal Data

- Tracking Technologies
- Personalization
- Online Targeted Advertising
- Digital Price Discrimination
- ...

## Personal Data Transparency

- Transparency Enhancing Technologies
- ...

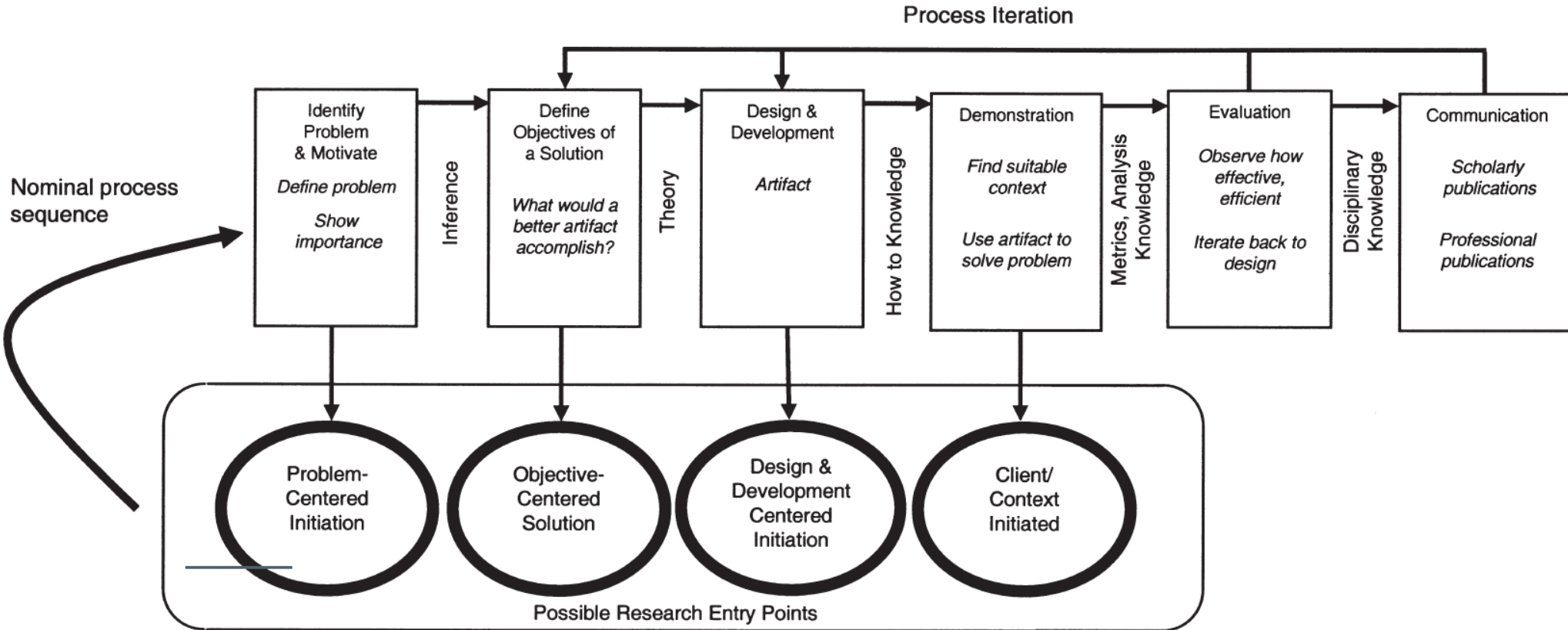
## Personal Data Economics

- Privacy Calculus
- Commoditization of Personal Data
- Business Models for Personal Data Services
- ...

## Emerging Technologies

- Big Data
- Internet of Things
- Hyperpersonalized Internet,
- Ubiquitous Services
- ...

# Design Science Research Process Model



Peffers, K., Tuunanen, T., Rothenberger, M., Chatterjee, S. (2007): A Design Science Research Methodology for Information Systems Research. In: Journal of Management Information Systems (24:3), pp. 45-77.

# Personal Data Transparency (PDT)

(or more exactly: Transparency of Personal Data Processing)

**the ability of consumers to easily notice and understand acquisition, use and dissemination of their personal data by service providers, government agencies or third parties**

# Towards a Conceptual Framework for PDT

- **Stakeholders**  
Who is interested in PDT?
- **Data Subjects**  
Whose personal data is collected, analyzed, used, disseminated ...?
- **Data Holders**  
Who processes personal data?
- **Type of Data**  
What types of personal data are processed?
- **Personal Data Value Chain**  
How exactly do data holders process personal data?
- **Level of Data Subjects' Autonomy**  
What level of autonomy do data subjects strive for?
- **Transparency Enhancing Technologies**  
What methods and tools help to enhance PDT?

# Stakeholders

- consumers, users, data subjects
- companies / data holders / data controllers / data processors
- intermediaries / service providers
- regulating authorities
- legislators
- consumer protection associations
- researchers / scholars / scientists
- society
- ...

## Research questions:

- Which stakeholders are interested in which aspects of PDT?
- Which information do specific stakeholders need to attain an enhanced level of transparency?

# Data Subjects

- **Privacy fundamentalists** express extreme concern about any use of their data, and are unwilling to disclose personal data
- **Privacy unconcerned** express mild concern for privacy only, and are not very anxious about how their personal data are processed.
- **Privacy pragmatists** are willing to disclose personal data when they see benefits for doing so.

Harris, L. & Ass. and Alan F. Westin, A. F. (1991): Harris-Equifax Consumer Privacy Survey 1991. Atlanta, GA: Equifax Inc.

## Further categorizations by

Acquisti, A. and Grossklags, J. (2005): Privacy and Rationality in Individual Decision Making. In: IEEE Security & Privacy 3, pp. 26-33

Spiekermann, S., Grossklags, J., and Berendt, B. (2001): E-privacy in 2nd Generation ECommerce: Privacy Preferences versus Actual Behavior. In: EC'01: Third ACM Conference on Electronic Commerce, Tampa, FL, pp. 38-47

## Research questions:

- Can these clusters be used for PDT research?
- If not, what clusters might be helpful?



# Data Holders

- service providers,
- intermediaries
  - for-profit
  - not-for-profit
- data brokers,
- government agencies.

## **Assumption: consumers do not equally trust all data holders.**

Kobsa, A. (2007): Privacy-Enhanced Web Personalization. In: P. Brusilovsky, A. Kobsa and W. Nejdl (eds.): The Adaptive Web: Methods and Strategies of Web Personalization. Berlin, New York: Springer, pp. 628–670.

## **Research questions:**

- Do consumers have different requirements for transparency?
- Relation between different levels of trust and requirements for transparency?

# Type of Data (OECD 2013)

- Volunteered data: explicitly provided by individuals.
- Observed data: captured by recording users' activities.
- Inferred data: created by analyzing personal data.

OECD (2013): Exploring the Economics of Personal Data: A Survey of Methodologies for Measuring Monetary Value. OECD Digital Economy Papers, No. 220, OECD Publishing.

## Other categorizations by

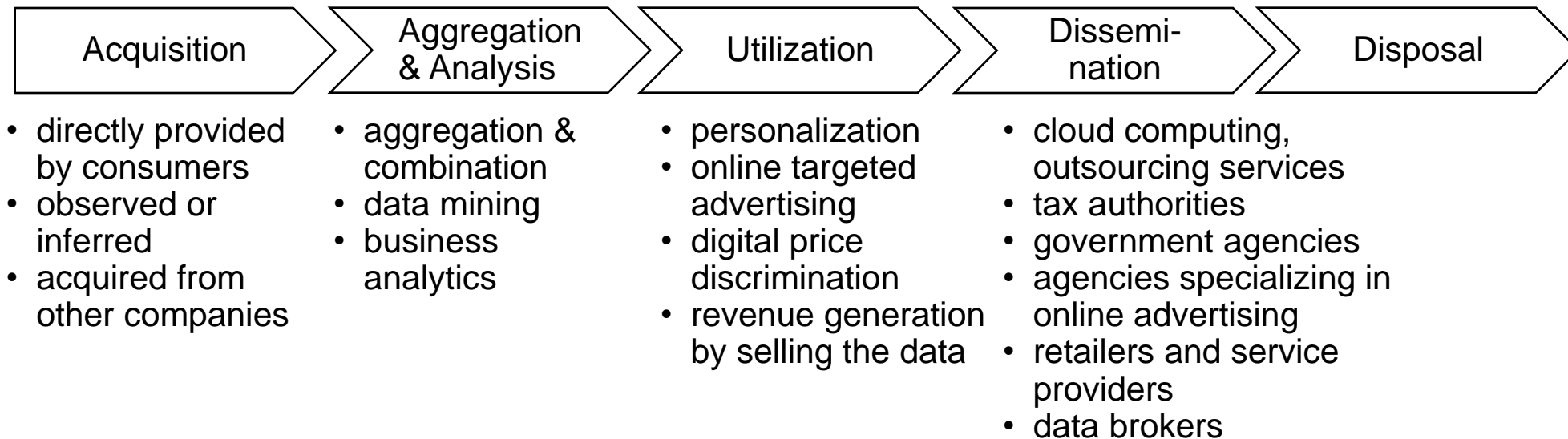
Schneier, B. (2010): A Taxonomy of Social Networking Data. In: IEEE Security and Privacy (8:4), p. 88-88

Abrams, M. (2014) : The Origins of Personal Data and its Implications for Governance. OECD Expert Roundtable Discussion Protecting Privacy in a Data-Driven Economy: Taking Stock of Current Thinking.

## Research questions:

- Do consumers have different requirements for transparency?
- What level of transparency do consumers require for which type of data?

# Personal Data Value Chain (OECD 2013)



OECD (2013): Exploring the Economics of Personal Data: A Survey of Methodologies for Measuring Monetary Value. OECD Digital Economy Papers, No. 220, OECD Publishing.

## Research questions:

- Are consumers equally interested in transparency of each activity?
- What level of transparency do consumers require for which activity?

# Level of Data Subjects' Autonomy

- **Awareness**  
knowing that personal data are tracked, stored, analyzed, disseminated
- **Insight**  
understanding details of how personal data are ...
- **Control**  
having the power of decision which data are ...
- **Ability to monetize**  
assess value, find “buyers”, negotiate prices, and deliver personal data

## Research questions:

- What levels of PDT do consumers need to be aware of / gain deeper insights / ... / be able to monetize their data?
- How can data holders enhance data subjects' autonomy?

# Transparency Enhancing Technologies

- privacy statements,
- privacy dashboards,
- ...

Janic, M., Wijbenga, J. P., and Veugen, T. (2013): Transparency Enhancing Tools (tets): An Overview. In Third Workshop on Socio-Technical Aspects in Security and Trust (STAST) 2013. IEEE, pp. 18–25.

## Research questions:

- Which technologies help to improve PDT?
- Which further technologies do consumers and companies need to improve PDT?
- When and how should these technologies be applied?

# Conclusion

- Privacy and commoditization require **personal data transparency** (PDT).
- PDT has **not yet been explored** sufficiently.
- A **conceptual framework** might help to guide research into PDT.

# References (1/3)

- Abrams, M. (2014) : The Origins of Personal Data and its Implications for Governance. OECD Expert Roundtable Discussion Protecting Privacy in a Data-Driven Economy: Taking Stock of Current Thinking
- Acquisti, A. 2010. The Economics of Personal Data and the Economics of Privacy: 30 Years after the OECD Privacy Guidelines. <http://www.oecd.org/sti/ieconomy/46968784.pdf>
- Acquisti, A. and Grossklags, J. (2005): Privacy and Rationality in Individual Decision Making. In: IEEE Security & Privacy 3, pp. 26-33
- Awad, N. F., Krishnan, M. S. 2006: The Personalization Privacy Paradox: An Empirical Evaluation of Information Transparency and the Willingness to be Profiled Online for Personalization. In: MIS Quarterly (30:1), pp. 13–28
- Berners-Lee, T. 2014.: Sir Tim Berners-Lee speaks out on data ownership. In: The Guardian, 8 Oct. 2014 <http://www.theguardian.com/technology/2014/oct/08/sir-tim-berners-lee-speaks-out-on-data-ownership>
- Cavoukian, A. 2013: Personal Data Ecosystem (PDE) – A Privacy by Design Approach to an Individual’s Pursuit of Radical Control. In: Mireille Hildebrandt, Kieron O’Hara, Michael Waidner, Robert Madelin (Eds.): Digital Enlightenment Yearbook 2013. IOS Press, Amsterdam et al., p. 89-101
- Cristofaro, E. de, Murdoch, S. J. (eds.) 2014. Privacy Enhancing Technologies: 14th International Symposium, PETS 2014, Amsterdam, The Netherlands, July 16-18, 2014. Proceedings
- Dinev, T., Hart, P. 2006: An Extended Privacy Calculus Model for E-Commerce Transactions. In: Information Systems Research (17:1), pp. 61-80
- Enck, W., Gilbert, P., Chun, B., Cox, L., Jung, J., McDaniel, P., Sheth, A. 2014: TaintDroid: An Information-Flow Tracking System for Realtime Privacy Monitoring on Smartphones. In: ACM Transactions on Computer Systems (32:2), Article No. 5
- FTC 2012: Protecting Consumer Privacy in an Era of Rapid Change: Recommendations for businesses and policy makers. FEDERAL TRADE COMMISSION. MARCH 2012. <http://www.ftc.gov/os/2012/03/120326privacyreport.pdf>
- Hansen, M. (2008): Marrying Transparency Tools with User-Controlled Identity Management. In: Simone Fischer-Hübner, Penny Duquenoy, Albin Zuccato, Leonardo Martucci (Eds.): The Future of Identity in the Information Society - Proceedings of the Third IFIP WG 9.2, Heidelberg, pp. 199-220
- Harris, L. & Ass. and Alan F. Westin, A. F. (1991): Harris-Equifax Consumer Privacy Survey 1991. Atlanta, GA: Equifax Inc.
- Janic, M., Wijbenga, J. P., and Veugen, T. (2013): Transparency Enhancing Tools (tets): An Overview. In Third Workshop on Socio-Technical Aspects in Security and Trust (STAST) 2013. IEEE, pp. 18–25

# References (2/3)

- Kobsa, A. (2007): Privacy-Enhanced Web Personalization. In: P. Brusilovsky, A. Kobsa and W. Nejdl (eds.): The Adaptive Web: Methods and Strategies of Web Personalization. Berlin, New York: Springer, pp. 628–670.
- Laudon, K. C. 1996: Markets and Privacy. In: Communications of the ACM (39:9), pp. 92-104
- Li, H., Sarathy, R., Xu, H. 2010: Understanding Situational Online Information Disclosure as a Privacy Calculus. In: Journal of Computer Information Systems (51:1), pp. 62–71
- Liu, B., Sheth, A., Weinsberg, U., Chandrashekar, J., Govindan, R. 2013: Adreveal: Improving Transparency into Online Targeted Advertising. In: HotNets-XII Proceedings of the Twelfth ACM Workshop on Hot Topics in Networks, Article No. 12
- Mayer, J.R., Mitchell, J.C. 2012: Third-Party Web Tracking: Policy and Technology. In: IEEE Symposium on Security and Privacy (SP), pp. 413-427
- OECD 2013: Exploring the Economics of Personal Data. A Survey of Methodologies for Measuring Monetary Value, Paris: OECD Publ.
- Peppers, K., Tuunanen, T., Rothenberger, M., Chatterjee, S. (2007): A Design Science Research Methodology for Information Systems Research. In: Journal of Management Information Systems (24:3), pp. 45-77
- Phelps, J., Nowak, G., Ferrell, E. 2000: Privacy Concerns and Consumer Willingness to Provide Personal Information. In: Journal of Public Policy & Marketing (19:1), pp. 27-41
- Schneier, B. (2010): A Taxonomy of Social Networking Data. In: IEEE Security and Privacy (8:4), p. 88-88
- Smith, H. J., Dinev, T., and Xu, H. 2011: Information Privacy Research: An Interdisciplinary Review. In: MIS Quarterly (35:4), pp. 989–1016
- Spiekermann, S., Grossklags, J., and Berendt, B. (2001): E-privacy in 2nd Generation ECommerce: Privacy Preferences versus Actual Behavior. In: EC'01: Third ACM Conference on Electronic Commerce, Tampa, FL, pp. 38-47
- Staiano, J., Oliver, N., Lepri, B., de Oliveira, R., Caraviello, M., Sebe, N. 2014: Money Walks: A Human-Centric Study on the Economics of Personal Mobile Data. In: ACM International Joint Conference on Pervasive and Ubiquitous Computing (Ubicomp 2014)
- Taddicken, M. 2014: The 'Privacy Paradox' in the Social Web: The Impact of Privacy Concerns, Individual Characteristics, and the Perceived Social Relevance on Different Forms of Self-Disclosure. In: Journal of Computer-Mediated Communication (19:2), pp.248–273
- Wang, S.-C., Wu, J.-H. 2014: Proactive Privacy Practices in Transition: Toward Ubiquitous Services. In: Information & Management (51:1), pp. 93–103



# References (3/3)

World Economic Forum 2011: Personal Data: The Emergence of a New Asset Class. Cologny/Geneva  
[http://www3.weforum.org/docs/WEF\\_ITTC\\_PersonalDataNewAsset\\_Report\\_2011.pdf](http://www3.weforum.org/docs/WEF_ITTC_PersonalDataNewAsset_Report_2011.pdf)

World Economic Forum 2013: Unlocking the Value of Personal Data: From Collection to Usage. Cologny/Geneva  
[http://www3.weforum.org/docs/WEF\\_IT\\_UnlockingValuePersonalData\\_CollectionUsage\\_Report\\_2013.pdf](http://www3.weforum.org/docs/WEF_IT_UnlockingValuePersonalData_CollectionUsage_Report_2013.pdf)

World Economic Forum 2014: Rethinking Personal Data: A New Lens for Strengthening Trust. Cologny/Geneva  
[http://www3.weforum.org/docs/WEF\\_RethinkingPersonalData\\_ANewLens\\_Report\\_2014.pdf](http://www3.weforum.org/docs/WEF_RethinkingPersonalData_ANewLens_Report_2014.pdf)

# Contact



Univ.-Prof. Dr. Dirk Stelzer

Technische Universität Ilmenau  
Chair of Information and Knowledge Management  
P.O. Box 100565  
98684 Ilmenau  
Germany

Fon: ++ 49 (0)3677 - 69 40 40

Fax: ++ 49 (0)3677 - 69 42 04

**[dirk.stelzer@tu-ilmenau.de](mailto:dirk.stelzer@tu-ilmenau.de)**

<http://www.tu-ilmenau.de/informationsmanagement>

# Ilmenau University of Technology

