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Workshop Proceeding of the 1st Workshop on Green (Responsible, Ethical and Social) IT and IS – the Corporate Perspective (GRES-IT/IS)

Preface

The 1st Workshop on Green (Responsible, Ethical and Social) IT and IS – the Corporate Perspective (GRES-IT/IS) includes extended abstracts covering the broad range of environmental (green), responsible, ethical and social issues investigated from researchers in the information systems research area. This first workshop in Vienna at Institute for Information Management and Control at Vienna University of Economics and Business attracted researchers investigating the whole bandwidth of possible topics. We aimed at starting the discussion on how these topics could gain more attendance in the field. We received 36 extended abstract fitting the requirements of the workshop and nine of them were presented and discussed in the workshop.

The organizers of the 1st Workshop on Green (Responsible, Ethical and Social) IT and IS decided to bring out all extended abstracts, presented at the workshop, in full. The idea behind this publication is to show the variety of topics in this area. On one hand, environmental issues of information systems have been addressed, i.e. 'green' approaches in Industry 4.0 and measurement of impacts of Green IT. On the other, social issues and impacts dominated the workshop, i.e. influence of smartphone usage on people and society, ways to address co-founders, human centric decision support systems, privacy responsibility and privacy issues from companies' and individuals' perspective. It is our hope that this working paper will make a good starting point and be of great use for other researchers doing research in this interesting and relevant area.

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Co-Founder Search for Tech Start-ups in Europe

An empirical study

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In the last three decades information and communication technology (ICT) had major socio-economic impact [1, 2, 3]. The boom of technological progress as well as rise of the web was accompanied by the rise of novel approaches in organizational design that – in turn – had influenced the process of the technological change [4]. As a result new organizational sources of technological change appeared, and they were referred to as start-ups [4, 5].

Due to their specifications as innovative enterprises start-ups face various challenges. As tech start-ups operate in highly volatile and risky environments and markets [6], they have to ensure flexibility and adaptation also of their organizational design. As a result human capital – as a part of this specific structure – quite different from that one in established companies and organizations becomes a subject of research and scientific debate [6, 7].

The proposed research will analyse the human resources in the context of tech start-ups with focus on the sources used for the co-founder search as well as the search for team members in an early phase of the start-up. It is important to understand that the risk-intense and volatile nature of the start-up environment alone sets specific traits to be observed within co-founder candidates and potential early team members attracted to such an environment. Whereas professionals and young graduates searching for job opportunities in established companies usually seek fixed income and rather guaranteed possibilities of long-term career growth, people searching for possibilities in start-ups look for participatory income models and scalable growth accompanied with the possibilities to arrive at senior positions early and quickly [8]. These criteria along with professional skills required in the technological sector indicate that there are specific sources needed for search of co-founders and early employees, entirely different from the ones in large established organizations.

Relevance of the research/research gap. The following research will address the challenges that technology start-up teams face during their search for co-founders and early team members as well as the current available IT-supported/online solutions. There are various findings concerning traditional ways of finding co-founders and early employees at tech start-ups [6, 9] based on the premises of social capital theory [10], e.g., through the search among one's friends, family members or former colleagues. At the same time there is still a lack in research that concerns novel emerging online solution targeted to go beyond one's personal network. These solutions among other topics are addressed in this research. Moreover, whereas there are results available on the empirical studies of patterns towards member acquisition within tech start-ups in the U.S. [8, 11], there is still a lack of evidence on the respective patterns, procedures and approaches on European tech start-up teams.

Methods of research. Based on the above-mentioned gaps in the current state of research on the sources of start-up team formation the research project aims to address the research question of finding out what are favourable sources to recruit co-founders among different sectors of technological start-ups in the European entrepreneurship ecosystem. Furthermore, the project brings into focus what problems within this process of acquisition can be addressed by the currently available solutions. Quantitative survey among 156 European technology start-ups will be used as an empirical research method aiming to address the research question by collecting and further analysing reliable data from the representative sample group of start-up founders and team members from 56 European cities.

Course of action. Understanding sources of team formation in tech start-ups goes beyond pure analysis of human capital characteristics involved in such a process. In order to fully grasp the factors that have an impact on specific human capital mobilizing around the topic of entrepreneurship and technology, we have to acquire deep understanding of start-ups as organizational entities, their surrounding ecosystem and its influence on the human capital within start-up teams. Thus the research will be structured as follows:

Work package 1 aims at bringing out why start-ups as organizations are different from other types of small and medium enterprises. Moreover, by using theoretical and practical case studies analysis will scrutinize why it is important to understand a variety of business models used by tech start-ups before proceeding to analyse the recruitment of start-up teams, their skills and sources of creation.

Work package 2 emphasises on the theoretical and statistical analysis of main challenges the human resources faces as a part of the entrepreneurship ecosystem. This work package provides an overview of problems that tech start-up teams face, and motivates new and efficient sources of co-founder and team member search.

Work package 3 provides an overview of two main categories of sources for cofounder and new team member search in tech start-ups, i.e. search through the personal social network and external search through the use of online solutions.

Work package 4 represents the core contribution, i.e. the analysis of the empirical data collected during a quantitative survey conducted with 156 founders and team members of tech start-ups in Europe. It focusses on the behaviour they exhibit and on the sources they used in the process of searching their co-founders and team members.

The choice of co-founder and early team members is crucial for the success of a start-up, and therefore IT-solutions and IT-platforms are highly determined by issues of trust and reliability. Potential founders and co-founders are often employed before they become founders and put their job at risk if they reveal too early their intention. All users (supply side and demand side) are to be protected. The business idea is to be protected as it is crucial for the success of the tech start-up. This implies highly secured IT-application.

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How to Make Decision Support Systems More Human Centric?
An Analysis of Three Digital Effort Feedback Mechanisms

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Introduction

Decision support systems (DSS) help people to make more sound decisions when being confronted with complex decision situations. One category of complex decisions are situations in which multi attributive decision making (MADM) is required. The complexity of MADM arises from the difficulty to find the optimal balance between multiple, often conflicting, decision criteria, and their corresponding attributes [1]. To support humans, DSS integrate mathematical and statistical methods [2]. However, due to their foundation on mathematical and logical models, many DSS are perceived hard to understand and to use by humans [2], [3]. Gaining more insight into DSS design in respect to more human centric approaches is therefore suggested an important field of future DSS research [4]. To contribute to this area the underlying research intends to explore DSS feedback mechanisms, which provide the users with information on their decision processes and outcomes [5], as a means to provide more human centric DSS.

Hitherto, DSS research concentrated on either the technical or the behavioral aspects of DSS [4]. Consequently, interconnected research was neglected. This calls for interdisciplinary research in the DSS field[6]. A previously conducted literature review, classifying the literature on DSS feedback mechanisms according to four layers of human computer interaction (HCI) interface design [7], confirms this view. It presents plenty of concepts for DSS feedback mechanisms to be found in literature but also a lack of research on the more detailed levels feedback mechanism design. These more detailed levels of feedback mechanism characteristics e.g., the time when feedback is provided [5] or by which means the feedback is provided [8], may also affect the impact of the feedback mechanism. To provide more insight into these relations this study reports on a comparison of three experiments which tested effort feedback in a multi-attribute decision making environment. Based on the insights gained from the comparison it is planned to conduct experiments to test the effects found.

Comparison of three effort feedback studies

The three studies on effort feedback [9]–[11] have been chosen due to their closeness in terms of tested feedback mechanisms, theory foundation, and experimental design. The four layer concept of HCI interface design, used in the preceding literature review to analyze and classify feedback mechanisms, was adopted to analyze the effort feedback mechanisms used in the three papers. These consist of the conceptual layer, the semantic layer, the syntactic layer and the lexical layer. An overview on the three studies, their findings regarding the effects generated by the feedback mechanism on the participant's time investment behavior, and the analysis of the feedback mechanisms according to the four layers, are presented in Table 1. Despite the large commonalities, each experiment reported a different effect of the feedback mechanism on the time decision makers invested in the decision making process. Creyer et al. [9] reported that their feedback mechanism, displayed as a shading circle during each trial, had no significant effect on the participant's time investment. The experiment conducted by Fennema and Kleinmuntz [10], in which the participants were presented the elapsed time as numerical text message after each trial, showed a decreasing effect of the feedback mechanism on time investment. In contrast to these studies, Maier et al. [11] showed that an effort feedback mechanism, presented during the trial and implicating a social norm, is actually able to increase time investment behavior.

Conclusion and future research

The analysis shows that, while providing the same type of information, the mechanisms differed in the way the feedback provided meaning. Creyer et al. [9] provided a feedback mechanism which actually had the potential to implicate a time restriction. However, the calculation was explicitly designed not to implicate a time restriction by selecting a timespan as a threshold that would hardly be exceeded by the participants. Maier et al. [11], on the other hand, implemented a threshold that would most surely lead to a conflict between the subject's actual time investment and the implemented threshold. Fennema and Kleinmuntz [10] did not implement any calculation function to introduce a threshold. Yet, the difference in timing could be the explanation why the feedback mechanism had this effect.

To examine whether these differences in the feedback mechanism design actually caused the observed effects, it is planned to conduct one or multiple experiments to examine the influences of design varieties on the semantic, the syntactic and the lexical layer. The big challenge now is to plan the experiments. One major question, for instance, is whether and how to split up the experiments. While single experiments bear the risk to merely confirm existing findings, a combined experiment would dramatically increase the complexity of the conducted research.

Table 1. Analysis of effort feedback according to four layers of HCI feedback design and their effects on time investment

Study	Analysis according to four layers of HCI interface design				Effects on time investment
	Concept	Semantic	Syntactic	Lexical	
Creyer et al.[9]	*Aim* • Support sense of invested time	*Data* • Time elapsed since start of trial *Calculations* • Relative to maximum of 200 seconds	*Timing* • During each trial	*Presentation* • Shading circle	Not significant under same task conditions
Fennema and Kleinmuntz [10]	*Aim* • Support sense of invested time	*Data* • Time elapsed since start of trial	*Timing* • After each trial	*Presentation* • Numeric text message	Decreasing effect on time investments
Maier et al.[11]	*Aim* • Persuade users to increase time invest-ment	*Data* • Dwell time per information unit *Calculations* • Average over 6 information units • Relative to an average of 0.6 seconds	*Timing* • During each trial	*Presentation* • Numeric, colored text message • Evaluative text message • Smiley graphic	Strong increasing effect on information unit level, weaker on task level

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Measuring Impacts of Green IT

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The term Green IT has become a hot topic since the intense use of ICT hardware shows enormous negative impacts on the environment. It comprises greening of IT (reducing environmental impacts of ICT products) and greening by IT (e.g. environmental information systems), often referred to as 'Green IS' [1]. Research, business and public authorities name three main reasons for the impacts. First, consumption of resources in production of ICT products is high and eats up rare and precious resources (e.g. rare earth metals) [2, 3]. Second, energy use throughout the whole lifecycle is immense [4]. Finally, having reached their end of life, the variety of products (e.g. mobile phones, servers, printers, computers integrated into other products) and different materials integrated (e.g. plastic, metals, liquids) impacts the environment again [5]. To reduce these negative impacts on environment, companies more and more implement Green IT (greening of ICT product) into their business. To manage their Green IT efforts, they need instruments to measure impacts of Green IT [1]. This is not specific for Green IT, but a regular task in business conduct. Companies measure their performance with the help of indicators due to various reasons. May it be decision making [6] or assessing their success [6, 7] in monetary or non-monetary numbers. Monetary or financial performance indicators, produced by accounting information systems, can be found in nearly every company [8]. By contrast, non-financial performance indicators like customer satisfaction, employee training or product quality [9] are harder to calculate and often lack the support of information systems. For assessing the performance of Green IT efforts in companies, financial and non-financial indicators and methodologies are possible. In this specific context, non-financial indicators seem to have some advantages as they provide information in their original, non-peculiar form (e.g. CO2 emissions in tons per year). Yet, approaches to monetize such indicators can be observed [7] (e.g. costs evolving from CO2 emissions in tons per year). A vast amount of complex schemes and methodologies are at hand to measure 'green' efforts of companies. Among them greenhouse gas (GHG) emissions, Environmental Performance Indicators (EPI) [10], Key Ecological Indicators (KEI) or Green performance indicators (GPIs) [11]. Existing sustainability frameworks like ISO 14001, the Greenhouse Gas Protocol (GHGP) or the Global Reporting Initiative (GRI) served as basis for many indicators schemes [12]. The advantage of such schemes is that they adopt a holistic view on company's ecological performance. The disadvantage is the amount of data needed, which challenges companies. However, they barely address Green IT as such [13]. Still, 'what' and 'how' to measure are open questions requiring further investigation [14]. Furthermore, both, financial and non-financial indicators, require a sound data collection. Whereas accounting systems and enterprise resource planning systems automatically generate data for financial indicators, data for environmental indicators requires additional sources. It remains unclear, which information systems can be used to create and provide the required data in an effective but also efficient way. In our research, we want to close this gap. Consequently, we concentrate on indicators and methodologies as well as indicator schemes applied to measure impacts Green IT approaches. We focus on the required data and the role of information systems for creating, collecting, processing and visualizing them. We aim at developing a landscape of the Green IT indicators, methodologies and schemes based on their data requirements and information systems involved in this process.

Methodological Approach

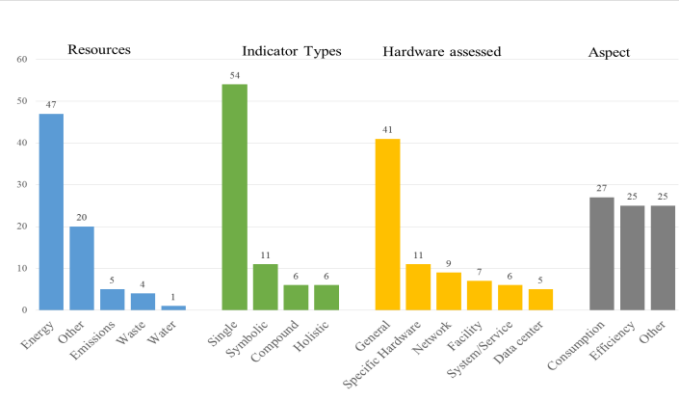
To gain an overview on the topic, we applied a literature review. We identified indicators, which support companies in their efforts to measure effects of Green IT approaches. We deliberately include only measurement of impacts concerning 'greening of IT'. To gain a basic understanding, we applied coding techniques to generate a first classification scheme. In a next step, we will set up a case study with a company, to investigate which indicators they use and which information systems are involved in the process. Moreover, we aim at identifying how creation and provision of required data takes place.

First Results and Next Steps

First, we identified appropriate search terms based on a short pre-study. Queries included different combinations of Green ICT/IT/IS, ICT/IT hardware, (performance) indicator (performance) measurement, metrics, performance management, environment, energy, pollution, as well as

scorecard. We applied Boolean operators (AND, OR, NOT) to combine the search terms, on two scientific databases (EBSCO and ABInform/TI ProQuest) in December 2015. The search resulted in 350 academic papers (7 excluded due to language issues). We further selected the papers based on reading the abstract and further reduced the sample to 118 papers. By investigating the content of them, we excluded all papers reporting on performance measurements of governments or pure environmental indicators, not targeting towards ICT hardware. Finally, we identified 59 papers for analysis. Further screening to identify indicators was done by the co-authors using a software program for content analysis (Atlas.ti). Based on the analysis we were able to identify 77 different indicators, schemes and methodologies connected to Green IT. We developed four categories (Figure 1) including resource or input/output measured (energy, emissions, waste, water, other), type of indicator (single, symbolic, compound, holistic), hardware (General, specific hardware, network, facility, system/service, data center) and aspect (consumption, efficiency, other). For the case study, we are in contact with two companies. We plan to conduct interviews as well as analyze documents and systems. Based on this, we would like to answer the questions 'what is measured', 'how is it measured' and 'which information systems are involved'. Currently, we are developing the interview guidelines and coordinate dates for the interviews, which should take place in fall or winter 2016.

Figure 1: Categories of indicators, schemes and methodologies



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Privacy Perceptions of Energy Data: A U.S. Consumer Study[1]

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Stimulus funding provided by the American Recovery and Reinvestment Act of 2009 (ARRA) assisted in the acceleration of smart meter deployment (58.5 million installed) among electrical utilities in the United Sates. The capture of energy use data at near real time intervals by smart meters enables automation of services, management of grid operations, and better matching of supply to demand. Potential consequences from these activities raises privacy concerns among consumers that should be addressed by utilities and regulators.

With this in mind, the following study was conducted across four U.S. cities with different levels of smart meter integration. The objective is to identify consumers' perceptions of privacy concerns raised by the deployment of smart meters. It asks the following questions:

- How do consumers perceive privacy risks when presented with information about possible smart meter data collection and use?
- How do utility companies currently protect data privacy and how well do their policies and practices correspond to the privacy concerns of consumers?

This paper focuses on the first question. Two focus groups (8-10 participants) were done in each of the following metropolitan areas:

- Syracuse, New York- no smart meter installation
- Detroit, Michigan– installation of smart meter ongoing by utilities
- Houston, Texas– smart meters installed in most homes
- San Jose, California- smart meters installed in most homes

A cross-section of consumer demographics and experience with smart meters was represented by 76 participants (See Table 1).

Scenarios were used to assist in illuminating potential issues. Participants interacted with four scenarios—the first two, plus two of the following three:

1. Video overview of smart grid by the Department of Energy https://www.youtube.com/watch?v=JwRTpWZReJk
2. Video advertisement for Bidgely, a home energy management service used by utilities. https://www.youtube.com/watch?v=Clc012Ss9LU
3. News story from Forbes business magazine describing home hacking via a vulnerable home electronic system http://www.forbes.com/sites/kashmirhill/2013/07/26/smart-homes-hack/#5eda5c9946a5
4. Researcher-developed scenario in which police search a home based on information received from the utility about high electrical usage, leading to suspected marijuana growing.
5. Researcher-developed scenario where a homeowner receives targeted advertisement from third parties about energy cost savings after subscribing to their utility's energy saving program

Transcripts of the focus groups were reviewed open coded by two researchers and salient privacy perceptions were organized to characterize views of data privacy. Those identified are: perceived control; perceived risk; value of privacy; and perceived benefits. Table 2 summarizes the meaning of these illustrating them with responses

Based on focus groups responses, participants were ranked as low, medium or high on the four perceptions. Figures 1 illustrates of our rankings which were similar across the four locations.

[1] The study is supported by the U.S. National Science Foundation (SES-1447589) and the Alfred P. Sloan Foundation.

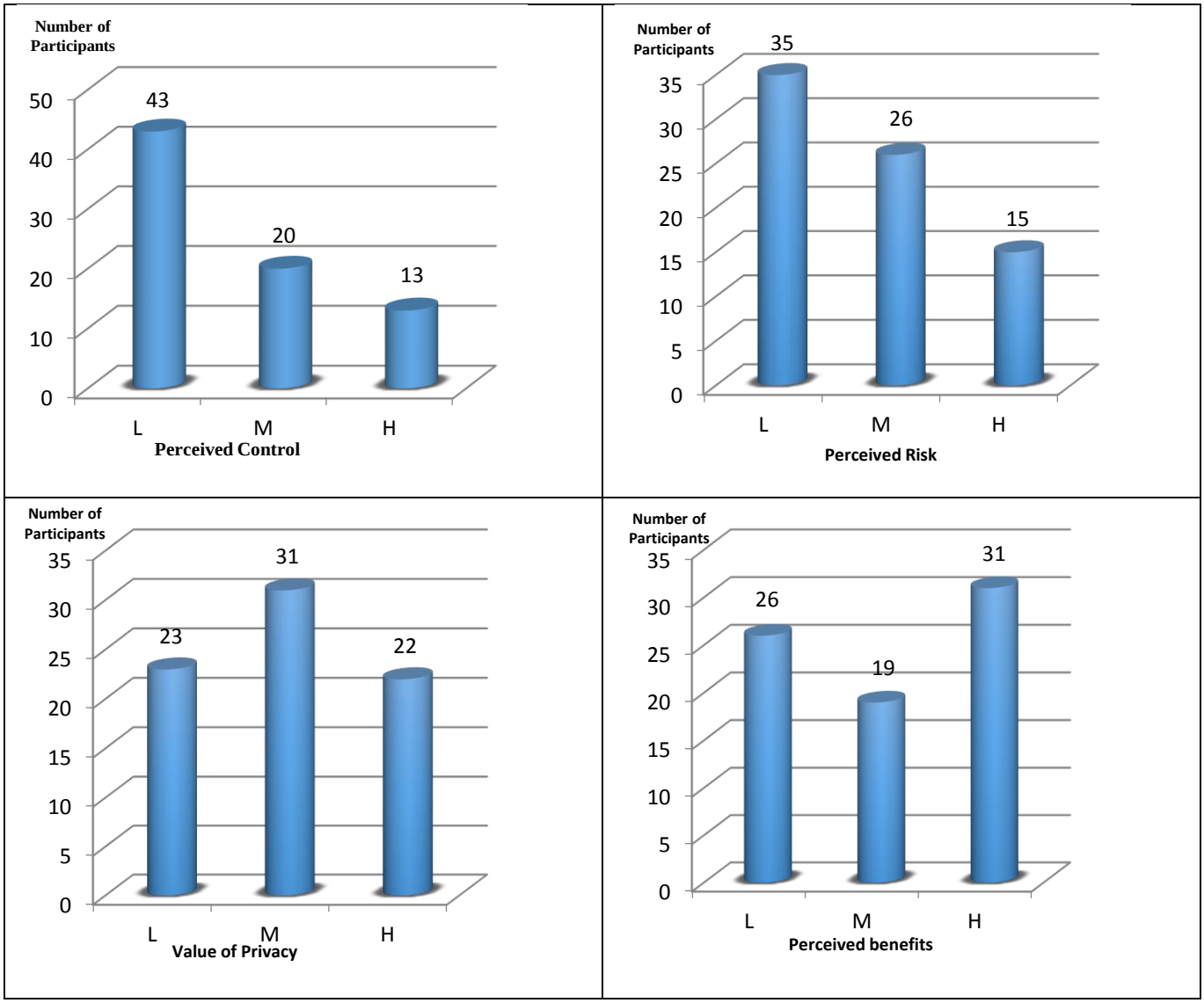
Table 1. Participant demographics

	# of Participants		# of participants		# of participants
Home Ownership		**Education**		**Employment**	
Own	70	High school	9	Full-time	52
Rent	6	Some college	10	Homemaker	9
Age		2 yr degree	13	Part-time	3
18-33	11	College graduate	31	Retired	10
34-45	29	Post graduate	13	Unemployed	2
46-59	24	**Income**		**Smart meter**	
60+	12	<$50K	7	Don't know	7
Gender		$50-75K	33	No	27
Male	38	$76-100K	20	Yes	42
Female	38	$101-125K	6		
		>$125K	10		

Table 2. Consumer perceptions of privacy

Perceptions	Definition	Examples of high and low
Perceived control	Power to control access to personal data and protect oneself from intrusions.	High:" Most things are safe if you have passwords." Low: "If guys are really good they can hack into anything"
Perceived risk	Belief about the potential harm from a loss of privacy and likelihood of occurrence	High: ""There are crazy killers and pedophiles out there…" Low: "This is the future."
Value of privacy	Importance placed on protecting one's privacy	High: "I don't want my neighbor knowing the amount of energy…" Low: "I don't have anything to hide. They can access all my data."
Perceived benefits	Realized benefits customer see as fair exchange from access to their data	High: "I would love to know which devices in my home pull the most energy." Low: "I'm from an older generation where you turn off lights when you leave a room."

Figure 1 Rankings of Consumer Perceptions



Participants perceive a low level control over access to their data or how it is used. Twice as many participants feel that the risk of privacy loss is low than see it as high, even after reviewing scenarios where it was compromised. One explanation is people believe their privacy is already invaded and the additional threat from smart meters is not very high. Value of privacy was evenly split between low and high, with some saying "I've got nothing to hide" [1] while others were concerned about "Big Brother". Perceived benefits were split closely between low and high. This was influenced by high electrical bills (hence, the potential savings), time spent monitoring energy use, and comfort with using technology to manage their lives.

Preliminary results illustrate the tradeoff between the perceived benefits and perceived risks which will shape the overall attitude towards data collection by utilities. Higher perceived benefits and lower perceived risk result in more favorable attitudes and willingness to participate in energy management programs. Attitudes will be moderated by their perceived control over the data and the value placed on privacy. Higher perceived control will moderate concerns over potential privacy and security risks. Those who value privacy will be cautious towards data collection, sharing and use and demand greater privacy protection from utilities and other third parties.

Utilities efforts should attempt to provide clear, understandable communications on potential benefits to consumers, such as better management of their energy use and resultant savings, as well as how the data is used by utilities and third parties to improve services. Preliminary interviews with utility representatives stress the importance of crafting consumer friendly communications and implementation of

opt-in or opt-out policies with steps taken to protect customer data from unauthorized access.

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Privacy Responsibility and Company Performance

A Qualitative Comparative Analysis

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Data and information have gained enormous importance in our so-called 'Information Society'. Data are a valuable factor, and many companies derive a competitive advantage from data [1]. However, data collection by companies interferes with peoples' privacy expectations. Privacy as the "right to be let alone" [2] or the "claim of individuals, groups and institutions to determine for themselves, when, how and to what extent information about them is communicated to others" [3] is loaded with various expectations towards the organizations, collecting, processing and storing data. Fulfilling peoples' expectations towards respecting their privacy may increase trust and loyalty towards a company [4] and hence influences companies' reputation.

At the same time, it is quite challenging for companies to take into account peoples' expectations, as it means collecting only those data which are necessary to fulfill a certain task [5, 6]. It is a fact that companies have an interest in collecting more data for various reasons, e.g. targeted marketing; for example, during a visit of a website [7-10] a lot of data is collected automatically and - even worse – submitted to third party providers. To overcome reluctance of customers to provide their data, privacy statements are provided on the websites. The disclosure of information about which data are collected and why can be voluntarily or required by law. Various laws and regulations on local or global level influence legal requirements of privacy statements. Hence, guidelines [11, 12] and tools [13] provide support to companies in developing legally-approve privacy statements. For example, the seven principles to realize privacy protection "include notice; choice; onward transfers to third parties; security; data integrity; access; and enforcement" [14]. The statements cover measures like cookies, encryption, anonymization and pseudonymization [15-18]. When done properly, companies' privacy statements strengthen trustworthiness [19], increase customer loyalty [4], reduce uncertainty [20] and create a feeling of transparency and fairness [19, 21]. However, due to data breaches happening lately and increased privacy awareness of customers, pure legal and technological statements have been criticized in the media as being useless for both parties. Thus, companies have started to add statements of the responsibility for the collected data as a part of the increasingly widespread subscription to Corporate Social Responsibility (CSR) [22, 23]. While CSR commitment has become more common, it is not yet clear whether it actually "pays off" [24, 25]. There are research findings that suggest that CSR commitment ought to be advantageous. By adding information beyond the pure legal or technological measures, a company implicitly adopts responsibility [26]. Voluntary disclosure of reports or statements beyond legal and technological measures have also been identified as means to establish trust and loyalty [19, 27]. In addition, information disclosed via statements and reports is a first basis for making decisions like investments, partnerships or becoming a customer [28]. Underlying concepts for voluntary disclosure have been found in agency theory, signaling theory, capital need theory and information asymmetry [29].

Research Aim, Research Design and Methodological Approach

In this research, we want to investigate if adopting privacy responsibility positively influences companies' reputation. To achieve this goal, we investigate privacy statements representing companies' approach to privacy towards the wider public. We assume a causal relationship between privacy responsibility, expressed in various statements and reports, and companies' reputation. We refer to privacy responsibility as the 'responsibility a company accepts and expresses for the protection of the data collected and stored by them'. We identify three topics in privacy statements and reports: (a) legal topic, represented by laws and regulations; (b) technical topics represented by security and data protection measures; and (c) responsibility topic, represented by the awareness and importance of privacy expressed in privacy statements and reports. Furthermore, we assume that there are latent structures in the documents that reveal more than only three topics. These topics are independent variables in our research having a causal relationship with company's reputation. We identified companies' reputation as the dependent variable. However, a clear understanding what reputation means is missing. Therefore, we ask: "Does privacy responsibility positively influence companies' reputation?"

We apply two different methods to answer the research questions. On one hand, we apply Latent Semantic Analysis (LSA) to analyze the documents and gain an understanding which of the independent variables are at hand. LSA allows investigating the latent structures in the documents as well as similarities between documents [30]. Thus, we reduce dimensions of text to reveal underlying structures without losing relevant information [31]. After describing the dependent variables, we apply qualitative comparative analysis (QCA) to analyze the causal relationship between the art and level of self-disclosure and the company's reputation. QCA is a set-based approach suited for the analysis of small to medium

samples; essentially, QCA examines the combination of variables in data sets [32]. The data sample consists of privacy statements from companies' websites, responsibility reports from a specific database (Global Reporting Initiative) and reputation indicators. In a next step, we will collect the data and pre-process it. Decisions concerning the reputation indicator of companies are required. In parallel, we will develop hypotheses.

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Taking Responsibility for Online Self-disclosure

The thin line between a company's user orientation and user surveillance

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Companies using the Internet for their business to consumers (business-to-consumer; B2C) frequently require users to disclose personal information (PI). For instance, for establishing legitimacy [e.g., 1] or authentication [e.g., 2, 3] users have to confirm their identity. For online sales, the user has to disclose PI such as full name, address, and credit card details for payment and fulfilling invoicing requirements [3, 4]. User profiles (based on user characteristics and/or behavior) are necessary for offering personalized services that are tailored to the individual (e.g., recommender systems [5]) [2, 6]. Similar user profiles are required for better targeting advertising campaigns [7]. What is more, online social networks (e.g., Facebook) and other social media services would be nonexistent without having users disclosing PI [8]; providers of such services build their entire business on users' self-disclosure. In a nutshell: users' online self-disclosure (OSD) is highly valuable for companies, allowing the latter offering their services and running effective marketing campaigns.

However, for users it is not always favorable to provide PI openly. In fact, revealing too much PI may be problematic [9-11]: The digital availability of PI facilitates copying, transmitting, and integrating such information easily, and the exploitation of PI could, thus, result in serious threats which can be both financial and social if in the wrong hands [9, 10, 12-14]. Aware of these threats, users attempt to "hold back" some PI to maintain the level of privacy that they wish to maintain [15]; they struggle in finding their balance in the tension between their desire to self-disclose and the desire to protect themselves [16].

Still, users' self-disclosing behavior is manipulable. For instance, Bauer and Schiffinger [17] found that system-based variables, such as system functionality and usefulness, have a substantial impact on OSD and are at least moderately effective. This fact would allow companies to purposefully "shape" users' self-disclosure. In short, companies could use system design to either manipulate users to disclose less or more PI.

But what is the role of the company in this context? Is it morally okay to exploit users' PI for their own profit? Or do companies have the responsibility to remunerate users whose PI they exploit? Do companies have the responsibility to protect users from self-disclosing too much?

There are two sides. One side supports that companies have to respect the users' desire for privacy and cannot collect and exploit at all their PI for the companies' profit. The other side claims that if users give away their PI abundantly and freely (e.g., on online social networks), why not use it; those that do not want to provide their PI should not use the offered service. Total surveillance and full privacy are the two extreme poles, of course. Hybrid forms are possible and currently reality.

But how should a company decide what to do? Several strategies are conceivable:

- Privacy by design: Privacy by design – an example of value-sensitive design – is an approach to systems engineering that takes privacy into account throughout the entire engineering process [18]. This approach has, though, been critiqued for being vaguely defined, leaving open questions in how to apply this approach when engineering systems [19].
- Situationalization: Situationalization [20] refers to using information characterizing the present situation based entirely on (physical) context that is not related to an individual or group of individuals (non-personal aspects); examples are location, time, atmospherics, or the social environment. In contrast to personalization, situationalization eliminates the need for person-related data (i.e., PI) [7]. As a result, this approach does not require users to self-disclose. And besides being privacy-sensitive, it may even be more effective than a personalization strategy [7].
- Privacy seal: Another strategy is to provide a privacy indicator, statement, or seal to informs users about the privacy efforts of that company [21]; this strategy may be used in addition to privacy by design or a situationalization approach. Privacy seals have, though, been reported as having only moderate effects on self-disclosure [22]. A responsible company will never show a privacy seal or statement to its users and not adhering to the stated policies.
- Transparency on PI use: Collecting and leveraging users' PI and clearly informing them – in advance – about data use is another strategy that companies may follow. The problem with current practice is that many companies have long data policy statements that are

little informative and/or hide the relevant statements on PI processing. A company taking the responsibility role seriously will definitely put effort in making their policy transparent and understandable to the average user.

- Service duality: Another strategy could be to offer two systems/services with different functionality, so that users with different attitudes towards self-disclosure and PI use may be served with different systems/services. Although this duality in service offering implies additional costs, these costs may be balanced by service pricing: Some people may pay for maintaining their privacy, whereas others may pay a higher fee for getting access to additional features in exchange for providing more PI to the company. This will potentially lead to the same (higher) price for the service for both user groups.

While this work-in-progress cannot provide answers to *how* a company may decide on the preferred strategy, the above non-exhaustive enumeration offers an overview of available options. Further research is necessary for investigating both the feasibility and impact of the various strategies.

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The dark side of Web 2.0

From self-marketing to self-destruction of music artists

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Web 2.0 and social media have triggered radical changes in the very fundament of music business [1]. In times before the Internet era, the music business was characterized by a standardized process including the creation, selection, distribution, and consumption of music. The roles of the involved market players (e.g. composer, lyricist, performer, producer, etc.) were clear-cut. Yet, in the early days of music business, in some market segments within that business (particularly in the recording industry) only few large-scale companies dominated the market; in other words, the market was a highly concentrated market. These few powerful and profit-oriented enterprises were dominating the market, pre-selecting and determining which musical works should hit the market. However, with the evolution of Web 2.0 and its new possibilities for home recording available at relatively low-cost and easy to handle, a myriad of music items have been released on the Web [2].

The main consequences of that development are the following: (1) the overall amount of music items available increased drastically, as there are now tens of millions of music items available at a consumer's fingertip [3]; and (2) the ratio between (professional) high-quality music and low-quality music shifted towards an overall deterioration.

This, in turn, has an impact on every market player involved in the music business:

Impacts from the viewpoint of the consumer: The supply of music items is perceived as overwhelmingly large. Novel recommender systems and interaction techniques for music consumption may seem to support navigating the wide choice of music items [3]. Still, recommender systems based on music meta-data cannot satisfyingly handle the diluted offer of high and low-quality music. In other words, for consumers it is more difficult and complex to find the "good" music in the ocean of the diluted supply with high-quality and a relatively large amount of low-quality music items.

Furthermore, the spread of broadband Internet in the beginning of this millennium allowed consumers to share music over the Internet. As no (or few) commercial online music platforms were available at that time, soon file-sharing platforms such as Napster evolved. Together with the lack of understanding that piracy is unlawful, the main message conveyed was: "music is available for free", which is a slogan based on misconception that seems to have invaded consumers' attitude towards digital goods, and particularly towards music [2].

Impacts from the viewpoint of the industry: A consequence of the high availability of free music on the Internet led to losses on the music market. On the one hand, file sharing and an overall increased amount of music items (either cheap or for free) on the Internet led to severe losses in terms of revenues. On the other hand, although the total number of consumed music item had increased (increased turnover), overall revenues decreased; in other words, music has become cheap(er).

Furthermore, new players have entered the music market such as those who make their music (i) directly available on the Internet or (ii) through aggregators (which, in turn, are also new players in the music business). The new players initiated a power shift by circumventing the few big players from the "old" music business (e.g., EMI was taken over by Universal Music) [1, 4]. As a result of this development, the "old" players have to invest more resources in holding their market position, and therefore there is less money available to be invested in newcomer artists (new acts).

Impacts from the viewpoint of the "average" artist: Web 2.0 and social media have highly influenced artistic activities [5] and the way how music is presented and made available. Current and future artists have to adopt such activities for living and/or making a career out of their work [5]. This also affects education programs, as artists have to be prepared for these activities including the development of appropriate management and technological skills, cf. [5, 6].

Although a relatively small number of artists earn enormous amounts of money [7, 8], the income of the "average" artist is much lower than in the income comparable professions [7, 9-11]. In other words, the music market is a 'winner take all' market [7, 10] or also referred to as the 'superstar phenomenon' [9, 10]. On average, artists in the music business are threatened by "precarity" (in German: 'Prekariat', a novel term in sociology describing those groups

of individuals that have to face living conditions with a lack of job security, including underemployment or undertaking extensive low or unremunerated activities that are essential if they are to retain access to jobs and to decent earnings [12, 13]). This phenomenon it particularly severe for professional artist with music education that have to make a living from music and do not earn their living from non-artistic activities. While precarity was already a fact for music artists before the Internet era, this phenomenon has become more widespread due to the massive appearance of new amateur "artists" on the market, and partly to the devaluation of music with the evolvement of Web 2.0 and social media.

The (initial) intention of platforms (e.g., YouTube, SoundCloud, MySpace, etc.) is to offer music (with video) for free to draw (new) audience. For example, if an unknown artist publishes a very good music video clip on YouTube, he or she (most likely) hopes to be "discovered" to get a (label) contract or more gigs. Still, this behavior results in a consumers' expectation that music is free of charge, especially as many (amateur) productions are available. Hence, precarity is also stimulated implicitly, but to a major degree, by the online behavior of artists themselves. Their behavior makes the platform owner the only "winner" in such settings. The platform owner does not even contribute to the value of any music/art; he generates enormous profit through advertising revenues, which in turn are a result of the high number of content, the high number of platform users and the high number of their clicks.

Concluding, artists seem to "dig their own grave" by making free online products available. Free online music makes it impossible to get fair pay for music items. What seems to be a good possibility and marketing activity for an individual artist in the short run, turns out to be an irresponsible act of self-destruction for the entire community of music artists in the long run.

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Towards an Understanding of Smartphone Usage to Assess its Implications on People & Society

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The technical development of Smartphones and involved technologies evolved them into very powerful microcomputers with plenty of different functionalities. This finally revolutionized the way people interact with their device and with each other. In South Korea, the country with the highest Smartphone adoption rate worldwide, 88% of the inhabitants were using Smartphones in 2015. Spain as Europe's member with the highest penetration rate reached 71% at least. Despite local differences, increased smartphone penetration is seen as global phenomena [1].

The aim of this research is to better understand Smartphone usage and investigate the consequences of the usage on people and society. The question why people start to use smartphones therefore serves as starting point. In order to get a better understanding of the adoption process, the well-established technology acceptance model (TAM) serves as basis [2]. As the basic TAM model does not seem to sufficiently explain the high Smartphone penetration, the concept of technology addiction was used to investigate inflated behavioral usage intention. Technology addictions refers to a mental health condition that is characterized by a maladaptive dependency on the use of technology [3]. In this study, perceived security and perceived enjoyment was incorporated into the TAM model as they were found to be important in the Smartphone context. Results from this study demonstrated the predominant influence of enjoyment in the Smartphone context [4]. It was also interesting that perceived security does not seem to influence the Smartphone usage behavior, despite its importance as demonstrated by Leavitt [5] and its importance for the modern workplaces [6].

As Smartphone usage is matured nowadays it seems logical to deeper investigate the usage instead of the adoption process, post-acceptance models are considered to continue the research on the Smartphone phenomenon. Bhattacherjees Post-Acceptance Model of IS Continuance serves as basis [7]. Briefly explained, this model posits that confirmation influences the perceived usefulness of the IT-artifact and satisfaction about its usage finally leads to the intention to continue its usage. Due to the findings of the previous work, the hedonic perspective, respectively enjoyment, as well as security and privacy risk perception are incorporated into the model and are investigated more explicitly. The aim is to get a better understanding of the importance of enjoyment and investigate whether continuous usage might neutralize believes about vulnerabilities and related risks. It might be possible that privacy and security concerns are neglected despite their growing importance.

This importance is derived from the fact that modern Smartphones grew into a treasury of (sensitive) information stored on the devices with their enormous storage sizes. But the Smartphone additionally serves as "key" to cloud services, email- and other accounts, cars, homes, to only name a few. With their sensors and network connection Smartphones, respectively their apps and their usage, have high privacy intrusion capabilities. On the other hand, Smartphone users generally tend to have low security awareness [8]. This is dangerous given that making payments with the Smartphone is becoming more and more popular. This does not only cover the usage of online banking applications and sensitive login-data readily stored on the device, but also the NFC capabilities.

For this study log-files of Android Smartphones were collected and are analyzed alongside a quantitative questionnaire based on relevant literature, adapted to the Smartphone context. The log-data shows, amongst other things, a snapshot of installed applications and allows to search for occurrence of applications that are prone to serve as privacy risk. The questionnaire and the information of the device further allow to assess whether the user shows addiction tendencies. This is done via the Smartphone addiction scale by Kwon et al [9] alongside metrics retrieved from the log files [10].

We posit that continuous Smartphone usage unveils interesting effects: The longer and the more intensive a Smartphone is used, the lower the overall suspiciousness about privacy and security becomes. Applications that are demanding a lot of permissions were granted them, otherwise they would not work. People think that as they already granted that much permissions, it does not matter if another application also receives them. Establishing connection to unsecure networks is another security threatening practice that might not be typical for a Smartphone adopter, but once getting used to be always-on and being addicted to the Smartphone, the barriers are lowered.

Continuous usage and addiction to Smartphone usage might weaken the own security conception about Smartphones to a dangerous level. Given the BYOD trend, this should be kept in mind. Employees might undermine the whole security conception of a company because they neglect the risks and store sensitive company information and login-data to company network and to various services.

The next steps in this work-in-progress are to evaluate the collected data from the questionnaire, supplement it with data from the log-files and examine the latter for clusters that might help to push the research into directions not considered yet.

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Where is the Green in Industry 4.0?
or
How Information Systems can play a role in creating Intelligent and Sustainable Production Systems of the Future

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Industry 4.0 – the last Chance for Truly Sustainable Production

Industrial organizations are facing substantial challenges due to a new industrial (r)evolution taking place. The so called Fourth Industrial Revolution (aka Industry 4.0) propagates an increasing digitalization and intelligentization [1] of production processes which inevitably will lead to a higher degree of automation and autonomy of future production systems. Industry 4.0 can be understood as both a "political-economical" program to re-industrialize Europe[1] [2], [3] but is also a "techno-logical" consequence of current developments in industry and science [4]. Accordingly, production technology will interweave with information and communication technology to form intelligent networks of factories, machines, devices, materials, and workers, which fulfills highly individualized customer demand in a highly responsive manner.

However, at the dawn of Industry 4.0 and the common excitement about the potential rise of European industry it seems that sustainability as an important and highly interrelated goal of European policy makers has been lost out of sight. In this article, I argue that a new industrial revolution has to take into account the pressing problem areas (e.g. growth of human population, environmental pollution, decrease of natural resources, climate change), modern society faces. I will argue for a fourth industrial revolution that is not only targeted at leveraging competitiveness but is also built upon the concept of sustainability as a basis for a long-term economic prosperity and welfare. I argue for information systems as a major enabler for this vision. Finally, I will present an exemplary implementation of an information system that facilitates the evaluation of the ecological impact of a production process.

[1] Similar initiatives can be found all over the world, e.g. Industrial Internet, Smart Manufacturing in US and in Japan

From pure Intelligence to Rationality and Sustainability in Production of the Future

Establishing smart and intelligent networks, factories and machines is a recurrently mentioned goal of Industry 4.0. While I consider a "smartness" as a limited intelligence, which enables a company to gain a competitive, advantage in the short-term I consider an "intelligent" production system something more far reaching. Ideally, an intelligent system is capable of taking into account long-term impacts of decisions. In the following I will firstly summarize the concept of intelligent production systems as it is propagated by the Industry 4.0 visionaries and subsequently will extend this concept with regard to ecological sustainability.

Intelligent production systems as conceptualized by Industry 4.0 visionaries are production systems where the production factors act intelligently on the individual and on the aggregate level. To be more concrete, in an intelligent production system material, parts, storage systems, transport systems and manufacturing machinery have an identity, have the ability to process information, have the ability to evaluate information, make decisions and interact with their environment. Such a system requires all subsystems to be well equipped with sensors, embedded software and actuators that continuously and ubiquitously generate and exploit data to be able to plan and execute concrete actions. A major enabler of such intelligent production systems will be the consequent vertical and horizontal integration of subsystems. Vertical integration refers to the data integration of the "virtual" planning layer (e.g. an ERP system) with the "physical" world of the shop floor. Horizontal integration refers to the data integration of different production processes, e.g. manufacturing with assembly and also out-sourced processes.

The promise of an intelligent production system in the above sense is mainly that human interventions are reduced

to a minimum, flexibility regarding individual customer demands (lot-size 1) and adaptivity regarding environmental changes (e.g. changing market price of materials, failure of suppliers) is increased to a maximum. The guiding principle behind such intelligence is and has always been to satisfy one or more of the typical objectives of production management: inventory, throughput-time, utilization and delivery date adherence. Objectives regarding the minimization of the ecological footprint of a production order are typically not explicitly formulated or are not part at all of traditional production optimization problems.

Industry 4.0 does not explicitly refer to ecological sustainability of production systems as a major objective of its program. However, the production technology and operations research community has addressed ecological impact and sustainability in various ways throughout the past decades [5]–[8]. Linking the rather limited concept of intelligence form the Industry 4.0 vision with well-established theories, concepts of sustainable production is at hand and needs to be accomplished to arrive at a truly intelligent and therefore also ecologically sustainable production systems of the future. I hypothesize that only those production systems that incorporate sustainability in their concept of intelligence will be competitive in the long-term.

A Promising Application Example of an Information System for Evaluating the Greenness of the Value Chain

In the production domain a production process is typically conceptualized as a value stream. The value stream is the set of activities that lead to the final customer ready product. The notion of value stream points to the added value as the measure of an activity's importance within the production process regarding resource allocation. Identification of activities together with evaluation of their resource allocation is usually performed through Value Stream Mapping (VSM), a practical method originally developed by Rother and Shook [9]. A major goal of VSM is the identification of "waste". Waste in the sense of Lean Management are activities that do not contribute to the value of a product, e.g. the set-up of a machine or the cleaning of a work place. In other words, "waste" are those activities that consume resources without contributing to the utility of a product. The original approach of value stream mapping expresses waste solely in terms of time and related costs.

In a project recently conducted by the Institute of Management Science and Fraunhofer Austria an information system has been developed that takes up the concept of the value stream to evaluate the ecological footprint of a production process [10]. To do so, a software tool has been developed that allows for the graphical sketch-up of the value stream of production facility as the basis for a subsequent systematic collection of ecologically relevant data and its effective visualization along the value stream. Thus, it is not only possible to systematically describe production processes in terms of costs but also in terms of the ecological impact. The combination of a well introduced and accepted graphical method[2] to sketch a value stream with the visualization of "greenness" indicators has the potential to raise awareness for ecological sustainability of a product and its related process. Consequently, production processes can be evaluated for their sustainability during design and run time. Decisions regarding the appropriate resources and technology to be used for a production process can be made more easily and in early stages of product/process engineering.

[2] VSM is well introduced in typical production departments of any industry

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We would like to thank you for your participation and attendance at our recent 1st GRES-IT/IS workshop in Vienna. Your presence, together with your active contributions, feedback and ideas, was greatly appreciated and has gone towards making this event an exciting experience for all participants.

Special thanks to Christine Bauer, Edward Bernroider, Roman Brandtweiner, Silvia Gundacker and Regina Ziegelwanger, who collectively have worked to make this workshop happen.

I am looking very much forward to meeting you at the 2nd GRES-IT/IS Workshop, 2017.

Information about the workshop can be found on the website:

https://www.wu.ac.at/en/imc/research/workshops/first-workshop-on-green-it-and-is-the-corporate-perspective-gres-itis/

Cheers,

Barbara Krumay