

**Four essays on the entanglement of career choices and gender in the information
and communication technology industry**

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I. PREFACE

1. Introduction

The headstone for the development of the information and communication technology industry (ICT-industry) was laid by John von Neumann who published the report “A First Draft of a Report on the EDVAC (Electronic Discrete Variable Automatic Computer)” in 1945 (Campbell & Aspray, 2004). What began with a written report has become one of the most robust industries in the world and therefore is one of the key drivers for economic growth (EconomyWatch, 2010). Nowadays, it has developed itself into an irreplaceable industry that supports and touches nearly every facet of global economy and individual interactions. Over the past years the ICT-industry has continuously expanded its areas of operations, number of employees, and has increased its global growth and productivity, while the trend is still rising (Dutta, Lanvin, & Geiger, 2015). However, studies show that especially knowledge-based industries, such as the ICT-industry, are dependent on a continuous supply of a skilled workforce, that enriches the industry with innovative technological ideas, creativity and solid manpower in order to facilitate its sustainable growth and to ensure its continued existence (Arora & Athreye, 2002; Arora & Gambardella, 2006; Namvar, Fathian, Gholamin, & Akhavan, 2010; Powell, & Snellman, 2004; Youndt, Subramaniam, & Snell, 2004).

Considering the ICT-industry’s dependence on skilled workers, it is alarming that countries around the globe such as the majority of the OECD countries (OECD, 2012) or the majority of European countries (Hüsing, Korte, & Dashja, 2015) are facing a shortage of skills in the ICT-industry. For example, Hüsing et al. (2015) find that in 2012 there was a demand for 73.000 skilled employees for “ICT business and management structure” and 201.000 vacancies regarding “core ICT practitioners” and “other ICT technicians” for the EU-27 and the tendency is still rising. Studies depict that this creates a considerable threat to the industry’s growth. Guthrie and Datta (2008) reveal that a decrease in number of employees is negatively linked with a firm’s performance and that this is moderated by the type of industry, showing a greater effect in knowledge-based industries. In addition, Forth and Mason (2006) show that shortage of skilled employees has a direct negative effect on firm performance.

I state that there are two basic options in order to encounter the shortage of skills in the ICT-industry. The first option is to activate an untapped potential of under-represented vocational groups such as ethnical minorities or female employees. The second option is to understand the motivation profile of people who enter the ICT-industry in order to derive adequate implications and set incentives to attract more people with similar motivation structures to the industry. In the following I will illustrate the two options in more detail.

Regarding the first option of activating under-represented vocational groups, studies mainly focus on the encouragement of female employees to opt for a career in the ICT-industry (Ahuja, 2002; Beise, Myers, VanBrackle, & Chevli-Saroq, 2003; Camp, 1997; Trauth, Nielsen, & von Hellens, 2003; von Hellens, Pringle, Nielsen, & Greenhill, 2000). Reasons for the encouragement of females can be traced back to industrial-level and firm-level aspects. On the industrial-level there is a widespread belief that the ICT-industry compared to other STEM-fields (such as manufacturing systems engineering, laboratory-based fields, etc.) and its distinct characteristics do have the potential to be a women-friendly environment and an attractive workplace for women due to factors such as flexible working hours, extended home office possibilities, physically less demanding white collar jobs, comparatively high salary, equal pay for equal work, non-discrimination policies, etc. (Aguirre, Hoteit & Sabbagh, 2012; Bhattacharyya & Nath, 2011; Kumar, 2001; Shanker, 2008; Upadhyya, 2006). It is argued that the growth of the ICT-industry will provide an opportunity and platform for women to be vocationally at par with their male peers (Antonelli, 1991; Perez & Soete, 1988; Shanker, 2008; Upadhyya, 2006) and that it can be molded to the requirements as it is still at its infancy.

On the firm-level results regarding a gender-diverse workforce are heterogeneous. On the one hand, studies reveal nonsignificant or negative effects of a gender-diverse workforce on various outcome variables (Baugh & Graen, 1997; Colquitt, Noe, & Jackson, 2002; Pelled, Eisenhardt, & Xin, 1999). These studies often focus on analyzing the effects of gender diversity in areas such as government agency (Baugh & Graen, 1997), production (Colquitt, Noe, & Jackson, 2002), sales (Jackson & Joshi, 2004), or electronic divisions (Pelled, Eisenhardt, & Xin, 1999). On the other hand, studies have demonstrated a positive effect of a gender-diverse workforce on a compa-

ny's growth and performance (Campbell & Minguez-Vera, 2008; Mahadeo, Soobaroyen, & Hanuman, 2012). Studies have shown that females and males possess different sets of skills, knowledge, and perspectives, which contribute to higher levels of creativity and innovation (Bantel & Jackson, 1989; Bowers, Pharmed, & Salas, 2000; Taylor & Greve, 2006) as well as higher quality of decision-making (Erhardt, Werbel, & Shrader, 2003; Rogelberg & Rumery, 1996), which are critical success factors in a knowledge-based and rapidly changing environment such as the ICT-industry. Moreover, by including females, organizations are able to better understand and address the needs of female stakeholders – female clients, female customers and female job applicants (Ali, Kulik, & Metz, 2011; Carter, Simkins, & Simpson, 2003; Cox & Blake, 1991; Hillman, Shropshire, & Cannella, 2007; Robinson & Dechant, 1997). Lastly, the presence of females in a company signals advancement opportunities for women within the organization (Deszö & Ross, 2012; Milliken & Martins, 1996; Welbourne, Cychota, & Ferrante, 2007; Wright, Ferris, Hiller, & Kroll, 1995), which also inspires lower-level female workers (Deszö & Ross, 2012; Mattis, 1993).

Despite empirically investigated advantages the under-representation of females in the ICT-industry is still evident on multiple levels, ranging from undergraduate and graduate enrolment to positions in industry and at universities. In this regard, we find various theoretical concepts to explain the under-representation such as the 'glass ceiling effect' (Bryant, 1985), 'leaky pipeline' (Schiebinger, 2001), 'traditional gender-roles' (Coppock, Haydon, & Richter, 2014), or 'restricted access to networks' (Ibarra, 1993). However, these concepts are not only used to explain the under-representation of females particularly in the ICT-industry, but are generally used to explain the under-representation of females in male-dominated vocational fields. I argue that these explanations play a subordinate role and are not sufficient for understanding the under-representation of females particularly in the ICT-industry. In order to understand this phenomenon and thus derive apt implications for the increase of female workers, we first need to have a clear understanding of what determines their career choice in general and second to consider ICT-specific characteristics that may facilitate or hinder their choice. This will enable us to address the correct aspects when deriving implications for the increase of females in the ICT-industry.

The second option to encounter the shortage of skills is to understand the profession in the ICT-industry and thus to address the question, what types of people enter this specific industry based on their motivation structure in order to derive more tailored implications. As the ICT-industry is an industry of the New Age, which we have engaged with for a very short period of time, we are less experienced with professions and career choices regarding the ICT-industry. Our knowledge regarding the understanding of professions and career choices is mainly shaped by professions of the Industrial Age and yet does not fully inform us about how to handle the new characteristics of the Network Age (Denning & Dunham, 2001). Especially, the ICT-industry displays a combination of new characteristics such as fast obsolescence of knowledge, high dynamics of new technologies combined with high salaries, and high demand of skilled workers that offer an opportunity, but are also a challenge for employees. Therefore, an understanding of the motivation structure of the people attracted to the ICT-industry will enable us to derive concrete and fitted implications for practitioners regarding the expectations and motivations of people in order to attract an increased number of people to the ICT-industry. In addition, with regard to the under-representation of female employees it may also assist us to attract those females who are, based on their motivation structure most suitable for the ICT-industry, and therefore are more likely to persist in that field.

I argue that in order to encounter the shortage of skills in the ICT-industry and to derive implications regarding the increase of skilled workers, we need to understand the career choices of individuals regarding the ICT-industry, especially that of females, and to comprehend what kinds of people are generally attracted to the ICT-industry based on their motivation structure. In this regard, I state, that we cannot apply prevailing assumptions and general explanations one to one, but need to take ICT-specific characteristics into account. By doing so, we will have to contextualize concepts and theories accordingly.

Among the career choice theories, the Social Cognitive Career Theory (SCCT) by Lent, Brown, and Hackett (1994) offers vast possibilities for researchers to view the concept and development of career choices from different angles and to adjust the core components of their suggested framework to the examined situation. Moreover, it is one of the most utilized frameworks regarding the analysis of career choices because it in-

cludes person as well as context factors. While person factors focus on personal beliefs, values, demographic aspects, etc., context factors also take circumstances of the external environment of an individual into account. Due to this distinction, researchers are able to understand individual-level, but also contextual-level components that a career choice is comprised of. Therefore, the theoretical considerations of this thesis will be drawn within the premises of the SCCT and tailored to the context of the ICT-industry. By contextualizing the concept of career choices through the inclusion of ICT-specific characteristics the thesis follows the call of Lent, Brown, and Hackett (2000) and Sheu, Lent, Brown, Miller, Hennessy, and Duffy (2010) to include context factors when considering the career choices of individuals instead of focusing on person factors exclusively.

To sum up, it is the aim of the dissertation to shed light on the possibilities to encounter the shortage of skills in the ICT-industry which are to analyze the career choices of individuals regarding the ICT-industry, especially that of women, and to understand the motivation structure of people attracted to the ICT-industry based on the theoretical considerations of the SCCT. I will address these aspects in four separate articles. The first three articles focus on the first option to encounter the shortage of skills in the ICT-industry by analyzing the career choices and persistence of individuals regarding the ICT-industry, and especially that of women. The fourth article addresses the second option of encountering the shortage of skills in the ICT-industry by analyzing the motivation structure of people attracted to the ICT-industry. In the following I will give a brief overview over their main contents before I give a detailed summary of the articles in the next section.

In the first article, I will focus on the career choice itself and identify core components that a career choice regarding the ICT-industry is comprised of. Moreover, I will discuss gender-specific differences among the core components to analyze at which points career choices regarding the ICT-industry deviate among females and males. This is to first of all have a clear understanding of the factors that affect a career choice of individuals regarding the ICT-industry and second to identify set screws regarding gender-specific differences.

In the second article, the thesis focuses on the Indian ICT-industry as a best practice example that has successfully encountered the under-representation of females

in the ICT-industry. The Indian ICT-industry consists of a comparably high percentage of female employees, namely 35% at the entry-level, but at the same time struggles with high attrition rates at higher levels. This leads to female under-representation in higher levels of the industry. Therefore, the Indian ICT-industry serves as a best practice example for attracting women to the ICT-industry, and simultaneously assists us in understanding the reasons why they tend not to stay.

In the third article, the thesis focuses on the stability of career choices by analyzing the short- and long-term persistence of females and males in computing disciplines. We focus on students' planned short- and long-term persistence as we are particularly interested in analyzing which factors already at a university level increase or decrease their planned persistence. Moreover, we reveal gender-differences in the short- and long-term persistence among them.

In the fourth article, the thesis analyzes the motivation structure of people that plan to enter the ICT-industry. This is to identify what kinds of people are attracted to the ICT-industry and to reveal differences in their vocational behavior, namely their probability of entering the ICT-industry. By doing so we are able to offer starting points for companies regarding the alignment of their recruiting strategies to distinct motivation profiles that reveal a high probability of entering the ICT-industry.

All four articles are stand-alone articles that have a separate introduction and conclusion. They contain all necessary information for their understanding and are formatted according to the style guidelines of the AMJ (2014). All four articles have been discussed and reviewed in various internal seminars within the Chair of International Management at the University of Passau and the Faculty for Business Administration and Economics and partly in international conferences.

In the following I will give a detailed overview over the four articles that the thesis is comprised of. As I am the single-author of the first article, but co-author of the other three articles, I will outline my personal contribution to the articles. Moreover, I will give an insight into the research questions, the content of the articles, the methodological approach, selected results and the main contributions.

2. Dissertation Overview

The first article is a single-author article and titled “*Developing a model of career choices regarding females in the ICT-industry - A theoretical approach*”. I have presented a former version of this article at the Research Colloquium at the Vienna University of Economics and Business (Austria) in 2012, the International Labour Process Conference (ILPC) 2012 in Stockholm (Sweden), the International Association of Feminist Economics (IAFFE) 2012 in Barcelona (Spain), the 39th Conference of the European International Business Academy (EIBA) 2013 in Bremen (Germany) and the Doctoral Colloquium at the University of Passau (Germany) in 2014.

The purpose of this article is to develop a testable model for career choices of individuals regarding the ICT-industry, and especially that of women. In a first step I review different career-related theories and decide to derive my theoretical model based on the framework of the SCCT. While identifying the core components that influence the career choices of individuals regarding the ICT-industry I review and assimilate literature from vocational research, education, psychology, sociology, ICT and business. I embed the core components in the premises of SCCT and theoretically explore their impact on a career choice. Further, I discuss their gendered pattern and formulate propositions for all identified core components and their influence on the career choice.

The contribution of this article is the development of a testable model regarding the career choices of individuals based on SCCT, which considers person as well as context factors. Further, the article contributes to career choice theory by including a novel aspect into the considerations of SCCT, which is the career salience of individuals. It provides an information basis for empirical research which core components to focus on when analyzing career choices of individuals regarding the ICT-industry, and especially that of women.

The second article, co-authored by Carola Jungwirth, is titled “*Why do Indian women choose a career in ICT? And why don't they stay? Core components of career choices in the ICT-industry - A qualitative study*”. I have presented a former version of this study at the Gender Symposium at the University of Passau (Germany) in 2013 and the 74th Annual Meeting of the Academy of Management (AoM) 2014 in Philadelphia (USA).

It was my responsibility to conduct some of the interviews (23 of 35), to code some of the interviews, and to write major parts of the article. However, the article is based on the idea, structure and interpretation of the results that have been developed in close collaboration and fruitful discussions with Carola Jungwirth. Moreover, Carola Jungwirth and I have developed the interview guideline together during various discussions and several meetings. It was Carola Jungwirth's contribution to conduct 12 interviews, to code some of the interviews and to write the introductory part of the article. Carola Jungwirth has also provided all necessary resources for conducting the interviews, as they took place in different parts of India.

The purpose of this article is to analyze why women decide to join the ICT-industry in India and why they tend not to stay. With this, the article contradicts the prevailing approach of analyzing why women decide against a career in the ICT-industry. While the prevailing approach focuses on the perception of context factors such as career-related barriers, the article gives a more holistic picture by considering context as well as person factors.

We conducted semi-structured interviews with 35 experts from academia, the private sector and the government that are linked to the Indian ICT-industry. We based our interview guideline and our analysis on the theoretical model that I have derived in article 1. Data analysis followed the approach of thematic coding as suggested by Flick (2009) using the software MAXQDA 2011.

Our findings indicate that women take person as well as context factors into account when they decide to join, but also to leave the industry. In detail, our findings suggest that especially the image of the ICT-industry, financial incentives and to some extent also personal interests play a role for Indian women to join the industry. Moreover, our results reveal that reasons to leave the industry are often rooted in still existing traditional gender roles.

The contribution of this article lies in a critical analysis of the Indian ICT-industry as a best practice example. On the one hand, it reveals factors that should be considered when attracting women to the Indian ICT-industry. On the other hand, it points out the downsides that need to be addressed in future attempts to balance the gender-ratio in the ICT-industry. Also, it is the first attempt to translate the theoretical model from article 1 into an empirical research setting and to analyze its applicability.

The third article, co-authored by Carola Jungwirth, is titled “*Interest beats image – At least in the long-run: An analysis of core components of career choices that influence the short- and long-term persistence of students in computing disciplines*”. I have presented a former version of this study in several internal seminars at the Chair of International Management at the University of Passau during October 2014 and April 2015.

In this article it was my responsibility to collect the data, to analyze them, and to write a first draft of the article. The first draft was based on interpretations, outlines and ideas that I discussed with Carola Jungwirth. Also, the underlying questionnaire is a product of our close collaboration. It was Carola Jungwirth’s contribution to give intensive and substantial feedback on each version of the article, and to discuss each version with me step by step which led to huge improvements and major adjustments. Moreover, Carola Jungwirth provided the resources that were necessary to collect the data, as the data have been gathered in different parts of India. She also provided resources to analyze the data as she permitted me to visit various seminars and trainings in order to advance my methodological skills.

The purpose of this article is to analyze which core components of the SCCT influence the short- and long-term persistence of female in comparison to male students in computing disciplines. Studies have shown that women usually tend to drop out a few years after working, meaning that gender ratio becomes rather imbalanced in the long-run than in the short-run (Nasscom-Mercer, 2009; Stephan & Levin, 2005). Therefore, we analyze the impacts of core components on short- as well as long-term persistence in order to reveal changes across these persistence types.

We use a sample of 723 Indian students of computing disciplines, collect quantitative data and analyze our data via a multi-group analysis with gender as a categorical moderator using the software IBM SPSS Statistics 22.

The main contribution of this paper is to give a more holistic picture of the persistence of females in computing disciplines and main factors of SCCT that influence their short- and long-term persistence. The article reveals that influencing factors regarding the short- and long-term persistence of students vary across gender and time and suggests that different types of persistence need to be considered when deriving measures regarding the retention of females in computing disciplines. Our findings in-

dicating that a positive image of the industry has a significant influence on the short-term persistence of females and males. We also observe a significant gender difference, where the image of the industry has a significant higher influence on the females' than on the males' short-term persistence. Moreover, we find that the interest in ICT-related matters has a significant positive influence on long-term persistence of females and males, while there is no gender difference observable. Therefore, we imply that efforts are needed that aim at developing ICT-related interests in the long-run in order to increase the persistence of females. With this, the article enhances prior research by not solely focusing on short-term persistence of individuals, but by also considering long-term persistence and person as well as context factors that show significant impacts.

The fourth article, co-authored by Carola Jungwirth, is titled "*The mixture makes the difference – A motivation-based taxonomy of ICT-students*". I have presented a former version of this study in several internal seminars at the Chair of International Management at the University of Passau during April 2015 and March 2016. The idea for this article was developed based on a study by Jungwirth and Roy (2015), which Carola Jungwirth has presented at the Vienna University of Economics and Business in November 2014.

It was my contribution to collect the data in different parts of Germany, to analyze the data, and to compose a first draft, while the interpretations of the data, content and structure of the article have been developed together with Carola Jungwirth. We also conceptualized the questionnaire that we used for our study, together. Further, it was Carola Jungwirth's contribution to give substantial input and intensive feedback on each step of developing and composing the article, and to discuss changes and revisions in detail. These discussions were an enrichment for this article and led to major improvements. Carola Jungwirth also provided the resources and infrastructure for data collection and data analysis.

This study is based on the observation that the ICT-industry is comprised of characteristics that on the one hand create a challenge and on the other hand an opportunity for people who join the ICT-industry. Therefore, the purpose of this article is to understand different motivation profiles of people that are attracted to the characteristics of the ICT-industry in order to adjust recruiting strategies accordingly. Moreover, we

aim at revealing differences in the probability of entering the ICT-industry among the motivation profiles and therewith analyzing which motivation profile displays the highest probability of entering the ICT-industry.

We use a sample of 458 German students of computer sciences and develop a motivation-based taxonomy of students that plan to enter the ICT-industry via cluster analysis. Further, we investigate differences in their vocational behavior via regression analyses. We use IBM SPSS Statistics 22 for our data analysis.

Our findings suggest that there are three distinct heterogeneous motivation profiles that we name striver, geek, and opportunist. Further, we find significant differences in the vocational behavior of these three motivation profiles, where the striver, which is comprised of high values of intrinsic and extrinsic motivation elements, shows the highest probability of entering the ICT-industry.

By identifying distinct motivation profiles of people that are attracted to the ICT-industry this study contributes to the young body of literature that engages with the profession in the ICT-industry and opportunities to reduce the shortage of skilled labor in the ICT-industry. It defines the people that plan to enter the ICT-industry in more detail and therewith offers starting points for deriving adequate implications. To the best of our knowledge, this study is among the first to configure motivation profiles of students and to analyze differences in their vocational behavior. This enables us to tailor recruiting strategies accordingly to the specific motivation profiles and with that to increase their probability of entering the ICT-industry.

PREFACE

Table 1: Overview of articles in this thesis

	Research Goal	Theoretical Back-ground	Method	Sample	Findings
Article 1	Identifying core components that form a career choice; Developing a theoretical and yet testable model regarding career choices of females in the ICT-industry.	Social Cognitive Career Theory; Literature from vocational re-search, education, psychology, and sociology.	Assimilation and combination of theories	n/a	Career choices consist of individual-level and ICT-specific core components. There are gender-differences regarding these core components observable.
Article 2	Identifying reasons why women decide to join the Indian ICT-industry and why they leave the industry after a certain period of time.	Social Cognitive Career Theory	Qualitative analysis following the approach of thematic coding	35 interviewees (22 students, 4 professors, 8 HR-employees, 1 governmental advisor)	Indian females are attracted to the ICT-industry due to the positive image, financial incentives and (partly) interest in ICT-related subjects. They leave the industry due to prevailing traditional gender roles and limited support systems.
Article 3	Analysis of which core components of the SCCT influence the short- and long-term persistence of female in comparison to male students in computing disciplines.	Social Cognitive Career Theory	Multi-group analysis	723 Indian students of computing disciplines	Positive image of the industry has a significant higher influence on females' than on males' short-term persistence. Interest in ICT-related matters has a significant positive influence on long-term persistence of females and males, while there is no gender difference observable. Efforts are needed that aim at developing ICT-related interests in the long-run in order to increase the persistence of females.
Article 4	Developing a motivation-based taxonomy of ICT-students in order to identify distinct motivation profiles of people attracted to the ICT-industry and to reveal differences in their vocational behavior.	Social Cognitive Career Theory and motivation theory	Cluster analysis, variance analysis, regression analysis	458 German students of computer sciences	Identification of three motivation profiles: striver, geek, opportunist. Motivation profiles with traits of high intrinsic and high extrinsic motivation displays the highest probability of entering the ICT-industry.

REFERENCES

- Aguirre, D., Hoteit, L., Rupp, C., & Sabbagh, K. 2012. *Empowering the third billion: Women and the world of work in 2012*. Booz-Publishing.
- Ahuja, M. K. 2002. Women in the information technology profession: A literature review, synthesis, and research agenda. *European Journal of Information Systems*, 11(1): 20-34.
- Ali, M., Kulik, C. T., & Metz, I. 2011. The gender diversity–performance relationship in services and manufacturing organizations. *International Journal of Human Resource Management*, 22(7): 1464-1485.
- Academy of Management, 2014. Style Guide for Authors. *Academy of Management Journal*, 57(5): 1-4.
- Antonelli, C. 1991. *The diffusion of advanced telecommunications in developing countries*. Development Centre Studies, Organization for Economic Co-operation and Development (OECD), Paris.
- Arora, A., & Athreye, S. 2002. The software industry and India's economic development. *Information economics and policy*, 14(2): 253-273.
- Arora, A., & Gambardella, A. 2006. *From underdogs to tigers: The rise and growth of the software industry in Brazil, China, India, Ireland, and Israel*. Oxford University Press.
- Bantel, K. A., & Jackson, S. E. 1989. Top Management and Innovations in Banking - Does the Composition of the Top Team Make a Difference?. *Strategic Management Journal*, 10(Special Issue: Strategic Leaders and Leadership): 107-124.
- Baugh, S. G., & Graen, G. B. 1997. Effects of team gender and racial composition on perceptions of team performance in cross-functional teams. *Group and Organization Management*, 22(3): 366-383.
- Beise, C., Myers, M., VanBrackle, L., & Chevli-Saroq, N. 2003. An examination of age, race, and sex as predictors of success in the first programming course. *Journal of Informatics Education and Research*, 5(1): 51-64.
- Bhattacharyya, A., & Nath, B. 2011. Women in information communications technology. *Asian Journal of Science and Technology*, 3(2): 6-14.
- Bowers, C., Pharmed, J. A., & Salas, E. 2000. When Member Homogeneity is Needed in Work Teams. *Small Group Research*, 31(3): 305-327.
- Bryant, G. 1985. *The Working Woman Report: Succeeding in Business in the 80's*. New York, NY: Simon & Schuster.
- Camp, T. 1997. The incredible shrinking pipeline. *Communications of the ACM*, 40(10): 103-10.
- Campbell, K., & Mínguez-Vera, A. 2008. Gender Diversity in the Boardroom and Firm Financial Performance. *Journal of Business Ethics*, 83(3): 435-451.

- Campbell-Kelly, M., & Aspray, W. 2004. *Computer: A History Of The Information Machine (Sloan Technology)* (2nd ed.), Boulder, CO, Oxford: Westview Press.
- Carter, D. A., Simkins, B. J., & Simpson, W. G. 2003. Corporate Governance, Board Diversity, and Firm Value. *Financial Review*, 38 (1): 33-53.
- Colquitt, J. A., Noe, R. A., & Jackson, C. L. 2002. Justice in teams: Antecedents and consequences of procedural justice climate. *Personnel Psychology*, 55(1): 83-109.
- Coppock, V., Haydon, D., & Richter, I. 2014. *The illusions of post-feminism: New women, old myths*. Abingdon, OX: Routledge.
- Cox Jr., T., & Blake, S. 1991. Managing Cultural Diversity - Implications for Organizational Competitiveness. *Academy of Management Executive*, 5(3): 45-56.
- Denning, P. J., & Dunham, R. 2001. The Profession of IT. *Communications of the ACM*, 44(11): 21-25.
- Dezsö, C. L., & Ross, D. G. 2012. Does Female Representation in Top Management Improve Firm Performance? A Panel Data Investigation. *Strategic Management Journal*, 33(9): 1072-1089.
- Dutta, S., Geiger, T., & Lanvin, B. 2015. *The Global Information Technology Report 2015 - ICTs for Inclusive Growth*. World Economic Forum, Geneva, Switzerland.
- EconomyWatch 2010. *IT Industry, Information Technology Industry*. <http://www.economywatch.com/business-and-economy/information-technology-industry.html>. [Last retrieved 14.12.2015].
- Erhardt, N., Werbel, J. D., & Shrader, C. B. 2003. Board of Director Diversity and Firm Financial Performance. *Corporate Governance: An International Review*, 11(2): 102-111.
- Flick, U. (Ed.). 2009. *An introduction to qualitative research* (4th ed.). London: Sage.
- Forth, J., & Mason, G. 2006. *Do ICT Skill Shortages Hamper Firms' Performance? Evidence from UK Benchmarking Surveys*. National Institute of Economic and Social Research (Discussion paper 281), London, England.
- Guthrie, J. P., & Datta, D. K. 2008. Dumb and Dumber: The Impact of Downsizing on Firm Performance as Moderated by Industry Conditions. *Organization Science*, 19(1): 108-123.
- Hillman, A. J., Shropshire, C., & Cannella Jr., A. A. 2007. Organizational Predictors of Women on Corporate Boards. *Academy of Management Journal*, 50 (4): 941-952.
- Hüsing, T., Korte, W. B., & Dashja, E. 2015. *E-skills and Eleadership skills 2020-Trends and forecasts for the European ICT professional and digital leadership labour market*. Emperica working paper, Gesellschaft für Kommunikations- und Technologieforschung mbh, Bonn, Germany.
- Ibarra, H. 1993. Personal networks of women and minorities in management: A conceptual framework. *Academy of Management Review*, 18(1): 56-87.

- Jackson, S. E., & Joshi, A. 2004. Diversity in social context: A multi-attribute, multi-level analysis of team diversity and sales performance. *Journal of Organizational Behavior*, 25(6): 675-702.
- Jungwirth, C., Roy, N. 2015. Ein gut bezahlter Job interessiert mich schon, aber langweilen will ich mich nicht! - Eine Analyse der Neigung deutscher Studentinnen und Studenten einen IT-Beruf zu ergreifen [I am interested in a well-paid job but I do not want to bore myself! - An analysis of female and male students' tendency of choosing an IT-job]. In E. Hanappi-Egger & R. Bendl (Eds.), *Diversität, Diversifizierung, (Ent)Solidarisierung in der Organisationsforschung: eine Standortbestimmung im deutschen Sprachraum*: 171-188. Wiesbaden: Springer.
- Kumar, N. 2001. Indian software development: International perspective. *Economic Political Weekly*, 36(45): 4278-4290.
- Lent, R. W., Brown, S. D., & Hackett, G. 1994. Toward a unifying social cognitive theory of career and academic interest, choice and performance. *Journal of Vocational Behavior*, 45(1): 79-122.
- Lent, R. W., Brown, S. D., & Hackett, G. 2000. Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology*, 47(1): 36-49.
- Lent, R. W., Paixão, M. P., Silva, J. T., & Leitão, L. M. 2010. Predicting occupational interests and choice aspirations in Portuguese high school students: A test of social cognitive career theory. *Journal of Vocational Behavior*, 76(2): 244-251.
- Mahadeo, J. D., Soobaroyen, T., & Hanuman, V. 2012. Board Composition and Financial Performance: Uncovering the Effects of Diversity in an Emerging Economy. *Journal of Business Ethics*, 105(3): 375-388.
- Mattis, N. C. 1993. Women directors: Progress and opportunities for the future. *Business & the Contemporary World*, 5(3): 140-156.
- Milliken, F. J., & Martins, L. L. 1996. Searching for Common Threads - Understanding the Multiple Effects of Diversity in Organizational Groups. *Academy of Management Review*, 21(2): 402-433.
- Namvar, M., Fathian, M., Gholamin, M. R., & Akhavan, P. 2010. *Exploring the role of human capital on firm's structural capital in Iranian e-business industry*. International Conference on Management Technology and Applications (ICMTA), Singapore.
- NASSCOM-Mercer 2009. *Gender inclusivity in India: Building empowered organisations*. New Delhi: NASSCOM-Mercer Publishing.
- OECD 2012. ICT Skills and Employment: New Competences and Jobs for a Greener and Smarter Economy. *OECD Digital Economy Papers*, 198, Paris: OECD Publishing.
- Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. 1999. Exploring the black box: An analysis of work group diversity, conflict, and performance. *Administrative Science Quarterly*, 44(1): 1-28.

- Perez, C., & Soete, L. 1988. Catching up in technology: Entry barriers and windows of opportunity. In G. Dosi, C. Freeman, R. Nelson, G. Silverberg, & L. Soete (Eds.), *Technical Change and Economic Theory* (1st ed.): pp. 458-479. London/New York: Pinter Publishers.
- Powell, W. W., & Snellman, K. 2004. The knowledge economy. *Annual review of sociology*, 30(1): 199-220.
- Robinson, G., & Dechant, K. 1997. Building a Business Case for Diversity. *Academy of Management Executive*, 11(3): 21-31.
- Rogelberg, S. G., & Rumery, S. M. 1996. Gender Diversity, Team Decision Quality, Time on Task, and Interpersonal Cohesion. *Small Group Research*, 27(1): 79-90.
- Schiebinger, L. 2001. *Has feminism changed science?* Cambridge, USA: Harvard University Press.
- Shanker, D. 2008. Gender relations in IT companies: An Indian experience. *Gender Technology and Development*, 12(2): 185-207.
- Sheu, H. B., Lent, R. W., Brown, S. D., Miller, M. J., Hennessy, K. D., & Duffy, R. D. 2010. Testing the choice model of social cognitive career theory across Holland themes: A meta-analytic path analysis. *Journal of Vocational Behavior*, 76(2): 252-264.
- Stephan, P. E., & Levin, S. G. 2005. Leaving careers in IT: gender differences in retention. *The Journal of Technology Transfer*, 30(4): 383-396.
- Taylor, A., & Greve, H. R. 2006. Superman or the Fantastic Four? Knowledge Combination and Experience in Innovative Teams. *Academy of Management Journal*, 49(4): 723-740.
- Trauth, E. M., Nielsen, S. H., & von Hellens, L. A. 2003. Explaining the IT gender gap: Australian stories for the new millennium. *Journal of Research and Practice in Information Technology*, 35(1): 7-20.
- Upadhyaya, C. 2006. Gender issues in the Indian software outsourcing industry. In A. Gurumurthy, P. J. Singh, A. Mundkur & M. Swamy (Eds.), *Gender in the Information society: Emerging issues*: 74-84. Bangkok: ICT4D Series.
- von Hellens, L. A., Pringle, R., Nielsen, S., & Greenhill, A. 2000. People, business, and IT skills: The perspective of women in the IT industry in Nance. *Proceedings of the ACM SIGCPR Special Interest Group on Computer Personnel Research*: 152-157. Chicago, IL.
- Welbourne, T. M., Cycyota, C. S., & Ferrante, C. J. 2007. Wall Street Reaction to Women in IPOs - An Examination of Gender Diversity in Top Management Teams. *Group and Organization Management*, 32(5): 524-547.
- Wright, P., Ferris, S. P., Hiller, J. S., & Kroll, M. 1995. Competitiveness Through Management of Diversity - Effects on Stock Price Valuation. *Academy of Management Journal*, 38(1): 272-287.

PREFACE

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**Developing a model of career choices regarding females in the ICT-industry
- A theoretical approach**

Working Paper

Nobina Roy

ABSTRACT

The purpose of this paper is to develop a theoretical and yet testable model that is comprised of relevant core components regarding the career choice of females in the ICT-industry. The focus is laid upon females' career choices as they are highly under-represented in the ICT-industry. The assumption is that a deeper understanding of components that influence the career choices of females will assist us in deriving adequate implications for encountering the under-representation. The derived model is based on main concepts of the Social Cognitive Career Theory, which consists of person and context factors that support or hinder a career choice. The model also includes a novel concept regarding career choices, namely career salience. Career salience is being introduced to the SCCT, as it adds valuable insights into the career choices of females and to the best of my knowledge, has not yet been considered in the premises of SCCT.

Keywords: SCCT, career choices, gender, ICT-industry

Article 1: Developing a model of career choices regarding females in the ICT-industry

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Developing a model of career choices regarding females in the ICT-industry - A theoretical approach

INTRODUCTION

Under-representation of female employees in vocational fields is a phenomenon that has predominantly been depicted in industries that are related to the STEM-fields (science, technology, engineering, mathematics). In this regard especially the ICT-industry reveals a high under-representation of female employees (Ahuja, 2002; Beise, Myers, VanBrackle, & Chevli-Saroq, 2003; Camp, 1997; Trauth, Nielsen, & von Hellens, 2003; von Hellens, Pringle, Nielsen, & Greenhill, 2000), which can be found at all levels in the ICT-industry. At college-level studies show that persistence of females is lesser than that of men in the ICT-field (Cech, Rubineau, Silbey, & Serond, 2011; Correll 2001, 2004) and women tend to switch their planned major of computer science to another major more often than men (Griffith, 2010; National Science Board, 2007). Under-representation is also evident at the entry-level of the industry as well as at top management positions (Hoobler, Lemmon, & Wayne, 2011; Panteli, Stack, Atkinson, & Ramsay, 1999; Trauth, Quesenberry, & Huang, 2009; Wilson-Kovacs, Ryan, & Haslam, 2006).

Over the last decades a lot of research has emerged that engages with the under-representation of females in the ICT-industry and offers a variety of reasons for the under-representation of women such as gender bias and discrimination, leaky pipeline, glass-ceiling effect, double-bind dilemma, lack of role models, restricted access to networks, issues related to work-life balance and family responsibilities (Blackwell, Snyder, & Mavriplis, 2009; Blickenstaff, 2005; Camp, 1997; Fox, 1991; Kyvik & Teiglen, 1996; Sonnert, Fox, & Adkins, 2007). Moreover, based on these causes governments of countries that deal with the under-representation of women in the ICT-industry, educators and HR divisions in companies have developed programs for females in order to encourage them to choose a career in the ICT-field (Blickenstaff, 2005; Cronin & Roger, 1999; OECD, 2001).

One might ask why it is at all necessary to encourage women to join the ICT-industry and to create a balanced gender-ratio. In this regard, studies reveal some ad-

vantages that are connected to a balanced gender-ratio in the ICT-industry. First, studies depict that the industry's growth is highly dependent on a constant intake of employees (Arora & Athreye, 2002; Arora & Gambardella, 2006; Powell & Snellman, 2004). By encouraging women to join the ICT-industry one would access a huge untapped potential of workers that is not yet being fully utilized for the industry's growth. Second, regardless of the widespread perception of ICT as a highly technical sector, creativity in problem solving and decision-making are critical success factors for employees in the ICT-field. Therefore, innovation as well as technical and scientific projects can only be successful if they are viewed from different angles and if solutions are discussed from diverse sets of people. This helps to make scientific endeavors more robust and complete (Blickenstaff, 2005; Katz, Allbritton, Aronis, Wilson, & Soffa, 2006; Roberts, 2003). Hence, the more diverse the workforce the more likely ICT-solutions will address a broad range of diverse stakeholders' needs (Florida & Gates, 2001). Therefore, a diverse workforce contributes to innovation and competitiveness of ICT-companies. Third, studies have shown that women tend to be more committed and loyal to their companies (Chung, 2002; Marsden, Kalleberg, & Cook, 1993; Scandura & Lankau, 1997). Hence, with encouraging women to join the ICT-industry we build up a substantial and diverse workforce that will enhance the growth of the industry. Therefore, it is important to create a balanced gender-ratio and to analyze what makes women choose a career in the ICT-industry and what keeps them from doing so.

A general criticism regarding career choices, gender and ICT is that the understanding of the under-representation of women in the ICT-industry is under-theorized and that we lack an adequate theoretical and yet testable foundation that explains the under-representation (Adam, Howcroft, & Richardson, 2001, 2004; Trauth, 2002, 2006). In this regard, I state that in order to completely understand the under-representation of women in the ICT-industry, we need to understand why or why not women would opt for a career in the ICT-industry. Therefore, we need a clear and holistic understanding of core components that a career choice regarding the ICT-industry is comprised of. Hence, we first of all need to understand individual-level components that influence a career choice regardless of the industry as well as contextual-level components of the ICT-industry that hinder or support the career choice of women regarding the ICT-industry. Once these core components are identified, we need an understanding

of gender-specific differences among them. We need to know at which points females' and males' career choices deviate from each other and where they are affected differently.

Therefore, this paper seeks to develop a theoretical model that firstly is comprised of core components which are relevant at exactly the stage of career choice-making regarding the ICT-industry, which secondly reveals gender-specific differences regarding these core components and which is thirdly testable for future research.

With this, the paper contributes to theory by offering a theoretical and yet testable model that focuses on individual-level and contextual-level core components which influence the career choices of females regarding the ICT-industry. While the model is based on theoretical considerations of the Social Cognitive Career Theory (SCCT, Lent, Brown, & Hackett, 1994), it enhances SCCT by including the concept of career salience, which has been shown to reveal important insights regarding women's career choices and has not been considered in the context of SCCT, yet. Further, the paper contributes to encountering the under-representation of females in the ICT-industry by identifying set screws for practitioners. It reveals ICT-specific core components that are of facilitating (career-related support systems) and hindering (career-related barriers) character and particularly relevant for females' career choices regarding the ICT-industry. With that it offers starting points for deriving adequate implications in order to encounter the under-representation of females.

In the remainder of this paper I will firstly give a brief overview over the literature on career choice theories and introduce the SCCT. Based on SCCT I will develop a theoretical model focusing on the career choice and individual-level as well as contextual-level core components that a career choice is comprised of. In order to contribute to the understanding of the under-representation of females in the ICT-industry, I will focus on such core components that are assumed to have different influences on career choices of females and males. To conclude, I will open avenues for further research.

LITERATURE REVIEW

Career choice theories generally originate in Parsons' (1909) model of career choice. The aim of the model is to identify a perfect fit between an individual and the

workplace. To achieve a perfect fit he gives three main instructions that need to be considered. First is, that one needs to have a clear understanding of one's own abilities, strengths and weaknesses. Second, it is necessary to analyze the workplace and the involved tasks. In the third step, an optimal fit of workplace and personality traits should be found with the help of a professional career counselor. Though the first and second step of Parsons' model have been the foundation for various studies that tried to develop measures in order to match personality traits with job-related key data ('Trait and Factor Theory'), the model reveals two major short-comings. One is that personality traits as well as jobs are assumed to be static and non-changeable. This implies that each person only fits to one specific job and that personal development is not being considered. Second is, that he does not specifically define which personality traits match which kind of work, which makes it difficult to apply the model to concrete situations.

Replying to this critique, Ginzberg, Ginsburg, Axelrad, and Herman (1951) are the first to state that career choices are not one-time incidences, but lifelong processes of development. This new view point was a milestone for career choice theories and has led to a first attempt by Super (1953) to synthesize two theories. Super's 'Archway model' combines elements from 'Trait and Factor Theory' with aspects of human psychology. Although this theory-driven framework loosely connects elements of different theories, Super (1990) himself admits that an all-embracing framework is still missing and needs to be developed.

Holland's (1959) theory of career choices is viewed as an expansion of the 'Trait and Factor Theory'. In the center of this concept lies the attempt to find the perfect fit between one of six personality types and the characteristics of a certain vocation. Though there have been attempts to test this concept empirically (e.g., see De Fruyt & Mervielde, 1997; Prediger & Vansickle, 1992; Rounds & Tracey, 1996), the fundamental critique on this concept is that the career choice cannot only be seen as a fit between personality types and vocational traits. Moreover, it is necessary to take several external aspects into account (Gottfredson, 1996).

Krumboltz, Mitchell, and Jones (1976) explore a complete new path of career choice theories. In contrast to 'Trait and Factor Theory' they do not raise the question of *how* an optimal career choice should be configured, but *why* individuals opt for a certain vocation. An individual's learning experiences and his/ her predisposition are put into

focus of their discussion (Krumboltz et al., 1976). With this they included cognitive and individual-specific aspects in career choice theories for the first time.

Lent et al. (1994) claim in their Social Cognitive Career Theory to have developed an all-embracing theory that builds a bridge between elements of above mentioned career choice theories. It is based on an article by Hackett and Betz (1981), who studied the effects of self-efficacy on the career development of women. Therefore, they firstly put the focus mainly on cognitive determinants that influence the career choice of individuals. The statements and theoretical constructs of SCCT have led to numerous theoretical and empirical studies that focused on proving or disproving the theoretical considerations or parts of them (e.g., see Brown, Lent, Telander, & Tramayne, 2011; Luzzo, Hawley, & McWhirter, 2001; Tang, Fouad, & Smith, 1999; Quimby & DeSantis, 2006). The SCCT reveals one of the latest efforts to analyze and understand the formation of vocational interests and career choices (Lent et al., 1994). It is the most used and cited theory in conjunction with the analysis of reasons and causes of under-represented occupation groups (for recent reviews see Betz, 2008; Lent, 2005; Lent, 2013). The SCCT will serve as my theoretical groundwork which will be examined in the next section of this paper in more details.

SOCIAL COGNITIVE CAREER THEORY (SCCT)

The SCCT is a combination of above mentioned career choice theories and Bandura's (1986) assumptions of his social cognitive theory. In his social cognitive theory Bandura (1986) states that there are three dimensions that generally underlie every choice that an individual makes: person dimension, environment dimension, and behavior dimension (Bandura, 1986; Lent et al., 1994). The person dimension addresses personal attributes such as the cognitive, emotional and physical attributes of a person. In contrast to that, the environment dimension focuses on external factors in the surrounding of an individual. The characteristic of the behavior dimension is that it is as a whole more observable for others in contrast to factors of the person dimension where for example cognitive attributes are not observable (Bandura, 1986; Lent et al., 1994). He terms the interconnectedness of these three dimensions triadic reciprocity and states, that each individual is an active agent regarding his/ her choices (Bandura, 1986). Fol-

lowing this thought, Lent et al. (1994) state that also a career choice is taken freely and independently. Though the career choice is being made within the premises of environmental circumstances and personal attributes, the individual is no victim of the circumstances (Lent et al., 1994) and will choose the alternative that has the highest potential of meeting his/ her career-related goals.

When developing their theory, Lent et al. (1994) firstly focused on the importance of personal and cognitive attributes as pointed out by Bandura (1986) as well as Hackett and Betz (1981). Lent et al. (1994) use Bandura's (1986) idea of choices as a starting point to develop their framework. They refine personal attributes and adjust them to the concept of career choices by distinguishing three main aspects that are crucial for careers. First are self-efficacy beliefs. The notion of self-efficacy beliefs poses the question "Can I do this?" (Lent, Brown, & Hackett, 1996: 381). It describes the assessment of one's own skills in order to accomplish a given task successfully. Self-efficacy beliefs are understood as an umbrella term for various domains of abilities which need to be contextualized to the examined situation (Jinks & Morgan, 1999; Pajares & Miller, 1994; Zimmerman, 1995) e.g., an individual may have high self-efficacy beliefs regarding numerical tasks, but low self-efficacy beliefs in literacy. The second aspect focuses on outcome expectations. Outcome expectations deal with the question "If I do this, what will happen?" (Lent et al., 1996: 381). Thus, they describe the anticipation of consequences after deciding to act in a certain way and therefore operate as motivator for individuals to behave in a certain way in order to achieve their goals (Bandura, 1986). There are different types of outcome expectations (e.g., social, physical, self-evaluative, etc.) that need to be adjusted to the examined context. The third aspect describes personal goals, which help individuals to regulate and organize their behavior.

As established above, former career theorists have elaborated on the importance of external context factors regarding the career choice of individuals. Therefore, Lent et al. (1994) amplify their theoretical considerations by adding context factors, as person factors and their interrelatedness do not completely suffice to explain career choices. Context factors are supposed to "comprise the real and perceived opportunity structure within which career plans are devised and implemented" (Lent et al., 1994: 107). Hence, these are factors that stem from the external environment of the individual and

can be facilitating (career-related support systems; e.g., financial and emotional support) or hindering (career-related barriers; e.g., discrimination regarding the career choice) (Lent et al., 1994).

To sum up, SCCT is basically based on two main theoretical frameworks, which are Bandura's three dimensions (person, environment and overt behavior) and Lent et al.'s (1994) distinction between person factors (self-efficacy beliefs, outcome expectations, and goals) and context factors (career-related support systems and career-related barriers).

Considering the state of the art, it is noteworthy that Lent et al. (1994) originally suggest certain relationships among person and context factors in their framework (see *Appendix*). However, research has mainly focused on the analysis of person factors such as analyzing various domains of self-efficacy beliefs and its impact on the career choice (Luzzo et al., 2001; Tang et al., 1999; Quimby & DeSantis, 2006). Although Lent, Brown, and Hackett (2000) and Sheu, Lent, Brown, Miller, Hennessy, and Duffy (2010) explicitly request scholars and junior scientists to include context factors in the analyses of career choices, those factors have mostly been neglected or even ignored. Thus, having realized the necessity of analyzing the combined effect of context and person factors, I reply to those calls and consider context factors in my theoretical model and give equal weight to all components instead of focusing on person factors exclusively. With this I broaden the focus from a psychological application of the theory to a more economic context.

Now, what most theories and frameworks in career literature have in common is that they have been developed to theoretically understand the entire process and development of career choices. They have not been developed against the background of empirical research, not considering the testability of their theoretical considerations. To develop a testable model of the career choice based on the theoretical groundwork of SCCT, there are some aspects of the SCCT that need to be pointed out in order to understand the developed model in the following section. First, is that the theoretical framework of the SCCT does not focus on one point in time, but on the entire career development of an individual starting at the early ages of childhood, over job entry and including job changes due to personal development, etc. Secondly, this portrayal of career development also includes feedback effects meaning that it considers that components

may be bi-directionally interconnected. There might be a situation where an individual sets a particular career-related goal based on his/ her self-efficacy beliefs. Based on the level of goal achievement he/ she will re-assess his/ her self-efficacy beliefs and therefore again set new goals. On the one hand, the advantage of this theory is that we get a deep insight of mechanisms and inter-correlations that affect the entire career development of individuals; on the other hand, this complexity leads to the fact that this theoretical framework as a whole is not convertible to an empirical research setting. This is mainly due to the consideration of the long process of career development that embraces the entire life-span and the above mentioned feedback effects. Addressing these issues empirically would mean to observe the participants of a study over decades, to constantly analyze their behavior and to keep track of their external influences and socialization processes as well as internal developments through thought-listings or the help of psychologists in order to identify the formation of the career choice over the period of their whole life-span. Finally, this would end up in a full-time observation of the participants' lives, which would result in time efforts and costs that are not feasible and manageable. On top of that it would not answer the question of career choices in that pointed manner as this paper seeks to address.

Until today, researchers have not been able to grasp the entire theoretical framework of SCCT empirically and still it is the most cited theoretical framework in empirical studies in order to explain career choices. This is basically because research uses this framework as a toolbox of components that influence career choices. Research has managed to deal with the drawbacks of the theory by zooming into the process and analyzing parts and subsets of the entire framework (e.g., see Blanco, 2011; Brown et al., 2011; Brown, Tramayne, Hoxha, Telander, Fan, & Lent, 2008) or by focusing on single components and their effects on career choices (e.g., see Lent et al., 2002; Lent, Brown, Schmidt, Brenner, Lyons, & Treistman, 2003). Research also alters, contextualizes, adds and abolishes relationships among the core components that are originally suggested in the framework (e.g., see Blanco, 2011; Byars-Winston & Fouad, 2008; Lent, Lopez, Sheu, & Lopez, 2011; Lent, Sheu, Gloster, & Wilkins, 2010). For example, Lent et al. (2010) as well as Lent et al. (2011) consider in their study an influence of perceived barriers on self-efficacy beliefs which is not suggested in the original framework by Lent et al. (1994). Although Blanco (2011) includes self-efficacy beliefs and goals in

his study, he chooses not to consider the direct influence of self-efficacy beliefs on goals as suggested in the original framework, but focuses on mediating effects. Examples like these are numerous, giving researchers the freedom to contextualize the general thoughts of SCCT and explore new relationships among the components.

I follow this procedure and handling of prior research by using the general assumptions and thoughts of SCCT as a base. Also, I focus on one point in time, namely the early adulthood of individuals, when individuals are just at the verge of making their career choice and on core components that may reveal gender-differences. Hence, the model is supposed to be a snapshot of a career choice of young adolescents and especially that of women when making a career choice regarding the ICT-industry. It is not the aim to analyze *how* the entire career choice develops, but *which components* individuals consider when making their career choice. Also, I follow prior research by deriving and exploring (new) relationships among the core components that may not be constituted in the original framework of SCCT, but are drawn on relevant literature and empirical research regarding career choices.

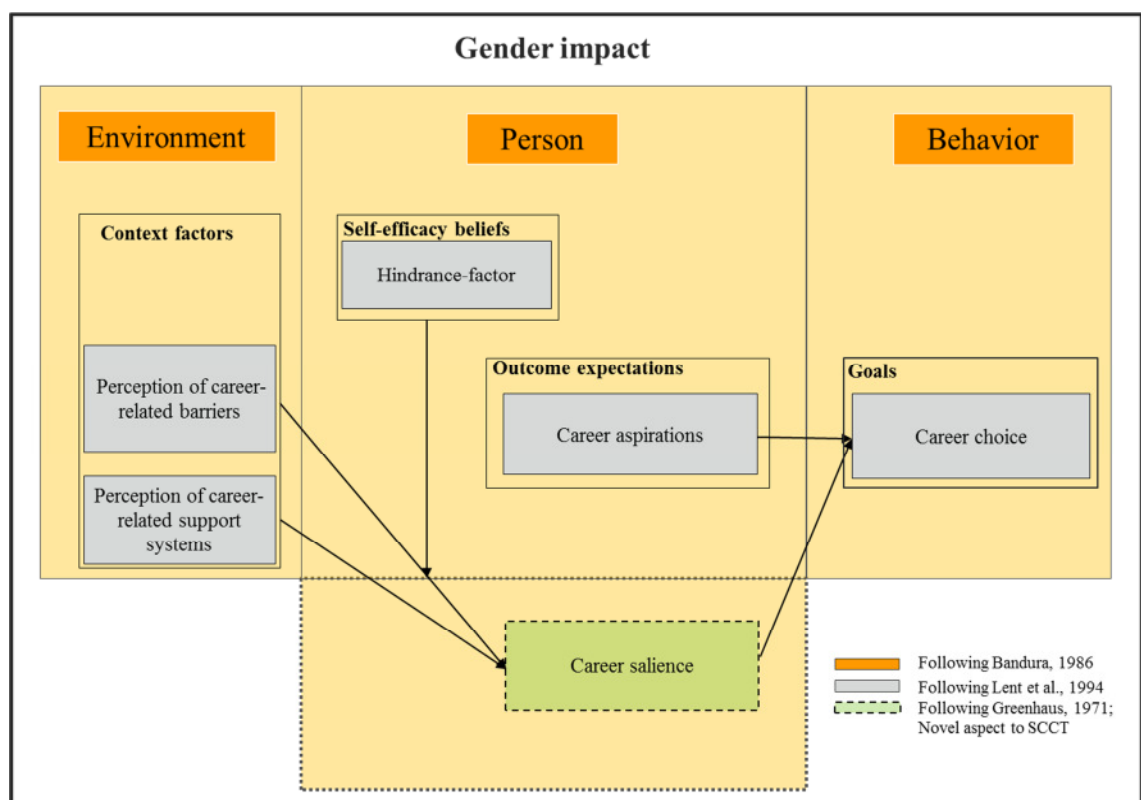
In the development of my theoretical model I follow the structure given by Whetten (1989), who states that four questions need to be addressed for complete theory and model development. First, I will address the question “**what?**” and with that I will introduce and define the core components. Further, I will place them in the theoretical considerations of SCCT, which means that I will classify the derived component in terms of Bandura’s (1986) three dimensions (person, environment and overt behavior) and the two main factors by Lent et al. (1994) (person factors and context factors). Secondly, I will address the question “**how?**” and will display the link to the other core components in the model in order to explain how the core components interrelate. This aims at verbalizing the arrows in the theoretical models and formulating adequate propositions. Thirdly, I will address the question “**why?**”. In the context of this paper, this means to address the question why it is relevant to consider the particular component or better to assess the gendered pattern of the core component. If the component underlies a gendered pattern, it should be subject of our considerations and included in the model. In my conclusion section I will address the fourth question “why research conducted has important implications for the link between theory development and empirical research”

(Whetten, 1989: 491) regarding the entire model and not for all components individually.

THEORETICAL MODEL

With the development of the theoretical model I am, by my current state of knowledge, the first to make the attempt of developing a theoretical model focusing on career choices of women regarding the ICT-industry and explicitly embedding it into the two entangled frameworks of SCCT, namely Bandura's (1986) three dimensions and the two main factors by Lent et al. (1994). Moreover, I include a novel concept to SCCT, namely career salience, that has not been considered, yet. The theoretical model consists of five core components, which are career aspirations, career salience, the hindrance-factor, career-related barriers and career-related support systems that have direct or indirect influence on the career choice of individuals (see *Figure 1*).

Figure 1: Core components of career choice



Source: Author's own illustration.

Career choice

The career choice can be understood as a decision in favor of or against the ICT-industry at all levels of the industry beginning at entry-level jobs to positions at the top management. At the end of making the career choice it is the goal that the individual takes a decision regarding his/ her career, which may result in being a part of the ICT-industry or in a decision against the ICT-industry. Hence, regarding Lent et al.'s (1994) categories of person factors (self-efficacy beliefs, goals, and outcome expectations) the career choice of an individual addresses the category *goals*. Regarding Bandura's (1986) dimensions the career choice can be put into the *behavior dimension*. The choice that an individual makes regarding the ICT-industry is visible for others in terms of the individual being a part of the ICT-industry or not. Hence, it is not to be put in the person dimension as the visibility of actions is the main characteristic that distinguishes the behavior dimension from the person dimension. Also, it does not belong to the environment dimension as the career choice itself is not a part of external factors regarding the surrounding of the individual. However, the career choice is influenced by various components that I will derive in the following.

Career aspirations

What?- The definition of career aspirations and their placement in SCCT. Career aspirations are defined as "information about an individual's interests and hopes, unfettered by reality" (Hellenga, Aber, & Rhodes, 2002: 200). Considering Lent et al.'s (1994) person factors career aspirations can be classified as *outcome expectations*. Outcome expectations address the question of the consequences that follow from the overt behavior of individuals, namely their career choices. They address the career-related outcome expectations of an individual unaffected by the real circumstances. One could also say that career aspirations define our dream career. The fulfilment of those career-related dreams and hopes describe the ultimate and most positive outcome expectation that an individual could think of and therefore describe the most positive form of outcome expectations. Career aspirations could comprise of the wish to become an expert in the aspired vocational field, to turn ones hobby into a job, to do something that one is highly interested in, to hold a managerial position in the aspired industry, etc. (O'Brien

& Fassinger, 1993). Regarding Bandura's dimensions career aspirations can be placed into the *person dimension* rather than into the behavior and environment dimension as they are about an individual's personal career-related dreams and visions that are developed in a cognitive process of the individual.

How?- The interrelatedness of career aspirations and other core components.

Addressing the question "how", studies have shown that high positive outcome expectations have a positive influence on career choices as they set high expectations regarding the career and influence the individual to behave in a particular way in order to fulfill those expectations (Croll, 2008; Elder, 1999; Mello, 2008; Schoon, Martin, & Ross, 2007; Schoon & Parsons, 2002). As stated above career aspirations describe a very strong and positive form of outcome expectations and therefore will have a strong influence on the career choice. Studies depict that there is a positive link between young peoples' career aspirations and their career attainment in adulthood (Clausen, 1995; Croll, 2008; Elder, 1999; Mello, 2008; Schoon, et al., 2007; Schoon & Parsons, 2002). For example, Schoon and Parsons (2002) show that people with high career aspirations are more likely to enter a (managerial) career than their less ambitious peers.

Proposition 1a. Career aspirations have a positive influence on the career choice of individuals.

Why? – The gendered pattern of career aspirations. Research suggests that women tend to have lower levels of career aspirations than men (e.g., Fels, 2004; Mau, 2003; Reis, 1991, van Vianen & Fischer, 2002; van Vianen & Keizer, 1996). Leung, Conoley, and Scheel (1994) surveyed female and male high school juniors that showed nearly the same academic qualifications. They found that female students in their sample were more likely than male students to pursue a bachelor's or master's degree, whereas they were less likely to consider a doctoral or professional degree.

Mendez and Crawford (2002) also show that women in their study were more flexible regarding their career aspirations and aspired a greater number of different careers; male students aspired careers that were aligned to higher education levels and more prestigious job positions. Research traces reasons for gender differences back to the fact that women reveal lower levels of competitiveness in working environments (e.g., Dreber, von Essen, & Ranehill, 2009; Gneezy, Niederle, & Rustichini, 2003;

Gneezy & Rustichini 2004; Hakim, 2006; Niederle & Vesterlund, 2007). Additionally, women seem to value prestigious positions in the labor market less than men (Mendez & Crawford, 2002). This may be because women often prefer job flexibility and lesser time demands of an occupation (Frome, Alfeld, Eccles, & Barber, 2006), which are more often found in lower level positions. Therefore, research suggests that this leads to the fact that women choose vocations and vocational positions that do not fully utilize their intellectual and work-related potential (Arnold, 1993; Mendez & Crawford, 2002; O'Brien, Friedman, Tipton, & Linn, 2000).

Proposition 1b. Women are assumed to have lower career aspirations than men.

Career salience

What?- The definition of career salience and its placement in SCCT. The notion of career salience was firstly conceptualized and operationalized by Greenhaus (1971). In his study he investigates the “role of career salience in occupational choice” (Greenhaus, 1971: 210). Career salience is defined as the perceived importance of work and commitment towards a career in one’s total life (Greenhaus, 1971) and describes the “value an individual places on work-related pursuits” (Raiff, 2004: 24). Statements like “I would move to another part of my country if it would help advance my career” (Greenhaus, 1971 cited in Diemer & Blustein, 2007: 28) measure the value an individual puts on career-related endeavors.

To the best of my knowledge, career salience has not been considered in the theoretical framework of the SCCT, yet. I include the concept of career salience and make an attempt of embedding this concept into the considerations of SCCT as studies have shown a significant impact of career salience on career choices and gender differences (see below). Considering Bandura’s three dimensions I place the notion of career salience in the *person dimension* arguing that career salience is built upon personal attitudes towards career and the value it has in comparison to free-time, family matters, etc. and therefore, very clearly is not an aspect that stems from the environment. It also does not belong to the behavior dimension as career salience is a cognitive process that guides the behavior of an individual, but is not visible for others. Regarding Lent et al.’s (1994) factors it is hardly possible to fit career salience in one of the categories. The closest

would be to place career salience in *outcome expectations* as they describe an evaluation of career-related expected outcomes. Still, this does not perfectly fit as career salience does not exactly constitute a form of outcome expectations like career aspirations do, but describes their assessment. Considering the theoretical relevance of career salience on the one hand and the difficulty of placing it into the factors of Lent et al. (1994) on the other hand, just undermines the fact that career salience is a novel aspect to SCCT that needs to have its own place in the person dimension (see *Figure 1*).

How?- The interrelatedness of career salience and other core components.

Addressing the question “how?”, studies have depicted that individuals that feel more committed and value their career highly, are more likely to persist in that career path and to pursue their goals (Allen & Ortlepp, 2002; Hock & DeMeis, 1990; Moya, Exposito, & Ruiz, 2000). For example, Weiss (1999) reveals in her study that teachers who value their careers strongly are more likely to retain in that field in contrast to teachers who do not value their careers in the same way. Mathieu (1992) shows in his study with undergraduate students that higher values of career-orientation have a positive influence on goal attainment. Hence, the assumption is that the more an individual values his/ her career, the likelier it is that he/ she will decide in favor of the ICT-industry.

Proposition 2a. Career salience has a positive influence on the career choice of individuals.

Why? – The gendered pattern of career salience. Studies depict that there are gender-specific differences regarding the career salience of individuals (Gerstein, Lichtman, & Barokas, 1988; Gilbert, 1993; Leung et al., 1994; Pfof & Fiore, 1990). Women are assumed to have lower values of career salience than men (Gerstein et al., 1988; Gilbert, 1993; Leung et al., 1994; Mednick & Thomas, 1993; Moya et al., 2000; Pfof & Fiore, 1990). Moya et al. (2000) find career salience to relate to the degree of occupational satisfaction or having a partner with higher academic achievements. They also show that the parental status of women has an influence on the value individuals put on their career, with mothers revealing lower career salience than women without children. None of these factors showed an influence on the career salience of men (Moya et al., 2000). Also, Chi-Ching (1995) depicts in his study that men reveal higher

values of career-orientation compared to their commitment to their family roles than women.

Reasons for a gendered pattern of career salience are often seen in the observation that women seem to place greater value on jobs that help them to fit family with career plans (e.g., see Eccles, 2007; Frome et al., 2006). Research suggests that women try to balance career and family plans and that they are more willing to alter their career plans according to their family responsibilities, future children or the plans of their partners (Mark & Houston, 2002; O'Brien et al., 2000).

However, in the above mentioned studies the question of causality remains unanswered, leaving open the direction of influence of career salience and family commitment. For example, it might be that women display lower values of career salience because they are due to traditional gender roles, etc. often in charge of family duties, or it might be that women generally reveal lower values of career salience than men and therefore seek for balance by taking over family responsibilities. While this shall not be in focus of this article, it supports the fact that further research on the aspect of career salience is needed. However, based on the above considerations I derive the following proposition:

Proposition 2b. Women are assumed to have lower values of career salience than men.

Perception of career-related barriers

What?- The definition of the perception of career-related barriers and its placement in SCCT. The perception of barriers is one of the most dominant and often considered constructs in order to analyze the under-representation of certain vocational groups in the labor market (Swanson, Daniels, & Tokar, 1996; Swanson & Woitke, 1997). Barriers are seen as a “mechanism for explaining the often noted gaps between [women’s] abilities and their achievements” (Lent et al., 2000: 38f.). When placing the perception of career-related barriers into SCCT one might discuss whether career-related barriers should belong to person or context factors as the perception of a career-related barrier is a personal assessment that can vary among all individuals. However, Lent et al. (2000) classify them as *negative context factors* that stem from the external

environment of the individual. Following this line of thought, I place the concept of career-related barriers in the *environment dimension* of Bandura's (1986) three dimensions. However, I will address the aspect of differences in the assessment of career-related barriers as a threat for each individual in a separate section (see *hindrance-factor*).

How?- The interrelatedness of the perception of career-related barriers and other core components. Addressing the question of how career-related barriers interrelate with other components of the theoretical model, I propose that there is a negative link between the perception of career-related barriers and career salience. Studies depict that individuals tend to value their career lesser if they perceive career-related barriers that hinder their career attainment (Leal-Muniz & Constantine, 2005). This may lower the salience of ones' career-related plans and visions and lead an individual to another career path in which he/ she may not perceive such career-related barriers. This could result in a decrease of career salience regarding the originally pursued career path and therewith a drop-out or change of careers. Another alternative would be that if an individual feels that he/ she will not be able to succeed in that career path due to career-related barriers he/ she may stay in that career path, but redefine his/ her priorities. For example, an individual may view his/ her vocation as one of those necessary evils which is "not worth the effort" (Greenhaus, 1971 cited in Diemer & Blustein, 2007: 30) and therefore put more value on family matters and free-time instead of vocational interests. As a consequence, this scenario also results in a lower career salience of the individual due to the perception of career-related barriers.

Proposition 3a. Career-related barriers have a negative influence on career salience of individuals.

Why? – The gendered pattern of the perception of career-related barriers. In this paper I distinguish two types of career-related barriers. First are career-related barriers regarding gender (Hackett & Lonborg, 1993; Quimby & DeSantis 2006; Russell & Rush, 1987; Swanson & Tokar, 1991a; Swanson & Tokar, 1991b). Swanson et al. (1996) and Swanson and Tokar (1991b) suggest that gender-specific career-related barriers can be existent in all stages e.g., when choosing a career, in the attempt to find a job, when performing the job, or in the attempt to balance the job with other aspects of

life. These categories should be considered in order to analyze and explain the often noted gap between women's educational skills and vocational achievements (Swanson & Tokar, 1991b). Considerable amount of research has found evidence for the perception of career-related barriers in these stages. For example, women may realize that there are very few female representatives in the ICT-industry which could affect their career advancement due to a missing role model, societal sex role stereotypes, or gender discrimination (Albert & Luzzo, 1999; O'Leary, 1974). Moreover, Luzzo et al. (2001) analyzed that women perceived significantly more barriers when finding a job regarding the perception of discriminatory hiring practices than male students. To sum up, gender-specific career-related barriers have been depicted to play a major role regarding the career choices, especially that of women.

The second category addresses industry-specific career-related barriers, precisely ICT-specific barriers. The assumption is that there are distinct characteristics of the ICT-industry that create barriers for individuals and especially for women who pursue a career in the ICT-industry. ICT-companies want their employees to upgrade their skills constantly in order to keep the company competitive and innovative. In this regard, especially women who are confronted with a career-break due to child-birth and rearing, face great difficulties in constantly upgrading their ICT-specific skills and therefore also a re-entry to the industry (Shanker, 2008). Moreover, Wajcman and Le (2007) find that female employees in the Vietnamese ICT-industry are mostly in low-level jobs that afford fewer skills whereas male employees concentrate in the high-end jobs. This observation is closely related to the 'glass ceiling effect'. Arfken, Bellar, and Helms (2004) state that "glass ceilings in organizations and often glass walls restrict women to certain fields and positions" (Arfken et al., 2004: 180). The majority of women are employed in the lower part of the career-ladder which leads to a feminization of certain vocational fields and managerial positions remain male-dominated (Kelker, Shrestha, & Veena, 2002). Due to this fact and lack of role models, women may not have future career visions regarding an ICT-related vocation and hence, do not opt for a career in the ICT-industry.

Another factor that characterizes the ICT-industry is the tradition of 'informal networks' (Upadhyya, 2006), which seems to create an obstacle for female employees. Since women most of the times carry the lion's share of family and housekeeping duties

along with their jobs, they are often not able to take part in networking activities with their male-dominated vocational groups after office hours (Shanker, 2008). This puts them at disadvantages regarding career attainment and promotions.

Proposition 3b. Women who pursue a career in the ICT-industry perceive higher career-related barriers than men.

Hindrance-Factor

What?- Definition of the hindrance-factor and its placement in SCCT. Swanson et al. (1996) suggest that career-related barriers will be assessed in a two-step process. In the first step the individual addresses the question how likely the barrier is to occur. If the individual concludes that the barrier is likely to occur, then he/ she will assess his/ her own abilities to deal with the barrier and ask himself/ herself how likely it is that he/ she will overcome the barrier or how much he/ she will be hindered by the barrier. Therefore, researchers suggest that the notions of the likelihood to perceive a barrier and the hindrance by a barrier should be disentangled (Swanson & Daniels, 1994; Swanson et al., 1996, Swanson & Woitke, 1997). For example, an individual may be aware of the ICT-specific barrier of the constant implementation of new technologies and upgrading skills and at the same time assess his/ her learning abilities as very high. Hence, the individual will feel that he/ she will be able to overcome the barrier much easier than an individual that assesses his/ her learning abilities as very low. This individual will perceive the barrier as much higher and may feel that he/ she is not able to overcome the hurdle with his/ her own abilities. I term the notion that does not particularly address the perception of career-related barriers, but the way of coping with them, the *hindrance-factor*.

The hindrance-factor is based on the considerations of the *self-efficacy beliefs* in the context of SCCT, which I have contextualized to the ability of coping with career-related barriers in the ICT-industry based on the assessment of ones' own skills. Regarding Bandura's (1986) dimensions I place the hindrance-factor in the *person dimension* arguing that it is about a personal assessment of one's coping-efficacy regarding particular career-related barriers. This assessment is comprised of a cognitive process that is based on former experiences of the individual with similar situations, successes

or failures and specific knowledge that an individual has about himself/ herself and therefore is clearly not an aspect of the environment dimension. Also, I do not place it in the behavior dimension as the assessment of the abilities is not visible for others, though the result of the assessment might be visible in a particular behavior e.g., an individual might assess his/ her abilities to constantly learn new skills as poor, based on his/ her performance at college where he/ she may not have done well and has had difficulties in passing the exams. Then the individual might decide not to join the ICT-industry; so the result of the assessment will be visible for others, but not the process and the factors of the assessment themselves.

How?- The interrelatedness of the hindrance-factor and other core components. Addressing the question “how?”, the assumption is that if people feel that they are able to cope with the perceived career-related barriers this will lessen the negative influence of barriers on career salience as they perceive the career-related barriers which have a negative effect on their career salience and at the same time find a way to deal with them. The relationship will increase if people assess their abilities as insufficient to cope with the perceived career-related barriers (Byars-Winston & Fouad, 2008; Perrone, Civiletto, Webb, & Fitch, 2004).

Proposition 4a. The higher the hindrance factor the stronger the negative impact of perceived career-related barriers on the career salience.

Why? – The gendered pattern of the hindrance-factor. Studies have observed that there is a gender-specific difference between perceiving a career-related barrier and being hindered by a barrier. In various studies (Byars, 1997; Kelly, 2010; O’Leary, 1974; Smith 2004) the perception of barriers among male and female college students has been analyzed. The studies reveal that male and female students assess certain factors, such as marriage or planning a family as career-related barriers, but only the minority of the male students feels that their career progress could be hindered by it; whereas the majority of the asked female students feel that a marriage would negatively affect their career choice and progress. Furthermore, women show a basic willingness to adjust their vocational behavior in order to cope with such factors. The suggestion is that certain factors are perceived as career-related barriers by both sexes in the same

way, but that they differently feel hindered by them which has diverse impacts on the vocational choices of females and males.

Proposition 4b. Women are assumed to have a higher hindrance factor than men.

Perception of career-related support systems

What?- The definition of the perception of career-related support systems and its placement in SCCT. Since career-related barriers were identified as a major reason for the under-representation of women in certain industries and especially in the ICT-industry, most studies have put their focus on the understanding of career-related barriers and their influence on career choices. As studies indicate that individuals mention the perception of career-related barriers *and* support systems regarding their career choices, it is necessary to also consider the complement of barriers, which is the influence of support systems (Lent et al., 2002). Supports or support systems are conceived “as environmental variables that can facilitate the formation and pursuit of individuals' career choices” (Lent et al., 2000: 42).

Analogous to career-related barriers, career-related support systems are placed in Bandura's (1986) *environment dimension* and belong to *facilitating context factors* defined by Lent et al. (1994) as they address supportive external factors that stem from social and vocational surrounding of the individual.

How?- The interrelatedness of the perception of career-related support systems and other core components. Addressing the question “how?” I argue that the perception of career-related support systems will have a positive influence on career salience as well, as the value of the career will rise if individuals feel that they are able to achieve their career visions with the help of adequate support systems. For example, Scandura and Lankau (1997) have shown that the career-orientation has increased when individuals felt supported by their employers. These results have been supported by various other research works (Casper, Harris, Taylor-Bianco, & Wayne, 2011; Eisenberger, Fasolo, & Davis-LaMastro, 1990). Further, Butts, Casper, and Yang (2013) reveal that the availability rather than the use of support systems was positively related to career-orientation of individuals.

Proposition 5a. The perception of support systems has a positive influence on career salience of individuals.

Why?– The gendered pattern of the perception of career-related support systems. In this paper I distinguish three support systems: social, organizational and governmental support systems.

a) Social Support Systems

Social supports describe supportive actions that stem from the social environment of an individual (Lent et al., 2001; Lent, Singley, Sheu, Schmidt, & Schmidt, 2007). Perceived parental support was found to relate to the educational plans and career expectations of high school students (Adya & Kaiser, 2005; Byars-Winston & Fouad, 2008; Ferry, Fouad, & Smith, 2000; Flores & O'Brien, 2002; McWhirter, Torres, & Rasheed, 1998). Studies also reveal that support by faculty staff and teachers have a positive impact (Hackett, Betz, Casas & Rocha-Singh, 1992; Seymour & Hewitt, 1997). Moreover, Bank, Slavings, and Biddle (1990) show that support by parents and peers have a positive influence on students' decision to stay in a particular field. Hence, encouragement, involvement, approval and recognition by the social environment are necessary to consider regarding the career choice of individuals.

b) Organizational Support Systems

Organizational support systems describe supportive measures by companies in order to attract more women to the ICT-industry and to support female employees who are already part of the workforce in the ICT-industry. The usual argument regarding organizational support systems is that many more women would opt for the ICT-industry, if employers adopted family-friendly work arrangements and offered benefits for employees such as parental leave, part-time working and so forth (OECD, 2001). For example, it has been shown that organizational support in terms of flexible work hours increased the career-orientation of female employees (Scandura & Lankau, 1997). Also, home working possibilities have become a popular instrument to show the understanding of women's needs (Hill, Ferris, & Märtinson, 2003). Furthermore, companies

try to address the problem of upgrading skills by offering courses for skill enhancement such as morning reading circles, etc.

c) Governmental Support Systems

In order to build a gender inclusive culture in a country, governments generally pass laws on education, safety and protection of women. For example in 1995, the Government of India passed an amendment to the Factories Act, allowing women to work night-shifts and mandating employers to provide adequate safeguards at the workplace and for commuting. Moreover, laws on education provide infrastructure for access to the ICT-based education and form the interest toward ICT-related vocations.

The assumption is that women perceive higher existent support systems regarding the ICT-industry than men. On the one hand, this might be because support systems mainly address women as target groups. On the other hand, this may also be because women perceive career-related barriers higher than men as well (Byars-Winston & Fouad, 2008; Luzzo & Hutcheson, 1996), and therefore are more sensitive towards the perception of career-related supports as they may actively look out for them. This is supported by the fact that women articulate a lower perception of barriers with the existence of support systems (Kelly, 2010).

Proposition 5b. Women who pursue a career in the ICT-industry perceive higher career-related support systems than men.

CONCLUSION

As established above Whetten (1989) suggests answering four questions to make a theoretical contribution, of which I have addressed three for each core component in the previous section. In the following I will address the last question, which is “why research conducted has important implications for the link between theory development and empirical research” (Whetten, 1989: 491).

It was the aim of this paper to develop a testable model that portrays the core components of the career choice regarding females in the ICT-industry based on the

theoretical framework of SCCT. Therefore, I have focused on particular core components of career choice that are assumed to display a gendered pattern, and I have revealed the influential relationships among the core components. Also, I have enhanced existing theory by including and anchoring the concept of career salience in the theoretical considerations of SCCT. This was to get a more holistic picture of how strongly females value their career and how this affects their career choices.

I state that the value for empirical research lies in a testable model of career choice regarding women in the ICT-industry that has a deep rooted theoretical foundation and includes all main aspects of SCCT. Moreover, the advantage of this model lies in its empirical manageability. It reduces the complexity of the original framework by concentrating on one point in time, namely the moment of career choice making at early adulthood instead of considering the entire process of the development of a career choice beginning in early childhood. Further, the developed model excludes feedback effects, which allows researchers to transfer the model into an empirical research setting. With that the model contributes to research by simplifying the complex nature of the framework given by Lent et al. (1994) and at the same time considering main individual-level and contextual-level core components of career choices regarding the ICT-industry.

This will serve as a substantial basis for further research to start their empirical studies from. Empirical insights into this theoretical model will help to better understand the career choices and to derive appropriate implications in order to encounter the under-representation of women in the ICT-industry. Moreover, empirical research could also elaborate on the role of career-related barriers and career-related support systems. One might ask, whether the perception of career-related barriers and the perception of career-related support systems are two sides of the same medal (Lent et al., 2000). If so, does this mean it would be sufficient to eradicate the career-related barriers? And how do career-related barriers and career-related support systems interrelate? Betz (1989) argues that the perception of career-related barriers and the perception of support systems are two unique constructs and that the perception of career-related support systems cannot be understood as the absence of career-related barriers. More likely, career-related support systems are active efforts by the social environment, organizations and governments to facilitate the career choice of an individual. Contrary to that, other stud-

ies indicate that the perception of career-related support systems and the perception of career-related barriers are two ends of a continuum e.g., they reveal that participants reported the existence of social supports as facilitating, whereas non-existent social supports were not reported as career-related barriers, but negative social supports were reported as hindering (Lent et al., 1998, cited in Lent et al., 2000). However, further research is needed to clear the interrelation between career-related support systems and career-related barriers.

Also, continuative research on existing organizational support systems that companies have already implemented would help to analyze the effectiveness and need of support systems and would help us to understand which implemented measures do affect women's career choices and which are 'all kippers and curtains'.

Furthermore, this theoretical model is not only applicable to the ICT-industry, but to industries in general that are confronted with the under-representation of women. This is because some of the core components are not necessarily ICT-specific, but rather individual-specific and can be analyzed regardless of the examined industry (such as career aspirations or career salience), whereas other components need to be contextualized and adapted to the examined situation and context, such as industry-specific barriers. I state that it might be necessary to refine certain components or add some aspects according to the context in which they are considered. For example, it might be interesting to include the value of interest or abilities regarding the considered field of interest. While Bandura (1993) puts lesser value on interest as a determinant for career choices (Bandura, 1993, cited in Lent et al., 1994: 108) there are others who have identified significant influences of interest and abilities on choices and self-efficacy beliefs (e.g., see Rottinghaus, Larson, & Borgen, 2003). However, future research will have to elaborate on these relationships.

Moreover, it will be interesting to elaborate on the explanation power of the distinct core components. It is very likely that some of the core components will have greater influence on the career choice than others; or that the explanation power of core components differs along cultures and different settings.

To conclude, this theoretical model offers a theoretical fundament to elaborate on the identified core components of career choices and to adjust it to particular research contexts.

REFERENCES

- Adam, A., Howcroft, D., & Richardson, H. 2001. Absent friends? The gender dimension in information systems research. In N. Russo, B. Fitzgerald & J. DeGross (Eds.), *Realigning research and practice in information systems development: The social and organizational perspective*: 332-352. Boston: Kluwer Academic Publishers.
- Adam, A., Howcroft, D., & Richardson, H. 2004. A decade of neglect: Reflecting on gender and IS. *New Technology, Work and Employment*, 19(3): 222-240.
- Adya, M., & Kaiser, K. M. 2005. Early determinants of women in the IT workforce: A model of girls' career choices. *Information Technology & People*, 18(3): 230-259.
- Ahuja, M. K. 2002. Women in the information technology profession: a literature review, synthesis, and research agenda. *European Journal of Information Systems*, 11(1): 20-34.
- Albert, K. A., & Luzzo, D. A. 1999. The role of perceived barriers in career development: A social cognitive perspective. *Journal of Counseling & Development*, 4(77): 431-436.
- Allen, S., & Ortlepp, K. 2002. Conceptualising and operationalizing work versus career salience. *Journal of Industrial Psychology*, 28(2): 7-14.
- Arfken, D. E., Bellar, S. L., & Helms, M. M. 2004. The ultimate glass ceiling revisited: The presence of women on corporate boards. *Journal of Business Ethics*, 50(2): 177-186.
- Arnold, K. D. 1993. Undergraduate aspirations and career outcomes of academically talented women: A discriminant analysis. *Roeper Review*, 15(3): 169-175.
- Arora, A., & Athreye, S. 2002. The software industry and India's economic development. *Information economics and policy*, 14(2): 253-273.
- Arora, A., & Gambardella, A. 2006. *From underdogs to tigers: The rise and growth of the software industry in Brazil, China, India, Ireland, and Israel*. Oxford: Oxford University Press.
- Bandura, A. 1986. *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bank, B. J., Slavings, R. L., & Biddle, B. J. 1990. Effects of peer, faculty, and parental influences on students' persistence. *Sociology of education*, 63(3): 208-225.
- Beise, C., Myers, M., VanBrackle, L., & Chevli-Saroq, N. 2003. An examination of age, race, and sex as predictors of success in the first programming course. *Journal of Informatics Education Research*, 5(1): 51-64.
- Betz, N. E. 1989. Implications of the null environment hypothesis for women's career development and for counseling psychology. *The Counseling Psychologist*, 17(1): 136-144.
- Betz, N. E. 2008. Advances in vocational theories. In S. D. Brown & R. W. Lent (Eds.), *Handbook of counseling psychology* (4th ed.): 357-374. Hoboken, NJ.: Wiley.

- Blackwell, L. V., Snyder, L. A., & Mavriplis, C. 2009. Diverse faculty in STEM fields: Attitudes, performance, and fair treatment. *Journal of Diversity in Higher Education*, 2(4): 195-205.
- Blanco, Á. 2011. Applying social cognitive career theory to predict interests and choice goals in statistics among Spanish psychology students. *Journal of Vocational Behavior*, 78(1): 49-58.
- Blickenstaff, J. C. 2005. Women in science careers: Leaky pipeline or gender filter? *Gender and Education*, 17(4): 369-386.
- Brown, S. D., Lent, R. W., Telander, K., & Tramayne, S. 2011. Social cognitive career theory, conscientiousness, and work performance: A meta-analytic path analysis. *Journal of Vocational Behavior*, 79(1): 81-90.
- Brown, S. D., Tramayne, S., Hoxha, D., Telander, K., Fan, X., & Lent, R. W. 2008. Social cognitive predictors of college students' academic performance and persistence: A meta-analytic path analysis. *Journal of Vocational Behavior*, 72(3): 298-308.
- Butts, M. M., Casper, W. J., & Yang, T. S. 2013. How important are work-family support policies? A meta-analytic investigation of their effects on employee outcomes. *Journal of Applied Psychology*, 98(1): 1-25.
- Byars, A. M. 1997. *Ethnic and racial influences on African American college women's career self-efficacy*. Unpublished doctoral dissertation, Arizona State University, Tempe, Arizona, USA.
- Byars-Winston, A. M., & Fouad, N. A. 2008. Math and science social cognitive variables in college students: Contributions of contextual factors in predicting goals. *Journal of Career Assessment*, 16(4): 425-440.
- Camp, T. 1997. The incredible shrinking pipeline. *Communications of the ACM*, 40(10): 103-110.
- Casper, W. J., Harris, C., Taylor-Bianco, A., & Wayne, J. H. 2011. Work-family conflict, perceived supervisor support and organizational commitment among Brazilian professionals. *Journal of Vocational Behavior*, 79(3): 640-652.
- Cech, E., Rubineau, B., Silbey, S., & Serond, C. 2011. Professional role confidence and gendered persistence in engineering. *American Sociological Review*, 76(5): 641-666.
- Chi-Ching, Y. 1995. The effects of career salience and life-cycle variables on perceptions of work-family interfaces. *Human Relations*, 48(3): 265-284.
- Chung, Y. B. 2002. Career decision-making self-efficacy and career commitment: Gender and ethnic differences among college students. *Journal of Career Development*, 28(4): 277-284.
- Clausen, J. A. 1995. Gender, contexts and turning points in adults' lives. In P. Moen, G. H. Elder Jr. & K. Luscher (Eds.), *Examining lives in context: Perspectives on the ecology of human development*: 365-389. Washington, DC: APA Press.
- Correll, S. J. 2001. Gender and the Career Choice Process: The Role of Biased Self-Assessment. *American Journal of Sociology*, 106(6): 1691-1730.

- Correll, S. J. 2004. Constraints into Preferences: Gender, Status, and Emerging Career Aspirations. *American Sociological Review*, 69(1): 93-113.
- Croll, P. 2008. Occupational choice, socio-economic status and educational attainment: A study of the occupational choices and destinations of young people in the British Household Panel Survey. *Research Papers in Education*, 23(3): 243-268.
- De Fruyt, F., & Mervielde, I. 1997. The five-factor model of personality and Holland's RIASEC interest types. *Personality and individual differences*, 23(1): 87-103.
- Diemer, M. A., & Blustein, D. L. 2007. Vocational hope and vocational identity: Urban adolescents' career development. *Journal of Career Assessment*, 15(1): 98-118.
- Dreber, A., von Essen, E., & Ranehill, E. 2009. *Outrunning the gender gap: Boys and girls compete equally*. SSE/EFI Working paper series in economics and finance no. 709, Stockholm, Sweden.
- Eccles, J. S. 2007. Where are all the women? Gender differences in participation in physical science and engineering. In S. J. Ceci & W. M. Williams (Eds.), *Why aren't more women in science? Top researchers debate the evidence*: 199-210. Washington, DC: American Psychological Association.
- Eisenberger, R., Fasolo, P., & Davis-LaMastro, V. 1990. Perceived organizational support and employee diligence, commitment, and innovation. *Journal of applied psychology*, 75(1): 51-59.
- Elder, G. H. 1999. *Children of the great depression: Social change in life experience*. Boulder, CO: Westview Press.
- Fels, A. 2004. Do women lack ambition? *Harvard Business Review*, 82(4): 50-60.
- Ferry, T. R., Fouad, N. A., & Smith, P. L. 2000. The role of family context in a social cognitive model for career-related choice behavior: A math and science perspective. *Journal of Vocational Behavior*, 57(3): 348-364.
- Flores, L. Y., & O'Brien, K. M. 2002. The career development of Mexican American adolescent women: A test of social cognitive career theory. *Journal of Counseling Psychology*, 49(1): 14-27.
- Florida, R., & Gates, G. 2001. *Technology and Tolerance: The Importance of Diversity to High-technology Growth*. Brookings Institution, Washington, D C.
- Fox, M. F. 1991. Gender, environmental milieu, and productivity. In H. Zuckerman, J. Cole & J. Bruer (Eds.), *The outer circle*: 188-204. New York: W.W. Norton and Company.
- Frome, P. M., Alfeld, C. J., Eccles, J. S., & Barber, B. L. 2006. Why don't they want a male-dominated job? An investigation of young women who changed their occupational aspirations. *Educational Research and Evaluation*, 12(4): 359-372.
- Gerstein, M., Lichtman, M., & Barokas, J. V. 1988. Occupational plans of adolescent women compared to men: A cross-sectional examination. *Career Development Quarterly*, 36(3): 222-230.
- Gilbert, L. A. 1993. *Two careers/one family: The promise of gender equality*. Newbury Park, CA: Sage.

- Ginzberg, E., Ginsburg, S. W., Axelrad, S., & Herman, J. L. 1951. *Occupational choice: An approach to a general theory*. New York: Columbia University Press.
- Gneezy, U., Niederle, M., & Rustichini, A. 2003. Performance in competitive environments: Gender differences. *Quarterly Journal of Economics*, 118(3): 1049-1074.
- Gneezy, U., & Rustichini, A. 2004. Gender and competition at a young age. *American Economic Review Papers and Proceedings*, 94(2): 377-381.
- Gottfredson, L. S. 1996. Gottfredson's theory of circumscription and compromise. In D. Brown, L. Brooks & Associates (Eds.), *Career choice and development* (3rd ed.): 179-232. San Francisco: Jossey-Bass Publishers.
- Greenhaus, J. H. 1971. An investigation of the role of career salience in vocational behavior. *Journal of Vocational Behavior*, 1(3): 209-216.
- Griffith, A. L. 2010. *Persistence of women and minorities in STEM field majors: Is it the school that matters?* Cornell University, School of Industrial and Labor Relations site: <http://digitalcommons.ilr.cornell.edu/workingpapers/122/> [Last retrieved 23.11.2015].
- Hackett, G., & Betz, N. E. 1981. A self-efficacy approach to the career development of women. *Journal of Vocational Behavior*, 18(3): 326-336.
- Hackett, G., Betz, N. E., Casas, J. M., & Rocha-Singh, I. A. 1992. Gender, ethnicity, and social cognitive factors predicting the academic achievement of students in engineering. *Journal of Counseling Psychology*, 39(4): 527-538.
- Hackett, G., & Lonborg, S. D. 1993. Career assessment for women: Trends and Issues. *Journal of Career Assessment*, 1(3): 197-216.
- Hakim, C. 2006. Women, careers, and work-life preferences. *British Journal of Guidance & Counselling*, 34(3): 279-294.
- Hellenga, K., Aber, M. S., & Rhodes, J. E. 2002. African American adolescent mothers' vocational aspiration-expectation gap: Individual, social, and environmental influences. *Psychology of Women Quarterly*, 26(3): 200-212.
- Hill, E. J., Ferris, M., & Mårtinson, V. 2003. Does it matter where you work? A comparison of how three work venues (traditional office, virtual office, and home office) influence aspects of work and personal/family life. *Journal of Vocational Behavior*, 63(2): 220-241.
- Hock, E., & DeMeis, D. K. 1990. Depression in mothers of infants: The role of maternal employment. *Developmental Psychology*, 26(2): 285-291.
- Holland, J. L. 1959. A theory of vocational choice. *Journal of Counseling Psychology*, 6(1): 35-45.
- Hoobler, J. M., Lemmon, G., & Wayne, S. J. 2011. Women's underrepresentation in upper management: New insights on a persistent problem. *Organizational Dynamics*, 40(3): 151-156.
- Jinks, J. L., & Morgan, V. L. 1999. Children's perceived academic self-efficacy: An inventory scale. *The Clearing House*, 72(4): 224-230.

- Katz, S., Allbritton, D., Aronis, J., Wilson, C., & Soffa, M. L. 2006. Gender, achievement, and persistence in an undergraduate computer science program. *ACM SIGMIS Database*, 37(4): 42-57.
- Kelker, G., Shrestha, G., & Veena, N. 2002. IT industry and women's agency: Explorations in Bangalore and Delhi, India. *Gender, Technology and Development*, 6(1): 63-84.
- Kelly, R. R. 2010. *The Relationship Between Career Decision-Making Self-Efficacy and Perceived Career Barriers in the Career Decision Making of Selected Community College Students*. University of North Carolina, Chapel Hill, NC, USA.
- Krumboltz, J. D., Mitchell, A. M., & Jones, G. B. 1976. A social learning theory of career selection. *The Counseling Psychologist*, 6(1): 71-81.
- Kyvik, S., & Teigen, M. 1996. Child care, research collaboration, and gender differences in scientific productivity. *Science, Technology, & Human Values*, 21(1): 54-71.
- Leal-Muniz, V., & Constantine, M. G. 2005. Predictors of the career commitment process in Mexican American college students. *Journal of Career Assessment*, 13(2): 204-215.
- Lent, R. W. 2005. A social cognitive view of career development and counseling. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work*: 101-130. Hoboken, NJ: Wiley.
- Lent, R. W. 2013. Social cognitive career theory. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling* (2nd ed.): 115-146. New York: Wiley.
- Lent, R. W., Brown, S. D., Brenner, B., Chopra, S. B., Davis, T., Talleyrand, R., & Suthakaran, V. 2001. The role of contextual supports and barriers in the choice of math/science educational options: A test of social cognitive hypotheses. *Journal of Counseling Psychology*, 48(4): 474-483.
- Lent, R. W., Brown, S. D., & Hackett, G. 1994. Toward a unifying social cognitive theory of career and academic interest, choice and performance. *Journal of Vocational Behavior*, 45(1): 79-122.
- Lent, R. W., Brown, S. D., & Hackett, G. 1996. Career development from a social cognitive perspective. In D. Brown, L. Brooks & Associates (Eds.), *Career choice and development* (3rd ed.): 373-421. San Francisco: Jossey-Bass Publishers.
- Lent, R. W., Brown, S. D., & Hackett, G. 2000. Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counselling Psychology*, 47(1): 36-49.
- Lent, R. W., Brown, S. D., Schmidt, J., Brenner, B., Lyons, H., & Treistman, D. 2003. Relation of contextual supports and barriers to choice behavior in engineering majors: Test of alternative social cognitive models. *Journal of Counseling Psychology*, 50(4): 458-465.
- Lent, R. W., Brown, S. D., Talleyrand, R., McPartland, E. B., Davis, T., Chopra, S., Alexander, M. S., Suthakaran, V., & Chai, C. M. 2002. Career choice barriers,

- supports, and coping strategies: College students' experiences. *Journal of Vocational Behavior*, 60(1): 61-72.
- Lent, R. W., Brown, S. D., Veerasamy, S., Talleyrand, R., Chai, C. M., Davis, T., Chopra, S. B., & McPartland, E. B. 1998. *Perceived supports and barriers to career choice*. Meeting of the National Career Development Association, Chicago, IL.
- Lent, R. W., Lopez, F. G., Sheu, H. B., & Lopez, A. M. 2011. Social cognitive predictors of the interests and choices of computing majors: Applicability to underrepresented students. *Journal of Vocational Behavior*, 78(2): 184-192.
- Lent, R. W., Sheu, H. B., Gloster, C. S., & Wilkins, G. 2010. Longitudinal test of the social cognitive model of choice in engineering students at historically Black universities. *Journal of Vocational Behavior*, 76(3): 387-394.
- Lent, R. W., Singley, D., Sheu, H. B., Schmidt, J. A., & Schmidt, L. C. 2007. Relation of social-cognitive factors to academic satisfaction in engineering students. *Journal of Career Assessment*, 15(1): 87-97.
- Leung, S., Conoley, C., & Scheel, M. 1994. The career and educational aspirations of gifted high school students: A retrospective study. *Journal of Counseling and Development*, 72(3): 298-303.
- Luzzo, D. A., Hawley, E., & McWhirter, G. 2001. Sex and ethnic differences in the perception of educational and career-related barriers and levels of coping efficacy. *Journal of Counseling & Development*, 79(1): 61-67.
- Luzzo, D. A., & Hutcheson, K. G. 1996. Causal attributions and sex differences associated with perceptions of occupational barriers. *Journal of Counseling & Development*, 75(1): 124-130.
- Marsden, P. V., Kalleberg, A. L., & Cook, C. R. 1993. Gender differences in organizational commitment influences of work positions and family roles. *Work and Occupations*, 20(3): 368-390.
- Mathieu, J. E. 1992. The Influence of Commitment to Assigned Goals and Performance on Subsequent Self-Set Goals and Performance. *Journal of Applied Social Psychology*, 22(13): 1012-1029.
- Mau, W. C. 2003. Factors that influence persistence in science and engineering career aspirations. *The Career Development Quarterly*, 51(3): 234-243.
- McWhirter, E. H., Torres, D., & Rasheed, S. 1998. Assessing barriers to women's career adjustment. *Journal of Career Assessment*, 6(4): 449-479.
- Mednick, M. T., & Thomas, V. G. 1993. Women and the psychology of achievement: A view from the eighties. In F. L. Denmark & M. A. Paludi (Eds.), *Psychology of women. A handbook of issues and theories*: 585-626. Westport: Greenwood Press.
- Mello, Z. R. 2008. Gender variation in developmental trajectories of educational and occupational expectations and attainment from adolescence to adulthood. *Developmental Psychology*, 44(4): 1069-1080.

- Mendez, L., & Crawford, K. 2002. Gender-role stereotyping and career aspirations: A comparison of gifted early adolescent boys and girls. *Journal of Secondary Gifted Education*, 13(3): 96-107.
- Moya, M., Exposito, F., & Ruiz, J. 2000. Close relationships, gender, and career salience. *Sex Roles*, 42(9): 825-846.
- National Science Board (NSB) 2007. A National Action Plan for Addressing the Critical Needs of the U.S. Science, Technology, Engineering, and Mathematics Education System. Arlington, VA: National Science Foundation.
- Niederle, M., & Vesterlund, L. 2007. Do women shy away from competition? Do men compete too much? *Quarterly Journal of Economics*, 122(3): 1067-1101.
- O'Brien, K. M., & Fassinger, R. E. (1993). A causal model of the career orientation and career choice of adolescent women. *Journal of counseling psychology*, 40(4): 456-469.
- O'Brien, K. M., Friedman, S. M., Tipton, L. C., & Linn, S. G. 2000. Attachment, separation, and women's vocational development: A longitudinal analysis. *Journal of Counselling Psychology*, 47(3): 301-315.
- O'Leary, V. E. 1974. Some attitudinal barriers to occupational aspirations in women. *Psychological Bulletin*, 81(11): 809-826.
- OECD 2001. Understanding the digital divide. Paris.
- Pajares, F., & Miller, M. D. 1994. The role of self-efficacy and self-concept beliefs in mathematical problem-solving: A path analysis. *Journal of Educational Psychology*, 86(2): 193-203.
- Panteli, A., Stack, J., Atkinson, M., & Ramsay, H. 1999. The status of women in the UK IT industry: an empirical study. *European Journal of Information Systems*, 8(3): 170-182.
- Parsons, F. 1909. *Choosing a vocation*. Boston: Houghton Mifflin.
- Perrone, K. M., Civiletto, C. L., Webb, L. K., & Fitch, J. C. 2004. Perceived barriers to and supports of the attainment of career and family goals among academically talented individuals. *International Journal of Stress Management*, 11(2): 114-131.
- Pfost, K. S., & Fiore, M. 1990. Pursuit of nontraditional occupations: Fear of success or fear of not being chosen? *Sex Roles*, 23(1/2): 15-24.
- Powell, W. W., & Snellman, K. 2004. The knowledge economy. *Annual review of sociology*, 30(1): 199-220.
- Prediger, D. J., & Vansickle, T. R. 1992. Locating occupations on Holland's hexagon: Beyond RIASEC. *Journal of Vocational Behavior*, 40(2): 111-128.
- Quimby, J. L., & DeSantis, A. M. 2006. The influence of role models on women's career choices. *The Career Development Quarterly*, 54(4): 297-306.
- Raiff, G. W. 2004. *The influence of perceived career barriers on women's career planning*. Doctoral dissertation, University of North Texas, Denton.

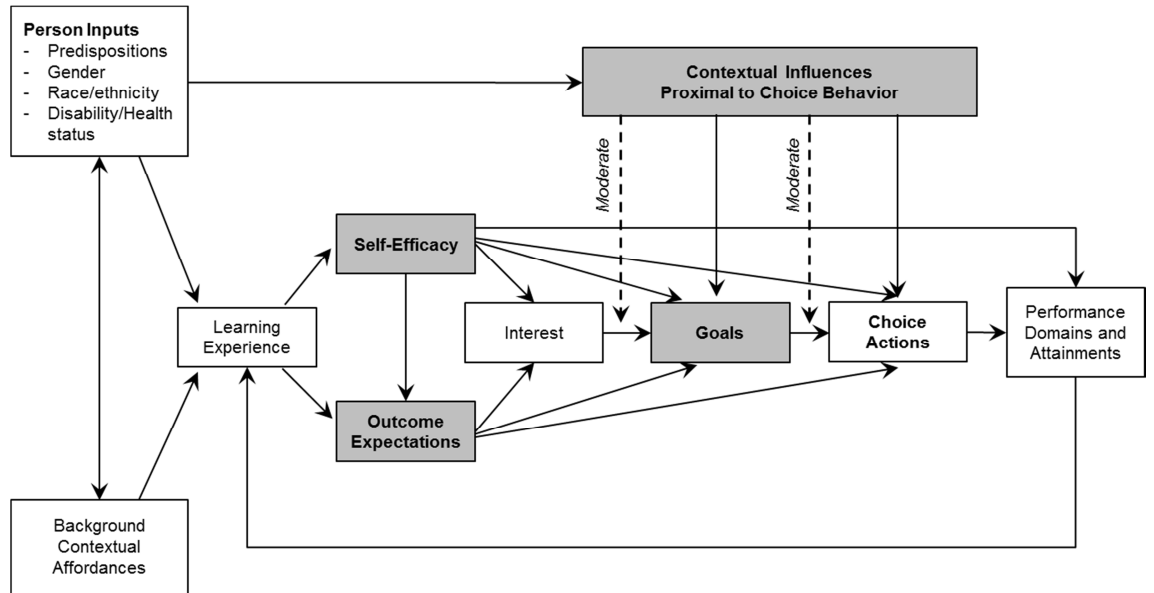
- Reis, S. M. 1991. The need for clarification in research designed to examine gender differences in achievement and accomplishment. *Roeper Review*, 13(4): 193-198.
- Roberts, E. 2003. *Expanding the Audience for Computer Science*. Proceedings of the Thirty-fourth SIGSCE Technical Symposium on Computer Science Education. Reno, NV, USA.
- Rottinghaus, P. J., Larson, L. M., & Borgen, F. H. 2003. The relation of self-efficacy and interests: A meta-analysis of 60 samples. *Journal of Vocational Behavior*, 62(2): 221-236.
- Rounds, J., & Tracey, T. J. 1996. Cross-cultural structural equivalence of RIASEC models and measures. *Journal of Counseling Psychology*, 43(3): 310-329.
- Russell, J. E. A., & Rush, M. C. 1987. A comparative study of age-related variation in women's views of a career in management. *Journal of Vocational Behavior*, 30(3): 280-294.
- Scandura, T. A., & Lankau, M. J. 1997. Relationships of gender, family responsibility and flexible work hours to organizational commitment and job satisfaction. *Journal of organizational Behavior*, 18(4): 377-391.
- Schoon, I., Martin, P., & Ross, A. 2007. Career transitions in times of social change. His and her story. *Journal of Vocational Behavior*, 70(1): 78-96.
- Schoon, I., & Parsons, S. 2002. Teenage aspirations for future careers and occupational outcomes. *Journal of Vocational Behavior*, 60(2): 262-288.
- Seymour, E., & Hewitt, N. M. 1997. *Talking about leaving: Why undergraduates leave the sciences*. Boulder, CO, Oxford: Westview Press.
- Shanker, D. 2008. Gender relations in IT companies: An Indian experience. *Gender Technology and Development*, 12(2): 185-207.
- Sheu, H. B., Lent, R. W., Brown, S. D., Miller, M. J., Hennessy, K. D., & Duffy, R. D. 2010. Testing the choice model of social cognitive career theory across Holland themes: A meta-analytic path analysis. *Journal of Vocational Behavior*, 76(2): 252-264.
- Smith, S. 2004. Career barriers among information technology undergraduate majors. *Information Technology, Learning, and Performance Journal*, 22(1): 49-56.
- Sonnert, G., Fox, M. F., & Adkins, K. 2007. Undergraduate women in science and engineering: Effects of faculty, fields, and institutions over time. *Social Science Quarterly*, 88(5): 1333-1356.
- Super, D. E. 1953. A theory of vocational development. *American Psychologist*, 8(5): 185-190.
- Super, D. E. 1990. A life-span, life-space approach to career development. In D. Brown, L. Brooks & Associates (Eds.), *Career choice and development* (3rd ed.): 373-421. San Francisco: Jossey-Bass Publishers.
- Swanson, J. L., & Daniels, K. K. 1994. *Examining the components of career-related barriers*. Paper presented at the annual meeting of the American Psychological Association, Los Angeles, CA.

- Swanson, J. L., Daniels, K. K., & Tokar, D. M. 1996. Measuring perceptions of career-related barriers: The Career Barriers Inventory. *Journal of Career Assessment*, 4(2): 219-244.
- Swanson, J. L., & Tokar, D. M. 1991a. College students' perceptions of barriers to career development. *Journal of Vocational Behavior*, 38(1): 92-106.
- Swanson, J. L., & Tokar, D. M. 1991b. Development and initial validation of the Career Barriers Inventory. *Journal of Vocational Behavior*, 39(3): 344-361.
- Swanson, J. L., & Woitke, R. 1997. Theory into practice in career assessment for women: Assessment and interventions regarding perceived career barriers. *Journal of Career Assessment*, 5(4): 443-462.
- Tang, M., Fouad, N. A., & Smith, P. L. 1999. Asian Americans' career choices: A path model to examine factors influencing their choices. *Journal of Vocational Behavior*, 54(1): 142-157.
- Trauth, E. M. 2002. Odd girl out: an individual differences perspective on women in the IT profession. *Information Technology & People*, 15(2): 98-118.
- Trauth, E. M. 2006. Theorizing Gender and Information Technology Research. In E. M. Trauth (Ed.), *Encyclopedia of Gender and Information Technology*: 1154-1159. Hershey, PA: Idea Group Publishing.
- Trauth, E. M., Nielsen, S. H., & von Hellens, L. A. 2003. Explaining the IT gender gap: Australian stories for the new millennium. *Journal of Research and Practice in Information Technology*, 35(1): 7-20.
- Trauth, E. M., Quesenberry, J. L., & Huang, H. 2009. Retaining women in the US IT workforce: theorizing the influence of organizational factors. *European Journal of Information Systems*, 18(5): 476-497.
- Upadhyia, C. 2006. Gender issues in the Indian software outsourcing industry. In A. Gurumurthy, P. J. Singh, A. Mundkur & M. Swamy (Eds.), *Gender in the Information society: Emerging issues, ICT4D Series*: 74-84. Bangkok.
- van Vianen, A. E. M., & Fischer, A. H. 2002. Illuminating the glass ceiling: The role of organizational culture preferences. *Journal of Occupational & Organizational Psychology*, 75(3): 315-337.
- van Vianen, A. E. M., & Keizer, W. A. J. 1996. Gender Differences in Managerial Intention. *Gender, Work & Organization*, 3(2): 103-114.
- von Hellens, L. A., Pringle, R., Nielsen, S., & Greenhill, A. 2000. People, business, and IT skills: The perspective of women in the IT industry. In W. Nance (Ed.), *Proceedings of the ACM SIGCPR Special Interest Group on Computer Personnel Research*: 152-157. Association for Computing Machinery, Chicago, IL.
- Wajcman, J., & Le, A. P. L. 2007. The gender relations of software work in Vietnam. *Gender, Technology and Development*, 11(1): 1-25.
- Weiss, E. M. 1999. Perceived workplace conditions and first-year teachers' morale, career choice commitment, and planned retention: A secondary analysis. *Teaching and Teacher Education*, 15(8): 861-879.

- Whetten, D. A. 1989. What Constitutes a Theoretical Contribution? *The Academy of Management Review*, 14(4): 490-495.
- Wilson-Kovacs, D. M., Ryan, M., & Haslam, A. 2006. The glass-cliff: women's career paths in the UK private IT sector. *Equal Opportunities International*, 25(8): 674-687.
- Zimmerman, B. J. 1995. Self-efficacy and educational development. In A. Bandura (Ed.), *Self-efficacy in changing societies*: 202-231. New York: Cambridge University Press.

APPENDIX

The career choice model by Lent, Brown, & Hackett 1994



**Why do Indian women choose a career in ICT? And why don't they stay?
Core components of career choices in ICT-industry - A qualitative study**

Working Paper

Carola Jungwirth and Nobina Roy

ABSTRACT

Like other industries of information and communication technology (ICT-industry) around the globe the fast growing Indian ICT-industry is struggling with a shortage of skilled labor. Unlike other ICT-industries the Indian ICT-industry is successful in persuading female students from choosing a career in ICT and achieving gender parity at the entry level. However, after six to twelve years women quit and the gender ratio becomes similar to other ICT-industries, namely a workforce of approximately 90 percent males and 10 percent females. While gender parity at the entry level seems to be ensured through several policies undertaken by the Indian government and the ICT-industry, the high attrition rate seems to be based on traditional role expectations. Analyzing this phenomenon we are particularly interested in understanding why so many women decide for a career in ICT, which contradicts the prevailing approach to explain why so many women decide against a career in ICT. Using the theoretical foundation of Social Cognitive Career Theory we conducted interviews with 35 experts from the Indian ICT-industry, universities (professors and students) and the government to identify core components of career choices in the Indian ICT-industry. Our results suggest that the good image and earnings opportunities are major drivers to attract women, but mislead them with regard to family-unfriendly working conditions within the Indian ICT-industry.

Keywords: ICT-industry, India, career choices, gender, contextual career-related barriers & supports

Article 2: Why do Indian women choose a career in ICT? And why don't they stay? Core components of career choices in ICT-industry - A qualitative study

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**Why do Indian women choose a career in ICT? And why don't they stay?
Core components of career choices in ICT-industry - A qualitative study**

INTRODUCTION

Like other industries of information and communication technology (ICT-industry) around the globe the fast growing Indian ICT-industry is struggling with a shortage of skilled labor, but unlike other ICT-industries the Indian ICT-industry is successful in persuading female students from choosing a career in ICT. The growth of the Indian ICT-industry has influenced women's employment (Rothboeck, Vijayabaskar, & Gayathri, 2001) and weakened patriarchal systems (Kelkar, Shrestha, & Veena, 2002). Therefore, the Indian ICT-industry is considered to be a gender-neutral work-environment (Shanker, 2008). Achieving gender parity at the entry level of the ICT-industry (Ramalingam, 2012) has enabled India to become an exemplary country dealing with the „women in STEM“ (science, technology, engineering, mathematics) issue. However, even in India women quit after six to twelve years and the gender ratio becomes similar to other ICT-industries, namely a workforce of approximately 90 percent males and 10 percent females (Lannon, 2013; Nasscom-Mercer, 2009).

Analyzing this phenomenon we are particularly interested in understanding why so many women decide for a career in ICT contradicting the prevailing approach, which explains why so many women decide against a career in ICT (e.g., Orser, Riding, & Stanley, 2012). Our research questions are: Why do Indian women choose a career in ICT? And why don't they stay? Using the theoretical foundation of Social Cognitive Career Theory (SCCT; Lent, Brown, & Hackett, 1994) we aim at identifying core components of women's career choices in Indian ICT-industry. Therefore, we conducted interviews with 35 experts from the Indian ICT-industry, universities and the government asking them to assess the career choices of women with regard to working conditions within the ICT-industry. Our results suggest that the good image and earnings opportunities are major drivers to attract women, but also mislead them with regard to family-unfriendly working conditions within the Indian ICT-industry.

Concerning the contents, we contribute to the “women in STEM” discussion, as we are able to show an influence of image campaigns and support measures on career

choices of women. Concerning the theory, we deduce the core components of career choices in ICT-industry from the more general SCCT (Lent et al., 1994) and present an approach to explain career choices of women in ICT. In contrast to prior research, we give equal weightage to all components instead of focusing on career-related barriers.

Before presenting the remainder of the paper we briefly outline the history of the Indian ICT-industry, which plays a prominent role in transforming the country into one of the world's fastest-growing economies: The starting point for the Indian ICT-industry was towards the end of the 1950ties, when English was proclaimed as the official language (King, 1999). At the beginning of the 1960ties the Indian government invested huge amounts into education and founded seven elite universities – five Indian Institutes of Technology (IITs) and two Indian Institutes of Managements (IIMs) (Bhatnagar, 2006). The strong focus on technology is obvious. In 1968 TATA Consultancy Services were founded and started to provide the Indian government and industry with state of the art ICT-solutions. The shortage of skilled labor in the US led to the phenomenon of „body shopping“ in the 1970ties (Arora, 2008), when Indian ICT-professionals moved to the US and returned to the Indian ICT-industry with a highly sophisticated level of experience. In 1988 the Nasscom (National Association of Software and Services Companies) was founded, which has the objective „to build a growth led by sustainable technology and business services sector in the country“ (Nasscom, 2013). As an influential lobby organization the Nasscom bundles Indian's ICT-activities and is crucial for all image building activities within and outside the country. Campaigns like “IT's a women's world” (Ramalingam, 2012) or the perception of ICT as “the” entry to a top-level career result from Nasscom's marketing activities (Bhatnagar, 2006; Nasscom, 2013; Nasscom-Mercer, 2009). Economic liberalization in the 1990s and first decade of the 21st century allowed strong entrepreneurial activities supporting the growth of the ICT-industry. Indian entrepreneurs returned from the US and started businesses in India, where an active cluster building policy led to ICT-agglomerations like Bangalore, Hyderabad, Chennai, National Capital Region, Pune, etc. (Balatchandirane, 2007). While the Indian ICT-industry accounted for 1,2 percent of the GDP in 1998/99, it accounts for 8 percent in 2012/13, which is comparable with the US (7,1 percent) or Germany (8,3 percent). This huge growth of the Indian ICT-industry explains its struggle with a shortage of skilled labor and its strong need and increased effort to attract women to the

ICT-industry. This effort also yields from the fact that men change their jobs more frequently compared to women, whereas women tend to stay for a longer period of time and therefore create a persistent asset for the company (Cech, Rubineau, Silbey, & Seron, 2011; Chung, 2002; Marsden, Kalleberg, & Cook, 1993; Scandura & Lankau, 1997). This is why companies are willing to recruit a high share of women at the entry level (50% to 60%) and are looking for measures against the high drop out rates.

In the remainder of this paper we introduce some literature on „women in STEM“ fields, which includes barriers as well as supports, but rather focuses on barriers. Based thereon, we deduce core components of career choices in ICT-industry. We depart from the more general SCCT (Lent et al., 1994), which we specify and refine using data from the expert interviews. The procedure of data collection and qualitative methods for data analysis are presented and in the subsequent sections we report our results and derive implications for future research.

LITERATURE REVIEW

Accumulated literature on women in STEM-fields focuses on contextual career-related factors as rationales (e.g., Deemer, Thoman, Chase, & Smith, 2014; Lindley, 2005; Swanson & Woitke, 1997). Such factors “comprise the real and perceived opportunity structure within which career plans are devised and implemented” (Lent et al., 1994: 107). In the following, previous research that focused on contextual career-related factors, which comprise barriers as well as supports, and their effects on career choices are being discussed.

Evidence from previous research implies that career-related barriers hold an important role in the career choice, particularly related to vocational behavior of men and women (Swanson & Tokar, 1991; Swanson & Woitke, 1997). Talmud and Izraeli (1999) suggest classifying career-related barriers into individual-level and institutional-level barriers. This classification assists to systemize several paradigms that may influence women’s vocational behavior in the technology sector. We apply this classification on paradigms related to the ICT-sector, assuming that the ICT-sector constitutes a subgroup of the technology sector and considerations are transferable.

Individual-level barriers: Talmud and Izraeli (1999) define individual-level barriers as “variables that are associated with gender, but are not an inherent aspect of gender” (Talmud & Izraeli, 1999: 461). These barriers are based on self-efficacy beliefs, lack of role models, socialization processes and differences in time allocation among men and women.

For example, considerable empirical research has analyzed gender differences in self-efficacy beliefs regarding STEM-related skills and their influence on considerations of STEM-related careers (Correll, 2001; Lent, Brown, Schmidt, Brenner, Lyons, & Treistman, 2003; Lent et al., 2005; Post-Kammer & Smith, 1985). Men report higher self-efficacy beliefs regarding their math- and science-related skills than women, which leads to differences in self-confidence. Also, the majority of women are employed in the lower part of the career-ladder, which leads to a feminization of certain vocational fields, whereas managerial positions remain male-dominated (Kelkar & Nathan, 2002). Due to the lack of role models in managerial positions, women often do not have future career visions regarding an ICT-related vocation and hence, do not opt for a career in the ICT-industry. Moreover, gender differences are also evidenced in expectations regarding career development and time allocation towards household and paid work due to traditional gender roles and socialization processes (Moya, Exposito, & Ruiz, 2000). Compared to men, women are not expected to invest the same amount of time into paid work as into household. Studies depict that women who work full-time feel double-burdened as they are additionally and solely in charge of household work (Blau, Ferber, & Winkler, 2010). This also helps to understand why women perceive higher barriers regarding work-life-balance than men (Swanson & Tokar, 1991).

In sum, women in ICT-sector are more likely to experience individual-level barriers than men.

Institutional-level barriers: Institutional-level barriers are variables that are inherent in “organizational culture: procedures, informal rules of behavior, incentives and organizational priorities” (Orser et al., 2012: 77; Carrillo & Gromb, 2006). The prediction is that organizations are not gender neutral and that above mentioned aspects permeate gender differences. As ICT-companies are mainly located in clusters these differences also spread across the sector and lead to sector-wide gender differences (Orser et al., 2012). For example, empirical evidence suggests that the dynamic and high speed of

innovations in ICT-sector as well as the necessity of mobility and flexibility create a barrier. As ICT-related businesses regularly implement new technologies (Taganas & Kaul, 2006), employees are required to constantly upgrade their skills and learn new technologies. Particularly women who have to take career-breaks due to child-birth and rearing, face difficulties to comply with these requirements as they are not able to invest the afforded amount of time which sets off their bargaining power regarding promotions and deters a re-entry to the industry (Shanker, 2008). Even the necessity of traveling and working during odd times results in a preference for unmarried women and men in recruitments as they are rarely bound to family duties (Bhattacharyya & Nath, 2011). Gender differences have also been evidenced in different accesses to informal networks and mentorships. Work culture in the ICT-industry is embossed by interpersonal relationships, team spirit and project work rather than by a bureaucratic work environment (Upadhyya, 2006). As mostly women are in charge of family and housekeeping duties, they are unable to take part in networking activities after-office hours with their male-dominated social groups (Shanker, 2008). This puts women at disadvantages when it comes to personal appraisal and promotions.

In sum, accumulated research has shown that there are gender differences regarding distinct characteristics of the ICT-sector and that women are more likely to perceive institutional-level barriers than men.

Contextual supports: Empirical evidence from previous research implies that not only barriers, but also supports hold an important role in the career choice process (Corneliussen, 2005; Lent, Brown, & Hackett, 2000). For example, supportive actions by faculty staff are related to higher academic performance of engineering students (Hackett, Betz, Casas, & Rocha-Singh, 1992). Gender differences have also been evidenced regarding support by significant others (friends, teachers and parents) that positively affect vocational behavior (Fisher & Stafford, 1999; McWhirter, 1997). Also society's acceptance of the chosen vocation seems to play a major part in the career choice-making (Shanker, 2008).

Following the levels of contextual career-related barriers, individual-level and institutional-level, it is important to mention that scholars and researchers have mainly focused on *social* contextual career-related supports, which address the individual-level of consideration. Contextual supports on an institutional-level have not yet been exam-

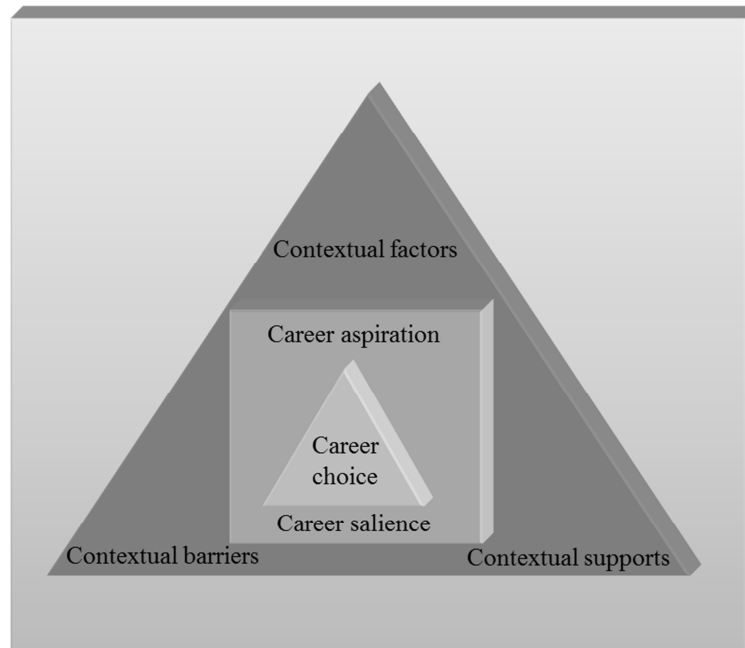
ined, intensively. We will elaborate on this aspect when introducing the core components of career choices.

All in all, literature rather focuses on barriers than on supports. In contrast to that, SCCT (Lent et al., 1994) includes barriers as well as supports. However, in its present form SCCT does not allow explaining concrete career choices in ICT as it is too general and complex. Therefore, we use SCCT as a basis to deduce the core components of women's career choices in Indian ICT-industry and present an approach that gives equal weightage to all components instead of focusing on barriers exclusively. With this we follow an approach by Roy (2013), who reduced the complex structure of the SCCT-framework to core components regarding the career choices of individuals in the ICT-industry.*

THEORY: CORE COMPONENTS OF CAREER CHOICES

According to Cooper, Argyris, and Channon (1998), career choice is a decision about which line of work to pursue. In context of SCCT career choices are not only influenced by career-related supports and barriers but also and predominantly by individual and personal career-related factors.

* For a more detailed deduction of the core components and their embeddedness in SCCT see Roy (2013). To make one note in advance: Roy (2013) considered the hindrance-factor in her model of career choices. As our data collection revealed that this factor is not relevant for our sample, we excluded the assessment of hindrance-factor from our study.

Figure 1: Core components of career choices

Source: Authors' own illustration.

Hellenga, Aber and Rhodes (2002) describe the term “career aspirations” as “information about an individual’s interests and hopes, unfettered by reality” (Hellenga et al., 2002: 200). They describe an individual’s career-related dreams and visions that are independent from the real circumstances. Studies put high value on career aspirations as they strongly guide an individual’s behavior (Rojewski, 1996). Career aspirations have also been found to relate to intentions to pursue non-traditional careers (Nauta, Epper-son, & Kahn, 1998) and therefore, define a component of considerable importance in women's vocational behavior regarding the ICT-industry. Therefore, we name career aspirations as the first core component.

O’Brien, Friedman, Tipton and Linn (2000) point out the importance of “career salience”. Career salience is defined as “value an individual places on work-related pursuits” (Raiff, 2004: 24). Hence, it addresses the amount of effort and involvement that an individual is willing to invest into his/ her career. Statements like “I would move to another city/ country if it would help advancing in my career” (Greenhaus, 1971 cited in Diemer & Blustein, 2007) reveal the value an individual puts on his/ her career. An individual's career salience is a reflection of past experiences and previous socialization and can lead to limited career-orientation beyond individual control. Therefore, we choose career salience as the second core component.

However, we assume the perception of contextual career-related barriers and supports to be crucial for a career choice. Career-related barriers are defined as “events or conditions, either within the person or in his or her environment, that make career progress difficult” (Swanson & Woitke, 1997: 446). The concept of career-related barriers emerged from discussions of the factors that are unique to the career psychology of women. Considerable research has demonstrated that individuals do perceive barriers to their career development, which affects their subsequent decision-making process in various ways (Luzzo & McWhirter, 2001; Swanson & Tokar, 1991; Swanson & Woitke, 1997). That is why we select the perception of contextual career-related barriers as our third core component.

In context of the SCCT career-related supports are conceived “as environmental variables that can facilitate the formation and pursuit of individuals' career choices” (Lent et al., 2000: 42). Research has mainly focused on social supports on an individual-level, but has neglected institutional-level supports. As institutional-level supports seem to be essential for the analysis of career choices in a particular vocational field such as the ICT-sector in India, we expand the notion of contextual supports by adding ‘organizational supports’ and ‘governmental supports’ to our considerations. The extensive research on career-related barriers might have restricted the research on factors that give incentives and actually facilitate the career choice (Lent et al., 2001; Lent et al., 2002). Analyzing career-related supports of the ICT-industry would not only supplement the research work on career-related barriers, but also give an insight into what kind of contextual conditions support women’s career choices, especially in technological vocations. That is why we select the perception of contextual career-related supports as the forth core component.

In the following sections, we examine these core components of career choices and show their impact on vocational behavior of women in the Indian ICT-sector.

METHODS

General context

Analyzing the impact of the factors on career choices of Indian women regarding the ICT-industry, we carried out a qualitative case study, which included within- and cross-site-analysis (Eisenhardt, 1989; Miles & Huberman, 1994; Siggelkow, 2007). The purpose of the study was to examine how the core components relate to career choices and personality variables of young women. We explore this in order to investigate why women decide for a career in the Indian ICT-sector and why they tend not to stay.

Data Collection and Sample

We conducted formal semi-structured, guideline-based expert interviews with 35 individuals engaged with or related to the Indian ICT-industry. *Appendix A* provides further information about our data base. As it was our aim to include an academic perspective as well as a practical perspective, we interviewed four types of experts:

1. Students of Computer Sciences (15 females, 7 males),
2. Professors of Computer Sciences (4 males),[†]
3. Female employees in ICT-companies (8 females),[‡]
4. Governmental advisor (1 male).[§]

We focused on expert interviews as suggested by Meuser and Nagel (1994) who define experts as individuals who are responsible for drafting, implementing or controlling a problem or solution; or who have access to information about groups of persons or decision processes (Meuser & Nagel, 1994: 443). Thence, experts are interviewed to supply insider information and are not questioned in order to examine single cases, but as representatives of institutions, organizations or certain groups of people (Meuser & Nagel, 1994). We complemented our analysis by considering other relevant documents

[†] We interviewed professors and students at Indian universities that particularly focused on ICT-specific education. Those universities reflected a gender distribution, which is similar to what we observe in the Indian ICT-industry. On average there are 35% of female students in ICT-faculties of Indian universities. Due to the fact that a university degree is not compulsory for working in the ICT-industry, this figure slightly differs from 45% of female employees in the Indian ICT-industry.

[‡] We interviewed 4 female HR-executives and 4 female employees. Regarding the characteristics of the enterprises we chose ICT-companies that had their headquarters in one of the major Indian ICT-hubs, namely Bengaluru, Pune, and Chennai.

[§] The governmental advisor worked in the Department of Science & Technology, Govt. of India.

concerning this field of investigation such as the industry report 2011 (Nasscom, 2011) and notes from informal talks during breaks and social events.

We developed our interview guideline on the basis of the selected core components (Gottfredson, 1996; Lent, Brown, & Hackett, 1996; Quimby & DeSantis, 2006; Shanker, 2008; Sheu, Lent, Brown, Miller, Hennessy, & Duffy, 2010; Strunk, Mayrhofer, Meyer, Steyrer, Schillinger, & Iellatchitch, 2003; Swanson, Daniels, & Tokar, 1996; Swanson & Woitke, 1997; Upadhy, 2006). The interview guideline consists of questions inquiring the existence and perception of the selected four core components and career choice, their meaning in the ICT-industry and their influence on career choices. All questions were conceptualized as open-ended questions, which allowed the interviewees to intensively talk about career aspects, even of those aspects that we did not consider. We recorded the face-to-face interviews digitally and transcribed them verbatim. The average length of the interviews was 38 minutes.

We selected the interviewees by means of theoretical sampling, which gives the researcher the freedom of expanding and adjusting the sample throughout the data collection and analysis process (Corbin & Strauss, 2008; Eisenhardt & Graebner, 2007; Glaser, 1978). The period of data collection lasted from September 2012 until February 2015. We started the data collection by interviewing 22 students of computer sciences at Indian universities assuming they represent an appropriate investigational group as they are confronted with their career choices very intensively at their current stage of life. Moreover, we argue, that they have invested a lot of time, effort (e.g., preparation for exams, etc.) and financial resources (e.g., fees, tutors, flat rent) in developing ICT-specific human capital, so that the perception of barriers or lack of supports in the Indian ICT-industry would be plausible factors influencing their career choices. We complemented the academic perspective by interviewing four professors assuming that they are at the gateway of academia and working life. Therefore, they were able to provide us with information about ICT-specific education, drop out rates concerning graduates and young professionals, differences in skill sets of male and female students, etc. We expanded our sample by interviewing eight female employees in ICT-companies in order to gain insights into recruiting processes and requirements and the current gender-specific situation in the ICT-industry. We completed data collection by interviewing an advisor of Indian government, who provided us with information about the governmen-

tal perspective on the gender issues in the Indian ICT-sector. Following the approach suggested by Corbin and Strauss (2008), we closed the data collection process when we were “theoretically saturated” and convinced that further information would not offer supplementary insights.

Data analysis

Drawing on Flick’s (2009) suggestion for analyzing qualitative data, we chose the approach of thematic coding, as it is suggested for research work that includes different investigational groups. It is on the one hand guided by theoretical conceptions and prior knowledge of the researcher and on the other hand accessible for new ideas and insights (Flick, 2009). We used the software MAXQDA to organize and structure our empirical data (Kelle, 2004; Kuckartz, 2007; MacMillan & Koenig, 2004).

We analyzed the data in multiple steps. First we focused on each interview separately, analyzing the interviews via within-site analysis and coding them on the basis of our core components of career choice and the interview guideline (Flick, 2009). Second step was a cross-site analysis by comparing the interviews and investigating for similarities and differences among them. We read and analyzed each interview several times to identify additional issues that emerged from the interviews, coded them using the language of the interviewee’s statements (“in vivo coding”) and added them to our code system (Flick, 2009). We merged the codes to variables, which we had identified and predefined in our theoretical considerations (Suddaby, 2010). In the third step, we analyzed the explanatory power of these core components regarding our research questions.

Rigor criteria

As qualitative studies are often confronted with the issue of inappropriate rigor criteria, we followed the approach of Gibbert, Ruigrok, and Wicki (2008) ensuring external validity, internal validity, construct validity, and reliability in order to guarantee rigor for our study.

The main purpose of external validity in qualitative research is not about statistical generalization, but rather about analytical generalization (Gibbert et al., 2008). We ensured external validity by choosing experts from different, but typical state universities and ICT-companies trying to interview people with various backgrounds e.g., re-

garding gender, age, work experience. We especially focused on interviewing *experts* ensuring to gain information that is typical and profound for our field of interest. Thus, we are convinced that our theoretical and empirical results will be valid when replicating this study with different data and methods.

We addressed internal validity by determining core components based on existent literature (Shanker, 2008; Swanson & Woitke, 1997) and triangulating our theories using career theories, in particular SCCT and literature on the ‘absence of women in technology’. This was to ensure that we view our results from multiple theoretical perspectives and consider findings of prior research.

Construct validity has been ensured by gathering data from different sources. Apart from conducting interviews we also collected primary data from informal interviews with students, professors, employees and governmental advisors. We triangulated the primary data with secondary data from industry reports (Nasscom, 2011, Nasscom, 2015), industry-related reports (OECD, 2010; Upadhya, 2006), and other academic articles (Lent et al., 2000; Lent, Miller, Smith, Watford, Hui, & Lim, 2015; Sheu et al., 2010; Swanson & Woitke, 1997). We participated at academic conferences and social events in order to discuss and cross-check our theoretical considerations with experts in that field. Also, the interview guideline was reviewed and pre-tested by experts, who are not included in our sample, ensuring that the questions are appropriate for our aim of research. Moreover, all interviewees got a copy of the transcripts and agreed to its correctness in order to ensure that no errors have occurred during the transcription process.

We ensured reliability of our analysis by documenting each step of our line of action particularly in the phases of data collection and data analysis. Moreover, we configured and retained a data base including all interview transcripts, notes of informal talks, secondary and key informant data. This contributes to the transparency of our study, ensuring that our results are comprehensible and reliable for fellow researchers. In this context, the software MAXQDA is a helpful tool for enhancing the transparency of the research.

RESULTS

The purpose of our study was to determine core components of career choices and analyze (1) why so many women decide for a career in ICT and (2) why they tend not to stay. In this section, we elaborate the core findings of our study. *Appendix B* and *Appendix C* support our results.

Career choice

In order to analyze why so many women decide for a career in the ICT-sector it is important to identify reasons and motivational factors for career choices (Adya & Kaiser, 2005). Our data depict that there are two main drivers for career choices of females regarding the Indian ICT-sector.

Image. Shanker (2008) argues that a lot of female engineers opt for a vocation in the ICT-industry due to its good reputation and high prestige. Our data support these results (S3_F: 20a; S9_F: 2f.). They suggest that ‘computer sciences’ are perceived to be a good career option for Indian females within the science and engineering fields as they lead to safe office-based and white-collar jobs in terms of the nature of work and the work-environment (E2_F: 3; P1_M: 2; Upadhyaya, 2006). Programming, coding, project-work, etc. being pivotal elements of the assigned tasks, require office-based work rather than manufactory or physically demanding work, which usually is associated with engineering jobs (P2_M: 5f.). All in all, it seems that the Nasscom has been able to successfully create a women-friendly image of the ICT-sector (P2_M: 4).

Financial aspects. Our interviewees state that women are attracted to Indian ICT-sector by financial aspects (P4_M: 3). Indian ICT-sector offers higher salaries than allied sectors (S8_F: 13; G1_M: 2). This salary level creates lucrative incentives for females. Yet, female software engineers have a privileged status in India as they have the potential to earn more than graduates of other fields (Shanker, 2008). This goes to the extent that women despite disinterest and dislike towards the field, join the ICT-sector in order to work there for a certain period of time, earn a lot of money and then leave the industry (S7_F: 3).

These two factors have created a novel sense of freedom and financial independence for Indian women (E3_F: 5f.) and have been named by all our interviewees as important factors for entering the ICT-industry.

Interest. However, our data reveal that above mentioned factors are complemented by ‘interest in the subject’. Some of the interviewees (in the students’ group) stated that they decided for a career in the ICT-field because they are interested in the subject and enjoy doing something that they really like (S13_M: 1; S10_F: 2; S12_M: 4; S20_M: 5).

Concerning the second research question ‘why don’t they stay?’ our data depict that career choices are made at very early age, where people are sometimes not aware of their abilities and the importance of the decision (P3_M: 4; S14_F: 2). Due to the rigidity of the school system in India, changes of the tracks in higher education are hardly possible. This may lead to drop outs as soon as people get the first chance. Another aspect is that work in the ICT-industry seems to get monotonous after a few years and people lose interest (S15_F: 3). An alternative career path in this regard is to leave industry and join research institutes, where the tasks are perceived as more challenging and interesting (E8_F: 9; S22_M: 13).

Moreover, our data reveal that generally women seem to be more persistent in a company than men. Female employees tend to stay for a longer period of time in one company as they prefer stability, job security and convenience (E7_F: 12; S1_F: 5). In comparison men change their jobs more often due to better job opportunities, better pay or job opportunities abroad (E7_F: 10). In most cases women leave the company due to pregnancy, societal pressure of complying to traditional role expectations, transfer of their spouses to different cities, etc. (E1_F: 4; E4_F: 8). Therefore, in the end the drop out rate is high and our interviewees state that the female employee’s ratio is between 5% and 10% at the senior management level (E1_F: 14; E5_F: 5).

Career aspirations

Some research has examined factors associated with women's choice of (Eccles, 1994) and persistence in STEM-fields (Farmer, Wardrop, Anderson, & Risinger, 1995; Nauta, Epperson, & Waggoner, 1999). However, our results depict that to understand predictors of women's involvement in non-traditional fields, research efforts must examine the component of career aspirations of women.

Regarding our first research question why so many women decide for a career in the Indian ICT-sector, we explicitly asked our interviewees for career aspirations (ca-

reer-related hopes and wishes) regarding a career in the Indian ICT-sector. Surprisingly, we could not find any concrete statement by our interviewees that addressed this issue. The analysis reveals that when asking questions regarding career aspirations, our interviewees did not refer to this question in terms of career-related visions that they had regarding a career in the ICT-sector, but rather referred to concrete expectations regarding their careers such as career prospects or compensation packages (P2_M: 6). Only in rare cases our interviewed (male) students stated some kind of dream that they had regarding the ICT-industry e.g., improving the society or being an entrepreneur in that field (S11_M: 2; S21_M: 25). However, this was not the case with the female interviewees. Sometimes they did not even have an idea about their career-related future, which they wanted to pursue (S17_F: 8). Our data depict that the definition by Hellenga et al. (2002) of career aspirations as “career-related interests and hopes, *unfettered by reality*” is not applicable for our analyzed sample regarding women in the Indian ICT-sector. We observe that career-related endeavors by women in the Indian ICT-sector are motivated by factors that particularly stem from reality and are rather pragmatic and down to earth in nature.

Concerning the second research question ‘why don’t they stay?’ we suggest that this is mainly because women are less motivated by intrinsic factors such as enjoyment, affinity, visions, dreams, etc. regarding the ICT-field, but rather extrinsic factors such as image and financial aspects. These factors do not seem to be sufficient motives for women’s persistence in the ICT-sector in the long-run. Moreover, positive image, job security and good career prospects induce that sometimes not the females themselves choose and aspire a career in the ICT-field, but their parents or significant others, who make the decision for them to work in this promising sector (E8_F: 9; P4_M: 3). This heteronomy additionally seems to lower the women’s probability to persist in the sector for long.

Career salience

Career salience constitutes the value an individual puts on his/ her career. Analysis of our data suggests that the component of ‘career salience’ is a relevant factor that helps to understand the value and importance of career-related considerations in women’s decision-making. Research has revealed that career salience relates to certain fac-

tors such as the degree of occupational satisfaction, parental status of women (with mothers showing lower career salience) and being with a partner with high academic achievements (Moya et al., 2000).

Addressing the question ‘why do Indian women choose a career in ICT?’ the interviewees agree on the fact that the Indian ICT-sector offers the opportunity for women to work on par with their male counterparts in terms of financial contribution to the household in a renowned high skilled industry and at the same time comply to society’s and family’s expectations regarding household and family duties. Nowadays, women find it natural to work in male-dominated environments and to stay in their jobs (E2_F: 2). Hence, for a certain period of time they are able to balance their career with household responsibilities without being forced to neglect one or the other.

However, addressing the question ‘why don’t they stay?’, we also observe that with further advancement of the career, female employees are more likely to make career-related sacrifices than male employees e.g., preferring family over career, not moving to another city for career advancement, etc. (E5_F: 6f.; S6_F: 7; P2_M: 2a). Majority of our interviewees agreed on the fact that in a partnership it is the woman who adjusts her career plans to certain circumstances e.g., family planning, career plans of her partner, or domestic responsibilities due to traditional gender roles and expectations by family and society (E1_F: 15; E2_F: 4; P2_M: 2b; P3_M: 5; S16_F: 10). These adjustments are supposed to be short-term adjustments e.g., career-breaks just until the child is old enough for external care, however, in most cases they have long-term impacts. Mostly, these adjustments are undertaken in early stages of a career; usually when women are around 25-31 years old and think about starting a family (P2_M: 2a). Normally employees need to undergo a period of approximately six years of programming before rising up to the next career stage (E8_F: 19). Female employees often drop out before completing those six years as they put their family plans before their careers and experience an inability to achieve a strong work-life balance. In that case, women lose crucial years of career advancement and development. Even if they re-enter the industry, they start at lower levels due to lesser work experience as their male peers. Moreover, they discover that they have lost time (E5_F: 6f.) in contrast to people, predominantly male colleagues, who have chosen to stay in the work-force.

Perception of contextual career-related barriers

The perception of career-related barriers was postulated as a concept to explain the gap between women's abilities and their achievements (Farmer, 1976; O'Leary, 1974). Our data support these observations by approving that the component of contextual career-related barriers has an explanatory impact on women's career choices.

Addressing the question 'why do Indian women choose a career in ICT?' our data suggest that there is a common understanding that the perceived barriers are gender-neutral. Interviewees collectively negate a purposeful discrimination of female employees in Indian ICT-sector regarding recruiting, job advancement, etc. They state that the perceived barriers are rather industry-specific and do not apply to women in particular (E7_F: 14f.; P4_M: 4). The perception of equal career opportunities in a non-traditional occupational field is an incentive for women to join the Indian ICT-sector.

Addressing the question 'why don't they stay?' we find evidence regarding individual-level and institutional-level barriers in the Indian ICT-sector that are, despite the common understanding of the general gender-neutrality of the barriers, more affective for women.

Individual-level barriers. In contrast to prior research work (Correll, 2004) our data extremely vary regarding the assessment of self-efficacy beliefs of science-related skills and aptitudes (S19_F: 18; E5_F: 5). Although objective measures like class performance do not give a hint for gender-based differences (E4_F: 5; P4_M: 5) our interviewees are discordant regarding the assessment of self-efficacy beliefs, and therefore also regarding the lack of self-confidence among females and males. Apart from that, we find evidence for social restrictions and different expectations regarding time allocation, where women in India are not expected to invest as much time into paid work as men (E2_F: 4).

Institutional-level barriers. Our data disclose that our interviewees often feel a lack of possibilities to upgrade ICT-specific skills (E3_F: 14; E5_F: 8; P2_M: 3). Taganas and Kaul (2006) depict that the ICT-industry is knowledge-centric and fast moving. In this regard, especially women being responsible for family duties, etc. face difficulties to keep pace as they have little spare time at their disposal to invest into upgrading their skills. Despite this double burden, however, our data suggest that male students are more aware of the problem of the obsolescence of knowledge than the female students.

An explanation could be that women anyway do not plan a long-lasting career in that field as they opt for alternative career paths and hence do not deal with that problem intensively.

Mobility has become an impediment characteristic of the ICT-industry for career advancement. Employees need to take over short-time or long-time on-site assignments as the ICT-industry is service-oriented and operates with clients and partners all over the globe (E1_F: 6a; P2_M: 1). Although employees cannot be forced to take such assignments it can have a negative impact on their career development when rejecting such offers multiple times (E8_F: 19). While married men still take up such assignments, married women prefer to refuse them due to guilty feelings towards their family, social and domestic pressure, etc. (S1_F: 10).

Long working hours and flexibility stem from the most evident feature of the Indian ICT-industry, which is the off-shoring sector (P2_M: 1). Most projects that are given to Indian ICT-companies by foreign clients are charged in man-days. Due to cost saving reasons and in order to make the best and cheapest offer to the customer, man-days are calculated as low as possible. Hence, project teams often lack manpower. Therefore, employees are supposed to work 9-12 hours on working days as well as on weekends when project deadlines have to be met (E1_F: 6b; P2_M: 2c). Those 9-12 hours do not include commuting (E6_F: 4). In India commuting hours comprise 2-3 hours due to poor infrastructure and ICT-clusters being located in the outskirts of the cities. Therefore, employees stay away from home nearly 15 hours daily. Also, being on calls until late night, when clients' day starts abroad, is a common feature of the ICT-industry (P2_M: 2c).

Another factor that characterizes the ICT-industry is the tradition of 'informal networks' or 'old boys' network'. Our results indicate that promotions and employee referrals mostly spring from such informal social activities (E5_F: 19; E7_F: 18; S3_F: 20b). Women comparatively attend such informal meetings less frequently than men due to lesser time at hand and sometimes social restrictions. Moreover, being a minority, female employees fear spoiling the unofficial atmosphere of male camaraderie and general informality (E8_F: 19; S3_F: 20c). Thus, women are unable and partly unwilling to take part in networking activities with male-dominated social groups (S3_F: 20c; Shanker 2008).

To conclude, women are often not able to carry the extra workload of these barriers due to domestic duties, household activities, social responsibilities, restrictions, etc. (S2_F: 21). This results in negative reports on women's appraisal since they are viewed as less dedicated (Bhattacharyya & Nath, 2011) and are put at disadvantages concerning personal appraisal and promotions (E5_F: 6f.).

Perception of contextual career-related supports

We specifically asked for three types of supports: social, organizational and governmental supports. Data analysis of contextual career-related supports suggests that it is highly relevant to examine this component as it gives deep insights into measures that positively affect women's career choices, but also discloses misfits between women's requirements and supportive measures that lead to higher drop outs. Before displaying our results regarding contextual career-related supports we need to make one remark. While interpreting these results we should keep in mind that our sample also consists of representatives from advanced and progressive companies regarding gender-issues (see *Appendix A*). Therefore, their statements might be distorted to some extent.

Governmental supports. Interviewees agreed on the fact that the government is not to hold responsible for supportive measures in the Indian ICT-industry. The Indian state is supposed to create a basic infrastructure and undertake measures regarding fundamental and elementary issues such as safety matters, compulsory schooling for girls, lowering the illiteracy rate, good transportation system, etc. (E5_F: 15; E7_F: 9; S1_F: 3; P2_M: 4f.). However, there is a common understanding among the interviewees that once women start working in a company it is not the government's responsibility, but rather the company's social responsibility to provide supports for women, create a 'de-gendered' work-environment and help them overcoming the career-related barriers (E2_F: 14; E5_F: 15).

Organizational supports. The prediction is that more women will opt for the ICT-industry if employers adopt family-friendly work arrangements and offer benefits for employees (Bhattacharyya & Nath, 2011; OECD, 2001). Our data reveal that companies make an effort to address above mentioned barriers (E2_F: 2) by providing half day work, term time working, or compressed work week options (E5_F: 7). Furthermore, companies address the problem of upgrading skills by offering morning reading circles.

This allows employees to spend one hour of the day to read ICT-specific journals and magazines and to exchange newly gained knowledge (E7_F: 18). Also, policies like ‘You certify, we pay’ (E1_F: 9) or informal networks organized by the company have become popular instruments to address female employees’ needs (S4_F: 8). In addition, numerous Indian ICT-companies have established bus shuttle services that transport employees home safely in case they have to work night shifts and long hours (P2_M: 5). Furthermore, ICT-companies have strong policies on prevention of sexual harassment. The establishment of complaint centers, complaint committees, regular meetings, etc. is an integral component to encounter sexual harassment at the work-place on a zero-tolerance basis (S1_F: 7). Moreover, Indian ICT-companies are very particular about recruiting a 50:50 gender ratio at the entry level and they stop the recruiting process if this ratio cannot be assured (E2_F: 7).

Social supports. We find that companies, which put emphasis on creating a positive and women-friendly work culture are perceived as supportive by employees and especially women feel they have more possibilities of achieving their personal goals (E5_F: 7). In particular, we find that ICT-companies have a common approach of creating a women-friendly atmosphere. Rather than propagating female employees’ contribution to the company’s performance and disguising their constraints and obstacles, companies attempt to create a common understanding by deeply involving all male employees in gender-related issues and debates (E2_F: 8f.; S4_F: 8). While companies cannot influence social pressure from families and friends, they make an attempt to influence social pressure that stems from male colleagues and other team members. “[It is] something that needs to be absorbed and really believed by every person on the ground” (E2_F: 7).

Concerning the question ‘why do Indian women choose a career in ICT?’ our data reveal that women opt for the ICT-industry being attracted by such supportive measures, sincere concerns of ICT-companies and favorable recruiting policies. These efforts are appreciated and perceived very positively by our interviewed experts (E5_F: 7). Nasscom states that in 2007 nearly 80% of Indian ICT-companies focused on creating a women-friendly environment. During 2007 and 2008 female employment has risen from 562,800 to 670,984 female employees in the Indian ICT-industry (NASSCOM-

Mercer, 2009). Hence, we assume positive impacts of supports on women's career choices. Our data support these observations.

Addressing the question 'why don't they stay?' our data depict that the awareness of necessary social supports has not reached domestic spheres yet (S1_F: 8; S4_F: 10). Although some female interviewees in lead positions stated that they had strong social supports which was essential for their career development (E1_F: 25; E5_F: 11), this is not applicable to the vast majority. Interviewees noted that social supports by family, close relatives and friends are limited. They are offered as long as family duties and domestic responsibilities are not subordinated to career aspirations (E1_F: 15; E5_F: 10). Especially the students' group formulates the need to change the mindset of the society from traditional gender-role based thinking towards a more broad-minded perspective (S20_M:24; S10_F: 10). Furthermore, companies address the career-related barrier of long working hours and necessity of flexibility by offering 'flexi-times' which allow employees to work from home and schedule their working times flexibly (E5_F: 7). Our results indicate that what seems to be a supportive policy results in a legitimization of making employees work late night and long hours. This is due to the fact that despite flexible working times companies usually have core hours from 8 am till 5 pm during which all employees need to be in office for team discussions and meetings (E1_F: 6b; P2_M: 2b; P2_M: 2c). Flexi-time policies contribute to organizations' demand on employees of being available after office hours and attending conference calls from home, and therefore increase the actual working hours.

Altogether, data analysis reveals that though we asked for statements using open-ended questions, we could not identify additional core factors that may influence career choices of women in Indian ICT-sector. Hence, presented core components and above mentioned side aspects seem to cover all impacts on women's career choices regarding the ICT-sector in India.

DISCUSSION AND IMPLICATIONS

Purpose of our study was to investigate why Indian women choose a career in ICT and why they tend not to stay. Therefore, we determined four core components of

career choices based on the SCCT and collected qualitative data by interviewing 35 experts in our field of interest.

The novel contribution of our study is the empirical analysis and presentation of an approach to explain women's career choices in ICT, which gives equal weightage to career-related contextual factors of the industry as well as career-related individual and personal factors. We contribute by conceptualizing core components and by applying them to our research questions. We point out that career aspirations in terms of their original definition are not applicable for women in the Indian ICT-sector, as they rather refer to aspects like career prospects, compensation packages, etc. For example, the majority of our interviewees does not make statements like 'I love what I am doing' or 'I wish to be regarded as an expert in my field'. This may explain why women do not persist in this professional field and why they value family issues higher than occupational issues. Further, we contribute by analyzing key features that are typical for the ICT-industry and that create barriers for female employees in particular. We also conceptualize the contextual career-related supports by distinguishing three categories, namely governmental, organizational and social supports and show their impacts on career choices. This is a pivotal contribution since supports have been identified theoretically in prior research, but there has been less empirical effort to analyze this concept.

Some additional results are important to mention. Our data suggest that the four expert groups value each of the core components differently regarding their explanatory power to answer the research questions, which is due to different perceptions and perspectives on the topic. For example, professors and the governmental advisor argue that women are attracted to the ICT-sector for the wrong reasons such as the image and financial aspects, but are not truly interested in the field itself. Further, professors give a lot of weight to career-related barriers, mentioning that especially women are confronted with industry-specific barriers and subtle demoralization by employers. Whereas ICT-employees and students put more emphasis on the perception of supports as motives for choosing a career in the ICT-industries while an actual lack of supports may explain high drop out rates. Employees and students put less value on career-related barriers, which they find to be gender-neutral and associate them only with unstable and bad companies, but not with successful companies. Interestingly, all interviewees (except for the majority of the students) state that people are attracted by the image and

high salaries, whereas a great portion of the interviewed students added that they were also driven by their interests. Hence, there seems to be a misfit or misunderstanding between the students' motivations to choose a career in the ICT-industry and the industries understanding of these reasons. Therefore, a more penetrative approach to understand reasons for career choices and drop outs would help companies to address students properly, to adjust supportive measures and to encounter barriers effectively.

Implications for theory. This study departs from the common scholarly practice of studying career choices of individuals. Based on SCCT it highlights components which suggest that career choice is not an individual variable, but a complex interwoven texture of factors like skills, gender roles, economics, present and future perspectives through which a woman has to meet her career choices. Analyzing this phenomenon we were particularly interested in understanding why so many women decide for a career in ICT, which contradicts the prevailing approach to explain why so many women decide against a career in ICT (e.g., Orser et al., 2012). It is important to highlight that this approach enriches emerging literature on career choices as it does not solely focus on the perception of contextual career-related barriers, but also gives weight to personal components and the perception of contextual career-related supports.

Managerial implications. In order to guarantee a constant influx of skilled labor and to 'develop the pipeline' in ICT-companies, we suggest to put emphasis on the identification of draw backs in contextual career-related supports and the existence of contextual career-related barriers. Although it is important to recognize that Indian ICT-companies have been active in creating a women-friendly work-environment, policies that ensure retention of women in the Indian ICT-sector and support career advancement to lead positions are missing. For example, organizational supports should concentrate on work-life balance and career development measures e.g., mentoring programs, extended maternity leaves and reintegration programs after a career-break. Moreover, companies ought to address the phenomenon of obsolescence of knowledge by offering learning and development possibilities. Also, knowledge management systems need to be implemented. Furthermore, companies would profit from re-thinking the career path of ICT-professionals, as our data reveal that people also drop out due to a long period of monotonous work at the beginning before moving on to more managerial and challenging work. It might be fruitful to consider possibilities of handing over limited responsi-

bility and challenging work to freshers as well as shorten the first period of coding tasks.

We reveal that within the STEM-fields ‘computer sciences’ are perceived to be a good career option for Indian females due to the positive image of the Indian ICT-sector. Although we observe that image has an impact on the attractiveness of a career choice we believe that this created image should not differ too much from reality as this results in high ratios at the entry levels initially, whereas at the same time high attrition rates remain the same if the resulting higher expectations of the employees are not met. While it has to be acknowledged that ICT-companies have taken responsibility of ensuring supportive measures, we warn from uncritically accepting the image that the Indian ICT-industry has created for itself.

Limitations and directions for future research. Like all research, our research has limitations that suggest opportunities for future research. We note that we analyzed the *perception* of career-related barriers and supports, rather than examining their *strength of impact*. It is probable that some components are more influential on vocational behavior than others. For career counseling it might be helpful to investigate which of them have larger impact on career choices of individuals than others. Moreover, our sample regarding employees consists of female experts exclusively. It would be interesting to investigate viewpoints and assessments of male employees as well.

CONCLUSION

In this study, we provide evidence that the identified and analyzed core components affect the career choice of women regarding the Indian ICT-industry. Further, we find that financial incentives, image of the industry and (partly) interest play a role in their career choices. Our results reveal that these are main drivers that led to gender parity at the entry-level and hence supported the utilization of an untapped potential in the workforce. We question whether all of these factors are sufficient motives to retain women in the industry in a long-time perspective. We hope that this study will stimulate further development of career choice theory and further empirical research in the area of motivation and retention of female workforce in technology-based industries. From the

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practice point of view, managers are advised to adopt an approach that takes person factors as well as context factors into account.

REFERENCES

- Adya, M., & Kaiser, K. 2005. Early determinants of women in the IT workforce: A model of girl's career choices. *Information Technology & People*, 18(3): 230-259.
- Arora, A. 2008. Indian software industry and its prospects. In J. Bhaqwati & C. Calomiris (Eds.), *Sustaining India's growth miracle*: 166-211. New York: Columbia University Press.
- Balatchandirane, G. 2007. *IT clusters in India*. Discussion Paper no. 85, Institute of developing economies, Chiba, Japan.
- Bhatnagar, S. 2006. India's software industry. In V. Chandra (Ed.), *Technology, adaptation, and exports: How some developing countries got it right*: 49-81. Washington, DC: The World Bank.
- Bhattacharyya, A., & Nath, B. 2011. Women in information communications technology. *Asian Journal of Science and Technology*, 3(2): 6-14.
- Blau, F. D., Ferber, M. A., & Winkler, A. E. (Eds.). 2010. *The economics of women, men, and work* (6th ed.). Upper Saddle River, New Jersey: Prentice Hall.
- Carrillo, J., & Gromb, D. 2006. Cultural inertia and uniformity in organizations. *Journal of Law, Economics and Organization*, 23(3): 743-71.
- Cech, E., Rubineau, B., Silbey, S., & Seron, C. 2011. Professional Role Confidence and Gendered Persistence in Engineering. *American Sociological Review*, 76(5): 641-666.
- Chung, Y. B. 2002. Career decision-making self-efficacy and career commitment: Gender and ethnic differences among college students. *Journal of Career Development*, 28(4): 277-284.
- Cooper, C. L., Argyris, C., & Channon, D. F. 1998. *The concise Blackwell Encyclopedia of management*. New York: Blackwell Publishers.
- Corbin, J., & Strauss, A. 2008. *Basics of qualitative research. Techniques and procedures for developing grounded theory* (3rd ed.). Los Angeles: Sage.
- Corneliussen, H. 2005. *Gender in the history of computer technology in Norway 1979-2000*. Paper presented at European Symposium on 'Gender and ICT: Working for Change', Manchester, England.
- Correll, S. J. 2001. Gender and the career choice process: The role of biased self-assessments. *American Journal of Sociology*, 106(6): 1691-1730.
- Correll, S. J. 2004. Constraints into preferences: Gender, status, and emerging career aspirations. *American Sociological Review*, 69(1): 93-113.
- Deemer, E. D., Thoman, D. B., Chase, J. P., & Smith, J. L. 2014. Feeling the threat: Stereotype threat as a contextual barrier to women's science career choice intentions. *Journal of Career Development*, 41(2): 141-158.
- Diemer, M. A., & Blustein, D. L. 2007. Vocational hope and vocational identity: Urban adolescents' career development. *Journal of Career Assessment*, 15(1): 98-118.

- Eccles, J. 1994. Understanding women's educational and occupational choices: Applying the Eccles et al. model of achievement-related choices. *Psychology of Women Quarterly*, 18(4): 585-609.
- Eisenhardt, K. M. 1989. Building theories from case study research. *Academy of Management Review*, 14(4): 532-550.
- Eisenhardt, K. M., & Graebner, M. E. 2007. Theory building from cases. Opportunities and challenges. *Academy of Management Journal*, 50(1): 25-32.
- Farmer, H. S. 1976. What inhibits achievement and career motivation in women? *The Counseling Psychologist*, 6(2): 12-14.
- Farmer, H. S., Wardrop, J. L., Anderson, M. Z., & Risinger, R. 1995. Women's career choices: Focus on science, math, and technology careers. *Journal of Counseling Psychology*, 42(2): 155-170.
- Fisher, T. A., & Stafford, M. E. 1999. Reliability and validity of the career influence inventory: A pilot study. *Journal of Career Assessment*, 7(2): 187-202.
- Flick, U. (Ed.). 2009. *An introduction to qualitative research* (4th ed.). London: Sage.
- Gibbert, M., Ruigrok, W., & Wicki, B. 2008. What passes as a rigorous case study? *Strategic Management Journal*, 29(13): 1465-1474.
- Glaser, B. G. 1978. *Theoretical sensitivity*. Mill Valley: Sociology Press.
- Gottfredson, L. S. 1996. Gottfredson's theory of circumscription and compromise. In D. Brown, L. Brooks & Associates (Eds.), *Career choice and development*: 179-232. San Francisco: Jossey-Bass Publishers.
- Greenhaus, J. H. 1971. An investigation of the role of career salience in vocational behavior. *Journal of Vocational Behavior*, 1(3): 209-216.
- Hackett, G., Betz, N. E., Casas, J. M., & Rocha-Singh, I. A. 1992. Gender, ethnicity, and social cognitive factors predicting the academic achievement of students in engineering. *Journal of Counseling Psychology*, 39(4): 527-538.
- Hellenga, K., Aber, M. S., & Rhodes, J. E. 2002. African American adolescent mothers' vocational aspiration-expectation gap: Individual, social, and environmental influences. *Psychology of Women Quarterly*, 26(3): 200-212.
- Kelkar, G., & Nathan, D. 2002. *Information and communication technologies: Gender and culture*. Bangalore: Institute for Social Sciences.
- Kelkar, G., Shrestha, G., & Veena, N. 2002. IT industry and women's agency: Explorations in Bangalore and Delhi, India. *Gender, technology and development*, 6(1): 63-84.
- Kelle, U. 2004. Computer assisted qualitative data analysis. In C. Seale, G. Gobo, J. F. Gubrium & D. Silverman (Eds.), *Qualitative research practice*: 473-489. London: Sage.
- King, R. 1999. *Nehru and the language politics of India*. New Delhi: Oxford University Press.
- Kuckartz, U. 2007. *Einführung in die computergestützte Analyse qualitativer Daten* (2nd ed.). Wiesbaden: Verlag für Sozialwissenschaften.

- Lannon, J. 2013. *Research Initiative: Women in India's IT Industry*. The Centre for Internet and Society. <http://cis-india.org/internet-governance/blog/women-in-indias-it-industry> [Last retrieved 9.12.2015].
- Lent, R. W., Brown, S. D., & Hackett, G. 1994. Toward a unifying social cognitive theory of career and academic interest, choice and performance. *Journal of Vocational Behavior*, 45(1): 79-122.
- Lent, R. W., Brown, S. D., & Hackett, G. 1996. Career development from a social cognitive perspective. In D. Brown, L. Brooks & Associates (Eds.), *Career choice and development*: 373-421. San Francisco: Jossey-Bass Publishers.
- Lent, R. W., Brown, S. D., & Hackett, G. 2000. Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology*, 47(1): 36-49.
- Lent, R. W., Brown, S. D., Brenner, B., Chopra, S., Davis, T., Talleyrand, R., & Suthakaran, V. 2001. The role of contextual supports and barriers in the choice of math/science educational options: A test of social cognitive hypotheses. *Journal of Counseling Psychology*, 48: 474-483.
- Lent, R. W., Brown, S. D., Talleyrand, R., McPartland, E. B., Davis, T., Chopra, S., Alexander, M. S., Suthakaran, V., & Chai, C. M. 2002. Career choice barriers, supports, and coping strategies: College students' experiences. *Journal of Vocational Behavior*, 60(1): 61-72.
- Lent, R. W., Brown, S. D., Schmidt, J., Brenner, B., Lyons, H., & Treistman, D. 2003. Relation of contextual supports and barriers to choice behavior in engineering majors: Test of alternative social cognitive models. *Journal of Counseling Psychology*, 50(4): 458-65.
- Lent, R., Brown, S., Sheu, H., Schmidt, J., Brenner, B., Gloster, C., Wilkins, G., Schmidt, L., Lyons, H., & Treistman, D. 2005. Social cognitive predictors of academic interests and goals in engineering: Utility for women and students at historically black universities. *Journal of Counseling Psychology*, 52(1): 84-92.
- Lent, R. W., Miller, M. J., Smith, P. E., Watford, B. A., Hui, K., & Lim, R. H. 2015. Social cognitive model of adjustment to engineering majors: Longitudinal test across gender and race/ethnicity. *Journal of Vocational Behavior*, 86(1): 77-85.
- Lindley, L. 2005. Perceived barriers to career development in the context of Social Cognitive Career Theory. *Journal of Career Assessment*, 13(3): 271-287.
- Luzzo, D. A., & McWhirter, E. H. 2001. Sex and ethnic differences in the perception of educational and career-related barriers and levels of coping efficacy. *Journal of Counseling & Development*, 79(1): 61-67.
- MacMillan, K., & Koenig, T. 2004. The wow factor: Preconceptions and expectations for data analysis software in qualitative research. *Social Science Computer Review*, 22(2): 179-186.
- Marsden, P. V., Kalleberg, A. L., & Cook, C. R. 1993. Gender differences in organizational commitment influences of work positions and family roles. *Work and Occupations*, 20(3): 368-390.

- McWhirter, E. H. 1997. Perceived barriers to education and career: Ethnic and gender differences. *Journal of Vocational Behavior*, 50(1): 124-140.
- Meuser, M., & Nagel, U. 1994. Expertenwissen und Experteninterview. In R. Hitzler, A. Honer & C. Maeder (Eds.), *Expertenwissen*: 180-92. Opladen: Leske + Budrich.
- Miles, M. B., & Huberman, A. M. 1994. *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks: Sage.
- Moya, M., Exposito, F., & Ruiz, J. 2000. Close relationships, gender, and career salience. *Sex Roles*, 42(9): 825-846.
- NASSCOM 2011. *Annual report 2010-11*. New Delhi: NASSCOM Publishing.
- NASSCOM 2013. *Electronics and information technology: Annual report 2012-2013*. New Delhi: NASSCOM Publishing.
- NASSCOM 2015. *Annual report 2014-15*. New Delhi: NASSCOM Publishing.
- NASSCOM-Mercer 2009. *Gender inclusivity in India: Building empowered organisations*. New Delhi: NASSCOM-Mercer Publishing.
- Nauta, M. M., Epperson, D. L., & Kahn, J. H. 1998. A multiple groups analysis of predictors of higher level career aspirations among women in science and engineering. *Journal of Counseling Psychology*, 45(4): 483-496.
- Nauta, M. M., Epperson, D. L., & Waggoner, K. M. 1999. Perceived causes of success and failure: Are women attributions related to persistence in engineering majors? *Journal of Research in Science Teaching*, 36(6): 663-676.
- O'Brien, K. M., Friedman, S. M., Tipton, L. C., & Linn, S. G. 2000. Attachment, separation, and women's vocational development: A longitudinal analysis. *Journal of Counseling Psychology*, 47(3): 301-315.
- O'Leary, V. E. 1974. Some attitudinal barriers to occupational aspirations in women. *Psychological Bulletin*, 81(11): 809-826.
- OECD 2001. *Understanding the digital divide*. Paris: OECD Publishing.
- OECD 2010. *The information and communication technology sector in India: Performance, growth and key challenges*. Paris: OECD Publishing.
- Orser, B., Riding, A., & Stanley, J. 2012. Perceived career challenges and response strategies of women in the advanced technology sector. *Entrepreneurship & Regional Development: An International Journal*, 24(1-2): 73-93.
- Post-Kammer, P., & Smith, P. L. 1985. Sex differences in career self-efficacy, consideration, and interests of eighth and ninth graders. *Journal of Counseling Psychology*, 32(4): 551-559.
- Quimby, J. L., & DeSantis, A. M. 2006. The influence of role models on women's career choices. *The Career Development Quarterly*, 54(4): 297-306.
- Raiff, G. W. 2004. *The influence of perceived career barriers on women's career planning*. University of North Texas: Doctoral Dissertation.
- Ramalingam, A. 2012. *IT's a woman's world*. New Delhi: NASSCOM Publishing.

- Rojewski, J. W. 1996. Occupational aspirations and early career-choice patterns of adolescents with and without learning disabilities. *Learning Disability Quarterly*, 19(2): 99-116.
- Rothboeck, S., Vijayabaskar, M., & Gayathri, V. 2001. *Labor in the new economy: The case of the Indian software labor market*. New Delhi: International Labor Organization.
- Roy, N. 2013. Developing a model of career choices regarding females in the ICT-industry - A theoretical approach. Working Paper Series of the University of Passau, Germany.
- Scandura, T. A., & Lankau, M. J. 1997. Relationships of gender, family responsibility and flexible work hours to organizational commitment and job satisfaction. *Journal of Organizational Behavior*, 18(4): 377-391.
- Shanker, D. 2008. Gender relations in IT companies: An Indian experience. *Gender, Technology and Development*, 12(2): 185-207.
- Sheu, H. B., Lent, R. W., Brown, S. D., Miller, M. J., Hennessy, K. D., & Duffy, R. D. 2010. Testing the choice model of social cognitive career theory across Holland themes: A meta-analytic path analysis. *Journal of Vocational Behavior*, 76(2): 252-264.
- Siggelkow, N. 2007. Persuasion with case studies. *Academy of Management Journal*, 50(1): 20-24.
- Strunk, G., Mayrhofer, W., Meyer, M., Steyrer, J., Schillinger, M., & Iellatchitch, A. 2003. *Organizational and post-organizational career aspirations, personality traits and behavior*. Seattle: Academy of Management Conference.
- Suddaby, R. 2010. Editor's comments: Construct clarity in theories of management and organization. *Academy of Management Review*, 35(3): 346-357.
- Swanson, J. L., & Tokar, D. M. 1991. College students' perceptions of barriers to career development. *Journal of Vocational Behavior*, 38(1): 92-106.
- Swanson, J. L., Daniels, K. K., & Tokar, D. M. 1996. Assessing perceptions of career-related barriers: The career barriers inventory. *Journal of Career Assessment*, 4(2): 219-244.
- Swanson, J. L., & Witke, R. 1997. Theory into practice in career assessment for women: Assessment and interventions regarding perceived career barriers. *Journal of Career Assessment*, 5(4): 443-462.
- Taganas, R. A. L., & Kaul, V. K. 2006. Innovation systems in India's IT industry: An empirical investigation. *Economic and Political Weekly*, 41(39): 4178-4186.
- Talmud, I., & Izraeli, D. N. 1999. The relationship between gender and performance issues of concern to directors: correlates or institution? *Journal of Organizational Behavior*, 20(4): 459-474.
- Upadhyaya, C. 2006. Gender issues in the Indian software outsourcing industry. In A. Gurusurthy, P. J. Singh, A. Mundkur & M. Swamy (Eds.), *Gender in the Information society: Emerging issues*: 74-84. Bangkok: ICT4D Series.

APPENDIX

Appendix A

Sample Description with Main Characteristics of the Interviewees^a

Institutions				Interviewee				
No.	Name	Department	Foundation	Position	Age	Sex	No.	Code ^b
1	Indian Government	Department of Science & Technology, Govt. of India		Governmental Advisor	43	M	1	G1_M
2	Indian Institute of Management Bangalore (IIM Bangalore)	Quantitative Methods & Information Systems	1973	Professor	59	M	2	P1_M
				Professor	58	M	3	P2_M
				Student	23	F	4	S1_F
				Student	22	F	5	S2_F
				Student	24	F	6	S3_F
				Student	28	F	7	S4_F
				Student	28	F	8	S5_F
3	Indian Institute of Technology Madras (IIT Madras)	Computer Science and Engineering	1959	Professor	42	M	9	P3_M
				Student	22	F	10	S6_F
				Student	25	F	11	S7_F
				Student	25	F	12	S8_F
				Student	26	F	13	S9_F
				Student	21	F	14	S10_F
				Student	23	M	15	S11_M

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				Student	21	M	16	S12_M
				Student	21	M	17	S13_M
				Student	21	F	18	S14_F
				Student	22	F	19	S15_F
				Student	29	F	20	S16_F
				Student	21	F	21	S17_F
				Student	21	M	22	S18_M
				Student	20	F	23	S19_F
				Student	22	M	24	S20_M
				Student	21	M	25	S21_M
				Student	28	M	26	S22_M
4	Indrapastha Institute of Information Technology Delhi (IIIT Delhi)	Information Technology	2008	Professor	58	M	27	P4_M
Companies				Interviewee				
No.	Name	Industry	Foundation	Position	Age	Sex	No.	Code
5	Amazon.de	E-Commerce	1994	Employee	31	F	28	E1_F
6	Cisco Systems Inc.	Information and communication technology	1984	Employee	35	F	29	E2_F
7	Globals Inc.	E-Commerce and mobile solutions	2000	HR-executive	36	F	30	E3_F
8	Google Inc.	Internet-related products & services, including internet search, cloud computing, software & advertising technologies	1998	Employee	29	F	31	E4_F

ARTICLE 2

9	Infosys Limited	Technology and outsourcing	1981	Employee	26	F	32	E5_F
10	MphasiS Limited	Applications services, Infrastructure services, and Business Process Outsourcing	2000	HR-executive	40	F	33	E6_F
11	ThoughtWorks	Software development	1993	HR-executive	38	F	34	E7_F
12	Wipro Limited	Consumer products business, IT hardware and IT services	1945	HR-executive	45	F	35	E8_F

^a In alphabetical order; for anonymity reasons, order does not correspond to citation order.

^b Code system is as follows: E = Employee; F = Female; G = Government; M = Male; P = Professor; S = Student.

Appendix B

The System of Codes and Categories

No.	Career choice and its Core Components		Frequency of code per interviewee group ¹				Sum of frequency per code
			G	E	P	S	
Career choice (261 / 26%)							
1	Motivation for Career choice						
	1.1	Image Indian ICT-industry	5	2	2	20	29
	1.2	Financial aspects	2	5	3	22	32
	1.3	Independence - Freedom	0	4	0	5	9
	1.4	Pressure/ Heteronomy	0	2	3	8	13
	1.5	Nature of work	0	2	2	10	14
	1.6	Interest/ Learning/ No monotonous work	0	1	0	23	24
2	Persistence						
	2.1	Loyalty	0	8	0	16	24
	2.2	Preference for job security and stability	0	2	0	8	10
	2.3	Rigid school system	0	0	2	4	6
3	Drop Out						
	3.1	Less job satisfaction/ Work-related reasons					
		3.1.1 Hectic schedule/ Work load/ Travelling issues/ Relocation	1	0	2	13	16
		3.1.2 Monotonous work	0	0	0	4	4
	3.2	Alternatives					
		3.2.1 Better job offers	0	0	0	6	6
		3.2.2 Going abroad	0	2	0	0	2
		3.2.3 Alternative career paths e.g., research, teaching, etc.	0	0	2	4	6
	3.3	Societal reasons					
		3.3.1 Men are expected to work vs. women are not expected to work	0	0	0	2	2
		3.3.2 Social pressure	0	0	1	6	7
		3.3.3 Marriage/ Family	0	0	12	23	35

ARTICLE 2

Career Choice (continued)		Frequency of code per interviewee group				Sum of frequency per code
		G	E	P	S	
4	Reasons to return to the industry					
	4.1 Keeping oneself occupied	0	0	0	2	2
	4.2 Financial reasons/ Necessity to work	0	0	1	8	9
	4.3 Women want to work and value their career	0	0	0	6	6
	4.4 Children have grown up/ Ability to strike work-family balance	0	0	0	4	4
Career Aspirations (65 / 6%)						
5	Quality of prospects					
	5.1 Career paths	0	0	0	6	6
	5.2 Compensation packages	0	1	1	1	3
	5.3 Moving up	0	1	0	3	4
6	Quality of company	0	0	1	4	5
7	Building a network	0	0	0	1	1
8	Improving/ helping society	0	0	0	2	2
9	No gender differences in career aspirations	0	1	6	5	12
10	Gender differences in career aspirations	0	0	0	2	2
11	Career-related dream life					
	11.1 Being an entrepreneur	0	1	0	6	7
	11.2 Financial independence	0	0	0	2	2
	11.3 Being in academia	0	0	0	3	3
	11.4 Learning possibilities	0	0	0	1	1
	11.5 Work-life balance	0	0	0	2	2
	11.6 Personal happiness/ Independence/ Me-time/ Autonomy	0	0	0	4	4
	11.7 Nice co-workers	0	0	0	3	3
	11.8 Happy/ satisfied with challenging work	0	0	0	8	8
Career Salience (86 / 9%)						
12	Career-family trade-off					
	12.1 Women's priority for family over career	0	10	1	19	30
	12.2 Women's willingness to postpone family plans	0	1	0	8	9
	12.3 Women's lack of commitment	0	0	0	1	1
	12.4 Women's acceptance for struggling	0	1	0	1	2

ARTICLE 2

Career Salience (continued)		Frequency of code per interviewee group				Sum of frequency per code
		G	E	P	S	
13	Willingness to work hard	0	4	1	3	8
14	Willingness to relocate	0	1	0	13	14
15	Need for growing/ Learning	0	3	0	2	5
16	Happy to have a job	0	3	0	3	6
17	No gender difference in career salience	0	0	0	5	5
18	Gender difference in career salience	0	0	0	7	7
Perception of Barriers (222 / 23%)						
19	Individual-level barriers					
	19.1 Gender difference in science-related aptitudes	0	0	1	4	5
	19.2 No gender difference in science-related aptitude	0	1	1	13	15
	19.3 Guilt/ Society/ Traditions/ Culture	2	12	1	12	27
	19.4 Role expectations	0	8	0	7	15
	19.5 Having children/ Work-life-balance	1	3	0	6	10
20	Institutional-level barriers					
	20.1 Networking	2	2	0	16	20
	20.2 Subtle discouragement by the employer and structure of the industry	0	4	1	2	7
	20.3 Relationship to boss	0	5	0	1	6
	20.4 Leaky pipeline	0	4	1	0	5
	20.5 Amount of work	1	2	0	6	9
	20.6 Safety issues/ Harassment	1	1	1	7	10
21	Structural barriers					
	21.1 Obsolescence of knowledge	2	9	2	15	28
	21.2 Location/ Commuting	0	4	0	5	9
	21.3 Lack of scale	0	4	0	0	4
22	Onsite-offshore					
	22.1 Extended - Odd working-hours	2	6	5	9	22
	22.2 Travelling	0	6	1	3	10

ARTICLE 2

		Perception of Barriers (continued)		Frequency of code per interviewee group				Sum of frequency per code
23	Glass ceiling			G	E	P	S	
	23.1	Glass ceiling is existent		0	2	1	12	15
	23.2	Glass ceiling is not existent		0	0	0	6	6
		Perception of Support Systems (303 / 31%)						
24	Quality of Supports			0	8	0	0	8
25	Organizational support							
	25.1	Flexibility (Flexi-time/ Part-time/ Work from Home)		3	18	0	18	39
	25.2	Organizational Policies (Networks/ Mentorships/ Trainings)		3	18	0	11	32
	25.3	Crèche/ Daycare/ Schools		0	11	0	5	16
	25.4	Recruiting		0	7	1	3	11
	25.5	Maternity Leave - Pregnancy		1	5	0	7	13
	25.6	Sabbaticals		0	3	0	1	4
	25.7	Benchmarking		0	2	0	0	2
	25.8	Safety policies						
		25.8.1	Transport	1	6	2	15	24
		25.8.2	Anti-harassment	0	4	0	7	11
	25.9	Awareness and encouragement by companies		1	9	1	7	18
	25.10	Women-friendly culture in the company		1	14	0	4	19
	25.11	Non-existent Organizational Support		1	6	0	4	11
26	Social support							
	26.1	Support by parents		0	8	0	6	14
	26.2	Support by husband		0	3	0	10	13
	26.3	Supportive family-background/ upbringing		0	1	0	7	8
27	Governmental support							
	27.1	Necessity of governmental support		0	1	0	10	11
	27.2	Unnecessity of governmental support		0	6	0	2	8
	27.3	Existent governmental support		0	7	2	3	12
	27.4	Non-existent governmental support		3	9	0	6	18
28	Helpful supports							
	28.1	Changing mindset of the society		0	0	0	4	4
	28.2	Safety/ Transport/ Infrastructure		0	0	0	2	2
	28.3	Education/ Learning		0	1	0	1	2

ARTICLE 2

28	Helpful supports (continued)		Frequency of code per interviewee group				Sum of frequency per code
			G	E	P	S	
	28.4	Change mindset of society	0	0	0	4	4
	28.5	More work from home possibilities	0	0	0	1	1
	28.6	Transparent career paths	0	0	0	1	1
	28.7	Punishment of women-unfriendly companies	0	0	0	4	4
	28.8	Incentives for men to stay at home	0	0	0	1	1
Other Topics (49 / 5%)							
29	No Gender-Discrimination/ Gender Neutrality		3	15	3	14	35
30	Gender differences in preferences regarding the type of work		4	8	0	0	12
31	Start-up culture		0	2	0	0	2
Sum							996

Some rows are filled with zero codings as not all interviewees referred to the same issues that others may have mentioned.

Appendix C

Interviewees' Statements Emphasizing Our Findings

Core components of career choices

Career choices

"[...] women because of the family issues or something they prefer stability." (S1_F: 5)*

"[...] with women I have seen that once they have that comfort they don't tend to move out so easily." (E7_F: 12)

"[...] men job hop more and I have seen most women tend to stick on." (E7_F: 10)

"it could be because of various commitments they have that they tend to drop out after a certain level, may be after child birth, that is a very common reason why women stop working as they have more commitment towards their children and feel that they need to drop their career and take care of their family." (E4_F: 8)

"By 24 there is a lot of, you know societal or parental pressure, or their intrinsic need itself to get married. And culturally in India... you know..., so, the girl is expected to quit the job and move." (E1_F: 4)

"[...] it's not a job that they liked right? And it is not a job that they chose, it was forced upon them." (E8_F: 9)

"I think women are really well exposed today, very quick, and they discovered financial independence, which is a big factor. And if you are financially independent then it gives you the confidence to do anything that you want to." (E3_F: 5f.)

"And on the leadership level it's probably 5 percent, 5 to 8 %." (E1_F: 14)

"[...] at the managerial level, women are less as compared to men, but at the entry level, I don't know the ratio, but we must be 15 odd women engineers in Bangalore. We must be around 10%." (E5_F: 5)

"[...] the Indian academic system, at least in the sciences is not designed for easy migration from one subject to another, any more. It used to be, but now it's nearly impossible." (P3_M: 4)

"No, I was not very sure that it's definitely what I want to do, but we necessarily have to choose a field of study at the end of school." (S14_F: 2)

"Some women who are really determined and say 'I am going to work', stick on others will just quit. Or they get into teaching or something. Because it's not so competitive." (E8_F: 9)

"I thought IT industry looked really great if you from outside. But I think once you go inside it's like every day you keep same thing. Okay, the first two, three months it would be really nice, because you learn something new. But after that I think it gets more monotonous." (S15_F: 3)

"They quit their jobs to come for higher studies." (S22_M: 13)

Image of "I think there is a lot of glamour attributed to this industry. If it's the salary, the job positions, you know, all that." (S3_F: 20a)

the Indian " [...] that gives you some sort of a status compared to your peers. So I think people sort of look forward to it." (S9_F: 2f.)

ICT- "It's a very safe industry for women. [...]. So you are normally sitting in offices and safe places. People who are in this field are a little, you know, a lot more so to say educated and civilized [...]." (E2_F: 3)

industry "They didn't have to control the blue collar workers. And that is the reason why you find almost over 35, 36 percent females are in the ICT-industry." (P1_M: 2)

"[...] women are in great numbers at the entry point [...]. And they see, you know, working in IT companies is not physically demanding as in manufacturing companies. Interviewer: And it's a very prestigious job. Interviewee: It is prestigious." (P2_M: 5f.)

"India has a very vocal industry body Nasscom. Nasscom does a wonderful job of selling India outside, or the IT industry outside." (P2_M: 4)

ARTICLE 2

<i>Financial aspects</i>	<p>“[...] the only parameter they have is, either the big brand [...]. The other is the money.” (P4_M: 3)</p> <p>“There is huge difference between the salary which normal people would get compared to IT. In IT it will be like 5 into x for normal manufacturing.” (S8_F: 13)</p> <p>“The salary is high, it’s higher than in most other allied areas.” (G1_M: 2)</p> <p>“Everybody wants to get into IT and work there for ten to fifteen years, they want to earn a lot and then they want to get out of IT field. They just join for the money.” (S7_F: 3)</p>
<i>Interest</i>	<p>“So, I mean my interest always lied in computer science.” (S13_M: 1)</p> <p>“I just found it to be quite interesting.” (S10_F: 2)</p> <p>“Pure interest and my interest in mathematics and programming from my high-school. That's why I joined computer science here.” (S12_M: 4)</p> <p>“[...] so at this point I think I'm just interested driven.” (S18_M: 5)</p>
<i>Career aspirations</i>	<p>“[...] of course the compensation package is so much better [...]” (P2_M: 6)</p> <p>“I can do something to the society. Because all this revolves software is aiming making people's lives easier.” (S11_M: 2)</p> <p>“As I said, my goal is to be an entrepreneur. So right now I'm working on a couple of start-ups of my own. So, down the line I'd like to have my own of these ideas to click, and basically my point is to become a serial entrepreneur.” (S21_M: 25)</p> <p>“Interviewer: What is your dream of a wonderful life? Interviewee: Peace, a good work, having to do something, family has to be, but I cannot imagine it now.” (S17_F: 8)</p> <p>“[...] it’s not a job that they liked right? And it is not a job that they chose, it was forced upon them. So what are the motivations behind that then? You can go through with a year or two. After that you will always have that feeling, like ok I didn’t want this job, but I have to do this job. After that it’s personal. Some women who are really determined and say ‘I am going to work’, stick on others will just quit.” (E8_F: 9)</p> <p>“Your parents decide most of the things. [...] they would not have decided that they have to go for engineering. Somebody decided for them. [...] They are not in the position to really decide what they want to do in life, like they would not have decided that they have to go for engineering. Somebody decided for them. That you must go and do engineering.” (P4_M: 3)</p>
<i>Career Salience</i>	<p>“More and more women find it just natural to stick on to the engineering degree, you know, and do engineering.” (E2_F: 2)</p> <p>“Because I took 6 months off and 1.5 years I worked part time, I didn’t have that much time to contribute and do better than expectations. So I lost around 2 years. I knew that when I took this decision of working part time that it would affect my promotion.” (E5_F: 6f.)</p> <p>“They are sometimes not able to manage that. Once they step into another family and another culture, when more responsibilities from the family add on they just want to opt for an easier job.” (S6_F: 7)</p> <p>“[...] consultants and project managers are typically 27, 28 and above. That is when women are thinking of having a family. So they are huge compromises that one has to make.” (P2_M: 2a)</p> <p>“I mean, he might love kids more than his wife, who is maybe more career-oriented, but he will never give it up. That never happens. Even the more career-oriented wife is expected to give up the job if they’re struggling with managing.” (E1_F: 15)</p> <p>“[...] as women, you know, progress and you come to a certain age, when you are getting married, you are settling down. Then you have other things in your life as well, which take your time and your energy. Then you have a family to look after. And then you may have children and all of that.” (E2_F: 4)</p> <p>“Now, when you’re married you have kids, [...] you’re working 9 to 5, it is fine, but then this extended work hours takes away the flexibility that you need, as a working mother you need to do a tradeoff. So, that’s a challenge.” (P2_M: 2b)</p> <p>“It’s often a social choice that is being made. So I guess, women have a more focused skill set.” (P3_M: 5)</p> <p>“Women tend to prefer their family over their profession. At least as far as I see. The trend is changing though, now. So women do prefer their careers, I would say over family, along with family. But for men it's always the profession that is a little more important. Because the women will take care of the family.” (S16_F: 10)</p> <p>“It’s the first five, six years where, if you are technologically relevant [...]. Some of my female colleagues have left before that.” (E8_F: 19)</p>

ARTICLE 2

Contextual career-related barriers

“[...] If you are being sexually harassed. [...] There is a complaints committee [...] senior leaders are there. There is gender balance in that because prevention of sexual harassment is gender neutral. It cannot be only for women as there are women also who could harass men and those cases have also come to light.” (E7_F: 14f.)

“Okay, so IT industry is probably more gender neutral than any other industry in India.” (P4_M: 4)

Individual-level barriers

“I would say, fine statistically speaking, guys tend to be more logical.” (S19_F: 18)

“Women are equally capable to perform the same results; they are highly qualified to do so.” (E5_F: 5) “[...] girl students do better than boys, [...] in terms of marks and all that. So, I don’t see it should be any difference in aspiration.” (P4_M: 5)

“[...] there isn’t much difference. Women also would take up a software developer’s job because that is what their final aim is after completing a 4 year course in software.” (E4_F: 5)

“But that sort of pressure is really not there for the women. Once, you know parents don’t expect so much from girl children. And then again the husband doesn’t expect [...] to contribute to the family.” (E2_F: 4)

Institutional-level barriers

“Yes, we need to ramp up in terms of skills and knowledge, because what is good today is outdated tomorrow.” (E3_F: 14)

“Keeping yourself up to date in this constantly changing industry is definitely a challenge. If you start a family then your obviously family becomes your top priority, especially in India.” (E5_F: 8)

“Because the rate of change in this industry is so much. If I’m out for six months I become outdated. I just can’t get back into the workforce. People are [...] scared to take the break.” (P2_M: 3)

“Because of this globalization and this 24/7 culture, people work from home. And you just can’t help it. [...] I was on calls to late night and checked my mails and all that. The work requires you to do that.” (E1_F: 6a)

“Much of the work is for the American, North American market [...]. Which a) by definition requires a significant challenge in synchronizing with your counterparts in the US.” (P2_M: 1)

“Travelling is necessary [...], also for promotions. [...] You see, you have a good worker, she is female, but she will not travel abroad. If I promote her, other employees will say ‘but I even took on-site assignments’.” (E8_F: 19)

“Sometimes they are not allowed to travel alone. They are not allowed to go on long-term assignments. Sometimes they kind of miss out on those opportunities.” (S1_F: 10)

“I have somebody female, and she was a really good worker, I wouldn’t want to lose her. [...] So, I tell her ‘yes sure, if all the work gets done I don’t care if you leave at four in the evening. [...]’. But there are compulsions in terms of billable hours. When you are working for time projects. [...] So, from a compliance perspective I need you in the office.” (E1_F: 6b)

“And I cannot expect my customer to come earlier to the office. Therefore, but I tell my staff, you have to stay by late because you need to speak to the customer and talk to them over the media call or voice call.” (P2_M: 2c)

“And then the very logistic problem is, that these companies are usually in the outskirts of the city. So you add that commuting to the nine hours.” (E6_F: 4)

“Yes, I mean, it’s kind of informal. For example two of my friends work here because I recommended them.” (E5_F: 19)

“We recruit a lot from social networks and meetings.” (E7_F: 18)

“I have a friend. He got his job because he was referred by his friend. So it’s all about knowing people and networks.” (S3_F: 20b)

“[...] my colleagues stay after work, have a beer [...]. I used to stay back [...]. But I felt awkward and also I have a family at home.” (E8_F: 19)

“[...] they are bachelors. They can stay longer and meet [...]. But for women, it’s inappropriate to stay back after work.” (S3_F: 20c)

“I think, of course, you have to work as well as men. [...] But still I expect it to be very difficult. Working till night and then going home and you have all the housework to do.” (S2_F: 21)

ARTICLE 2

Contextual career-related supports

<i>Governmental support</i>	<p>“First they have to make sure that other bigger issues like female infanticide and illiteracy of women and girls across rural areas. [...] When a girl reaches that level I think a girl can take care of herself.” (E5_F: 15)</p> <p>“This country does not provide any kind of day care support. So companies have to provide it and it becomes a huge cost for them. Government has also not been able to provide good, accessible and easily available transportation. [...] If government can take care of these basic necessities companies will be able to create much more opportunities for women [...]” (E7_F: 9)</p> <p>“We are not governed by any labour laws or minimum wages [...]” (S1_F: 3)</p> <p>“India doesn’t have a good public transport. [...] for the women to travel at 4 o’ clock in the morning is unimaginable.” (P2_M: 4f.)</p> <p>“I think organizations are quite empowered to do things on their own.” (E2_F: 14)</p>
<i>Organizational supports</i>	<p>“I think there’s been a lot of conscious effort to get the women into the IT world.” (E2_F: 2)</p> <p>“I wanted that flexibility. I was happy that ‘x’ gave me that flexibility otherwise I would have to quit.” (E5_F: 7)</p> <p>“[...] it is a very knowledge-centric industry. [...] But also we offer possibilities, you know like a ‘morning reading circle.’” (E7_F: 18)</p> <p>“There is a huge amount of investment that they do on learning and education. [...] They have a policy called ‘You certify, we pay.’” (E1_F: 9)</p> <p>“We have a business women’s network. [...] men are also allowed to interact in that group. They talk about women’s issues.” (S4_F: 8)</p> <p>“Software industry [...] have their own regular buses [...]. Providing day care facilities [...] is the minimum required by law.” (P2_M: 5)</p> <p>“[...] it is a zero-tolerance policy. [...] if the person feels harassed, we say that the harassment has taken place.” (S1_F: 7)</p> <p>“[...] we decided [...] that when we hire our grades we ensure a 50:50 ratio. So we stop hiring if we don’t have enough women.” (E2_F: 7)</p>
<i>Social supports</i>	<p>“[...] men and family, also need to be sensitized towards to whatever topics we have.” (S1_F: 8)</p> <p>“So fish bowls are a way of talking to larger groups [...]. So, apparently a lot of men came and spoke about it. Which is a very nice thing. Because it means that they are involved and they want their interest. It’s about inclusivity. I mean, that everyone is there and shows interest and discusses.” (E2_F: 8f.)</p> <p>“[...] in the morning I got a call and my husband asked me ‘What did you do for breakfast?’ and I said ‘Bread’. ‘But that’s not proper breakfast’. [...] You have to get up in the morning, you have to study for the class. You have to make breakfast, you have to prepare lunch, you have to prepare for dinner, you need to go to the office, you come back, you study or you have a call and then you have dinner, [...] then you go to sleep.” (S4_F: 10)</p> <p>“[...] my daughter is 10 and half. My daughter is dyslexic, but my dad spends hours after hours with her. So, he spends time, I don’t spend that much of time. It’s very sad, but I can’t help it.” (E1_F: 25)</p> <p>“I have family support; either my in laws or my parents come and stay with us. Not everyone is as fortunate, not everyone gets this kind of support. There is another engineer I know who doesn’t have any family support [...]” (E5_F: 11)</p> <p>“In my in laws family [...], I am the only daughter in law who works. They still don’t get that how I go to work and still take care of the family. 80% of the population is like that. [...] They expect you to quit as soon as you have a baby.” (E5_F: 10)</p> <p>“[...] they are less women at college like here. That also comes from how a family supports the girl also in education. If the family prepares her for a job or a marriage. If that perspective can be improved, then everything will go right.” (S20_M: 24)</p> <p>“[...] on behold the society’s mindset towards working women could be changed, then it would help women in IT a lot.” (S10_F: 10)</p>

* Number in bracket refers to page number in the transcript.

Interest beats image – At least in the long-run: An analysis of core components of career choices that influence the short- and long-term persistence of students in computing disciplines

Working Paper

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ABSTRACT

Women's restraint to persist in computing professions is a global issue. Research based on Social Cognitive Career Theory (SCCT) is dominated by two explanations: (1) women leave due to low self-efficacy beliefs, outcome expectations, and interests, and (2) women leave because they perceive their family plans to be at odds with demands of careers in computing fields. While research traditionally viewed persistence from a *short-term* perspective (e.g., the probability of entering a job in a computing profession after majoring in a computing field), this perspective is not sufficient as women leave after a duration of approximately 6-12 years. Hence, we need to complement the *short-term* perspective by also considering the expected commitment in the long-run. Therefore, our research question is: Which core components of the Social Cognitive Career Theory influence the *short-* and *long-term* persistence of female in comparison to male students in computing disciplines? We use a sample of 723 Indian students of computing disciplines to examine *short-* and *long-term* persistence of female and male students based on SCCT. Our results indicate that the image of the job field has a significant positive influence on females', but not on males' *short-term* persistence, whereas personal interest in the ICT-field has a significant influence on the *long-term* persistence of females as well as males. Additionally, family-related barriers do not contribute to women's attrition, but are negatively associated with men's *long-term* persistence. Further aspects of persistence are analyzed and tested, which allows us to theoretically contribute to the refinement of the core components of SCCT.

Keywords: computing discipline, persistence, gender, SCCT

Article 3: Interest beats image – At least in the long-run: An analysis of core components of career choices that influence the short- and long-term persistence of students in computing disciplines

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Interest beats image – At least in the long-run: An analysis of core components of career choices that influence the short- and long-term persistence of students in computing disciplines

INTRODUCTION

Restraints to women's careers to participate and persist in computing professions are globally discussed as an unsolved puzzle (e.g., Hill, Corbett, & Rose, 2010). In this regard the Indian computer and software industry has received a good deal of theoretical and empirical attention in research (Budhwar & Baruch, 2003; Jungwirth & Roy, 2015a; Kelkar & Nathan, 2002; Kelkar, Shrestha, & Veena, 2002; Ramalingam, 2012; Rothboeck, Vijayabaskar & Gayathri, 2001; Shanker, 2008). By achieving gender parity at the entry level of the computer and software industry (Ramalingam, 2012), India has gained the reputation of being able to attract women to computing professions and has established itself as an exemplary country for fostering women in STEM fields (science, technology, engineering, mathematics). However, high entry rates of female employees are confronted with high attrition rates of female employees. This is because in the long-run the majority of women quit after six to twelve years, and the gender ratio becomes similar to the ones in other countries, namely a workforce of approximately 90 percent males and 10 percent females (Lannon, 2013; Nasscom, 2013). Hence, the lack of *long-term* persistence (which refers to the time span of few years after job entry) rather than the *short-term* persistence of females in computing disciplines seems to be a considerable problem in the Indian computing and software industry.

In this regard we are particularly interested in understanding core components of career choices that influence and differ between *short-* and *long-term* persistence of females in computing disciplines. For this we choose an approach that is two-fold. First, we analyze the impacts of core components of career choice on *short-term* persistence as well as on *long-term* persistence. With that we reveal core components that are crucial for *short-* and *long-term* persistence and that differ regarding their impacts on these two perspectives of persistence. Second, we analyze gender differences. We compare the impacts of core components on *short-* and *long-term* persistence among females and

males to identify core components that are particularly relevant when focusing on the retention of females in computing disciplines.

We embed our theoretical considerations in the premises of the Social Cognitive Career Theory (SCCT) proposed by Lent, Brown, and Hackett (1994, 2000). SCCT has received a lot of empirical attention (for recent reviews, see Betz, 2008; Lent, 2005; Lent, 2013) regarding the under-representation of vocational groups in STEM fields. It suggests that core components of career choices, which are person factors (self-efficacy beliefs, outcome expectations, and interests) and context factors (supports and barriers) work together to shape an individuals' career-related choice goals. Research indicates gendered persistence in computing professions is dominated by two explanations: women leave due to low self-efficacy beliefs, outcome expectations, and interests (person factors), and because they perceive their family plans to be at odds with demands of careers in computing fields (context factors). However, research based on SCCT has mainly focused on *short-term* rather than on *long-term* persistence of females in computing disciplines at college or entry-levels in the job market e.g., majoring in engineering (Lent et al., 2005), intending to stay enrolled in a STEM subject (Lent, Lopez, Lopez, & Sheu, 2008), the probability of entering an engineering job field, the likelihood of being an expert in that particular field within five years (Cech, Rubineau, Silbey, & Serond, 2011), etc.

We identify a research gap by arguing that this *short-term* perspective of persistence is not sufficient because the problem does not lie in the retention of females in computing disciplines right after their job entry, but in the retention of females in the *long-term* perspective. In this regard, studies have shown that females mostly do not drop out during college or at job entry, but rather after joining an occupation and working for a few years (Nasscom-Mercer, 2009; Stephan & Levin, 2005). Therefore, we address this phenomenon by analyzing the changes in the impacts of core components of career choices on *short-* and *long-term* persistence and by identifying differences among females and males. Although there is ample research on *short-term* persistence (e.g., Cech et al., 2011; Lent et al., 2005), we state that it is necessary to consider both *short-term* and *long-term* persistence as well as females and males in our analysis to be able to identify changes in the impacts of core components between *short-* and *long-term* persistence and to reveal gender differences. In particular, we raise the research

question “Which core components of SCCT influence the *short-* and *long-term* persistence of female in comparison to male students in computing disciplines?” By answering this research question we will have a more holistic picture of factors that have an influence on *short-* and *long-term* persistence and how they differ across these time spans as well as across gender.

We approach this research question by using a cross sectional research design, which allows the analysis of core components at one point in time, instead of a longitudinal research design, which focuses on the analysis of factors over a period of time. We do this because we are particularly interested in identifying core components of career choices that are perceived today, but predict and lead plans of persistence in the future. This will enable us to predict changes in the impacts of core components of career choices on *short-* and *long-term* persistence much earlier. Hence, it allows us to address crucial core components for *short-* and *long-term* persistence at an earlier stage of career and to align measures regarding the retention of females in computing disciplines accordingly.

This study uses a sample of 723 Indian students of computing disciplines to examine *short-* and *long-term* persistence of female in comparison to male students based on SCCT. We especially focus on examining students as this will give us insights into crucial factors that already at a university level affect students’ persistence regarding an occupation related to their studies. We offer an extension of SCCT by introducing the concepts of expanded interests – drivers that motivate the choice of a college major such as academic interests, image of the job field, etc. – and career salience to SCCT, and argue that these aspects need to be considered when analyzing the persistence of generation Y¹. Our findings suggest that in *short-* and *long-term* persistence self-efficacy beliefs and outcome expectations do not differ across gender, while the impact of the image of the job field reveals gender differences regarding females’ and males’ *short-* and *long-term* persistence. As intuitively expected, social context factors predict *short-term* persistence of female and male students, whereas family-related aspects predict *long-*

¹ Generation Y individuals are described as individuals who are aged 14-31 in 2008 (Noble, Haytko, & Phillips, 2009). In contrast to Generation X individuals (aged 45-65 in 2008), there is much unknown about predictors of career choices regarding the middle-aged members of this generation (ages 18-22) who predominantly are in the job market.

term persistence. Interestingly, family-related barriers are not negatively associated with females', but with men's *long-term* persistence.

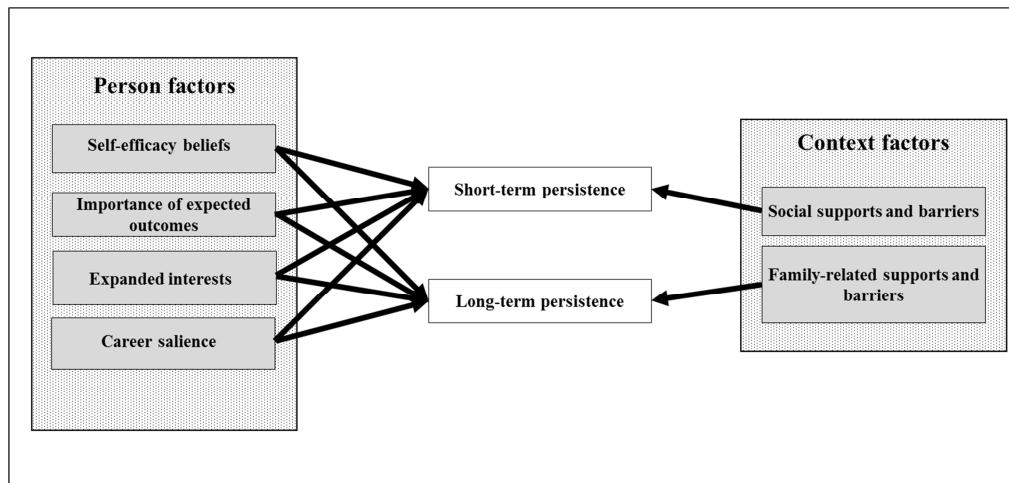
With the findings of this study we contribute to the "women in STEM" discussion, as we find changes in the impacts of core components on *short-* and *long-term* persistence and therefore different core components to be relevant for *short-* and *long-term* perspectives of persistence for females and males. We suggest that differentiated implications regarding two perspectives of persistence are needed in order to retain women in computing fields in the long-run. We contribute to theory by including the concept of *long-term* persistence into SCCT and by implementing it into a testable model.

In the remainder of this paper we start with a selective review of the SCCT literature highlighting aspects of the theory relevant to our understanding of the planned *short-* and *long-term* persistence of Indian students in computing fields and develop our hypotheses. We then present the procedures of data collection and the quantitative methods for data analysis. In the subsequent sections we report and discuss our results, and derive implications for future research.

THEORETICAL BACKGROUND

The SCCT model (Lent, 2013; Lent, Brown, Schmidt, Brenner, Lyons, & Treistman, 2003; Lent et al., 1994) predicts the relationships between person as well as context factors and career-related choice goals of individuals. While the majority of the studies applied the SCCT model to the *short-term* persistence, this approach may also help to understand which factors determine the *long-term* persistence of individuals. *Figure 1* illustrates the model of core components that have an impact on *short-* and *long-term* persistence. The model will be described in detail in the following section.

Figure 1: Theoretical model of core components that affect short- and long-term persistence



Source: Authors' own illustration.

Persistence as a choice goal

According to the SCCT's choice model, people develop choice goals to pursue academic and career-relevant activities (Lent et al., 1994; Sheu, Lent, Brown, Miller, Hennessy, & Duffy, 2010). Such choice goals refer among others to the planned persistence to stay in a certain field (Cooper, Argyris, & Channon, 1998). According to Lent (2005) persistence can be seen as a matter of choice stability, involving the decision to remain at or disengage from a particular activity (e.g., education tasks, job positions, or careers).

As previously established, the *short-term* perspective of planned persistence (e.g., majoring in a computing discipline, intending to stay enrolled) is significantly influenced by person factors and the perception of context factors (Blanco, 2011; Byars-Winston, Estrade, Howard, Davis, & Zalapa, 2010; Dahling & Thompson, 2010; Inda, Rodríguez, & Peña, 2013; Lent et al., 2005; 2008; Singh, Fouad, Fitzpatrick, Liu, Cappaert, & Figueredo, 2013). However, majoring in a computing discipline and choosing an occupation in that field are necessary, but not sufficient conditions to explain all facets of persistence (Cech et al., 2011). Once students complete their studies and enter an occupation, they have to think about whether they will leverage their degrees to secure *long-term* employment in the workforce.

Research on gender differences taking into account the *long-term* perspective (e.g., commitment to the job field, prioritizing process of job- and family-related issues)

with regard to the planned persistence in STEM fields has been rare (Glass, Sassler, Levitte, & Michelmore, 2013). This research gap is particularly detrimental as priorities may change over time and affect the planned persistence. For example, work-family balance may not play a major role in the *short-term*, but in the *long-term* perspective of planned persistence. This is because, males and females firstly focus on the job after the completion of their major and follow a similar career path by assessing family planning as irrelevant at the beginning of their professional career. However, work-family balance will gradually become more important in the *long-term* perspective (Major, Morganson, & Bolen, 2013). Predominantly women decide to leave the occupation due to childbirth, nurturance of children, traditional gender roles, etc. (Bailyn, 2003; Evertsson, 2013; Legault & Chasserio, 2013).

This is why we not only focus on *short-term* persistence, but also consider *long-term* persistence of females and males. The consideration of both persistence perspectives allows us to analyze the impacts of core components on *short-term* persistence and to use this as baseline for a comparison with the impacts of core components on *long-term* persistence. This has the advantage that we are able to understand the changes between *short-* and *long-term* persistence instead of limiting our focus to one perspective of persistence.

Person factors

According to Lent et al. (1994) person factors can be understood as “internal cognitive and affective states and physical attributes” (Lent et al., 1994: 82). These factors among others refer to gender, ethnicity, self-efficacy beliefs, outcome expectations, interests, etc. Influence of person factors is not likely to vary along the *short-* and *long-term* perspective of planned persistence. According to Lent et al. (1994) they are viewed as global and static predictors. They are rooted in an individual’s personality, biology and upbringing and are not likely to change across *short-* and *long-term* perspective of planned persistence. We acknowledge that over the course of development person factors can vary by an influence of external variables such as war, extreme poverty, and experiences with the employer, etc. and hence, affect planned persistence. However, such conditions are not included in our considerations. Still, we will offer separate hy-

potheses for the impacts of person factors on *short-* and *long-term* persistence as we assess these two dependent variables of persistence in our model separately.

Self-efficacy beliefs and outcome expectations. Self-efficacy beliefs can be understood as beliefs about one's ability to successfully perform particular behaviors or courses of action (Hackett & Betz, 1981; Lent et al., 2008). Hackett and Betz (1981) and Betz and Hackett (1981) introduced this concept to the vocational psychology literature. Based thereon, its potential to help explain women's high drop out rates in male-dominated career fields has been analyzed in numerous studies (e.g., Betz & Hackett, 1983; Fouad & Smith, 1996; Hackett, Betz, Casas, & Rocha-Singh, 1992; Lent, Brown, & Larkin, 1984; Lent, Brown, & Larkin, 1986; Lent, Lopez, & Bieschke, 1991; Lent, Lopez, & Bieschke, 1993; Schaefers, Epperson, & Nauta, 1997). This line of research has been expanded to include additional social cognitive variables such as outcome expectations (e.g., Lent et al., 1994; Lent et al., 2001; Lent et al., 2003; Lent et al., 2008). Outcome expectations can be understood as beliefs about the consequences of given actions (Lent et al., 2008). A large body of findings has accumulated on the positive influence of self-efficacy beliefs and outcome expectations on different choice goals (Betz, 2000; Byars-Winston et al., 2010; Pintrich, 2003; Quimby, Seyala, & Wolfson, 2007; Singh et al., 2013; Zimmerman, 2000). Especially, math/science self-efficacy beliefs have been found to significantly predict math/science-related choice goals, such as academic persistence (Schaefers et al., 1997), and consideration of math- and science-related careers (Post, Stewart, & Smith, 1991; Post-Kammer & Smith, 1985). Outcome expectations, along with math/science self-efficacy beliefs, have been found to predict course enrollment intentions (Fouad & Smith, 1996; Gainor & Lent, 1998). Byars-Winston and Fouad (2008) found students with strong self-efficacy estimates in math/science and positive outcome expectations regarding the personal value of pursuing math/science activities to be more likely to initiate and persist in math/science pursuits. Hence, we expect the planned persistence to increase with higher self-efficacy beliefs and outcome expectations.

Moreover, empirical support is found that suggests a gendered pattern of self-efficacy beliefs and outcome expectations. Research findings depict that women due to socialization processes, lower self-esteem, lack of role models, etc. tend to have lower

self-efficacy beliefs and outcome expectations than men which negatively affects their choice goals (Betz, 2000; Correll, 2001; Larose, Ratelle, Guay, Senécal, & Harvey, 2006; Luzzo & McWhirter, 2001; Pajares & Miller, 1994). Drawing on insights from above research findings, we offer the following hypotheses:

Hypothesis 1a. *Self-efficacy beliefs and outcome expectations have an influence on short-term persistence.*

Hypothesis 1b. *Self-efficacy beliefs and outcome expectations have an influence on long-term persistence.*

Hypothesis 2a. *The influences of self-efficacy beliefs and outcome expectations on short-term persistence are moderated by gender.*

Hypothesis 2b. *The influences of self-efficacy beliefs and outcome expectations on long-term persistence are moderated by gender.*

Expanded interests and career salience. Interest can be understood as “patterns of likes, dislikes, and indifferences regarding career-relevant activities” (Lent et al., 1994: 88). Empirical support has been found for the influence of math/science-related interests on choice goals such as choice of a college major (Jungwirth & Roy, 2015b; Lent et al., 1986; Lent et al., 2003; Lent et al., 2005) or academic achievement (Hackett et al., 1992; Nauta & Epperson, 2003). Developing interests in an area can subsequently lead to choosing to enter the occupation and to persist in that field (Singh et al., 2013).

We argue that apart from academic interests in a certain field there are more drivers that motivate the planned persistence in a field and that they may differ across gender (Engeser, Limbert, & Kehr, 2008; Schinzel, Kleinn, Wegerle, & Zimmer, 1999; Stewart, 2003). Jungwirth and Roy (2015a, 2015b) found that the image of the job field as well as factors like family pressure or existence of role-models are drivers for the choice of a college major and lead to gender differences. Although female students have demonstrated interests in their field (Davey, 2001; Jungwirth & Roy, 2015a, 2015b) they were more attracted by a positive image of the job field whereas male students reported significant higher interests, working experiences or traineeships as motivation for their choice of a college major (Jungwirth & Roy, 2015a, 2015b). We build on these findings and apply them to the planned persistence suggesting that different drivers for the choice of a college major (apart from academic interests) may also lead to differ-

ences in planned persistence among females and males. Therefore, we expand the original understanding of interests by taking into account other factors such as working experiences, career prospective, etc. Therefore, we rename the SCCT-component “interests” as “expanded interests”.

We introduce another novel aspect to SCCT by incorporating career salience into our model. Career salience can be understood as “the importance of work and a career in one’s total life” (Greenhaus, 1971: 210). It addresses the career-orientation of a person and the extent of career-involvement in terms of willingness of time investment, effort, willingness to make compromises, etc. (Allen & Ortlepp, 2002; Moya, Exposito & Ruiz, 2000). Studies show that career choices of generation Y are underpinned by subjective criteria such as career values and needs (Rodrigues, Guest, & Budjanovcanin, 2013). Topics related to the interface between the home-work environments, the role of career and work, as well as career development issues at different stages of an individual’s lifespan, may all be included and enriched by the consideration of career salience (Allen & Ortlepp, 2002). Hock and DeMeis (1990) found among mothers of 12-month-old infants that those with high scores in career salience were more likely to work after childbirth and that they would prefer to work rather than stay at home. Hence, an awareness of the importance of work and careers within peoples’ lives may contribute to our understanding of their behaviors and attitudes related to the planned persistence (Allen & Ortlepp, 2002). Therefore, we expect the planned persistence to increase the more a person values his/ her career.

Moreover, empirical support is found that suggests a gendered pattern of career salience (Gerstein, Lichtman, & Barokas, 1988; Gilbert, 1993; Leung, Conoley, & Scheel, 1994; Pfost & Fiore, 1990). Studies depict that women’s career salience is different from that of men showing that women consider their professional career as less important than men (Gerstein et al., 1988; Gilbert, 1993; Leung et al., 1994; Mednick & Thomas, 1993; Moya et al., 2000; Pfost & Fiore, 1990). Moya et al. (2000) found that women tend to attach less importance to their career based on their economic situation (e.g., necessity to work) than men, whose career salience was unrelated to the economic characteristics of their partner. Based on the insights of empirical research findings, we expect a gender difference regarding the influence of career salience on the planned

short- and long-term persistence. Drawing on insights from above research findings, we offer the following hypotheses:

Hypothesis 3a. *Expanded interests and career salience have an influence on short-term persistence.*

Hypothesis 3b. *Expanded interests and career salience have an influence on long-term persistence.*

Hypothesis 4a. *The influences of expanded interests and career salience on short-term persistence are moderated by gender.*

Hypothesis 4b. *The influences of expanded interests and career salience on long-term persistence are moderated by gender.*

Context factors

Context factors “comprise the real and perceived opportunity structures within which career plans are devised and implemented” (Lent et al., 1994: 107). They are subdivided into supports and barriers (Lent et al., 1994). Lent et al. (2003) recommend that “it would be valuable to examine the dimensionality of the contextual supports and barrier measures and to assess how particular types of supports and barriers (e.g., social supports, gender barriers), rather than aggregate environmental ratings, relate to choice behavior” (2003: 464). Keeping in mind our two perspectives of planned persistence, we suggest that different types of supports and barriers relate differently to these persistence types.

Social supports and barriers. Regarding the *short-term* perspective of planned persistence ‘social supports’ seem to play an important role. Lent et al. (2001) and Lent, Singley, Sheu, Schmidt, and Schmidt (2007) have employed this term by referring to an encouraging assistance received from proximal social members such as the spouse or partner, parents, siblings, children, extended family, and friends regarding career choices (Marcinkus, Whelan-Berry, & Gordon, 2007; Silva, Ahmad, Omar, & Rasdi, 2012). Seymour and Hewitt (1997) show that the majority of students who pursue STEM studies have been influenced and encouraged to do so by family, teachers, and other significant adults. Moreover, encouragement by faculty staff was found to have a positive influence on engineering students' academic performance (Hackett et al., 1992) and persistence (Schaefers et al., 1997).

Social barriers, as a counterpart, were found to have a negative influence on choice goals. This includes negative influences of social environment and family e.g., discouragement regarding the pursued job field (e.g., Dahling & Thompson, 2010; Lent et al., 2005, 2008), negative awareness and a negative opinion of others about the pursued job field (Jungwirth & Roy, 2015b).

To sum up, research indicates that social supports and barriers seem to be important regarding *short-term* persistence as they are crucial at the beginning of a career. We state that females and males follow similar career paths at the beginning of their careers and therefore do not expect a gendered pattern of social supports and barriers on *short-term* persistence. Hence, we assume that they perceive social supports and barriers in similar ways as these factors mainly affect the *short-term* persistence of individuals and their career plans do not deviate much from each other during this period of life.

Regarding the influence of social supports and barriers on *long-term* persistence there seems to be a lack of studies as research work has focused on the impacts of social supports and barriers on *short-term* persistence. Based on above considerations, we state that these factors are rather relevant regarding *short-* than *long-term* persistence as priorities change over time and other factors become more important (Evertsson, 2013; Hakim, 2000) that have an impact on *long-term* persistence (see family-related supports and barriers). Hence, we expect an influence of social supports and barriers on *short-term* persistence, but not on *long-term* persistence.

Due to the expectation of social supports and barriers being rather irrelevant regarding *long-term* persistence, we also do not expect gender differences to occur. Therefore, we will examine the moderating effect of gender regarding the influence of social supports and barriers on *short-term* persistence, but not on *long-term* persistence. Drawing on insights from above research findings, we offer the following hypotheses:

Hypothesis 5a. *The perceptions of social supports and barriers have an influence on short-term persistence.*

Hypothesis 5b. *The perceptions of social supports and barriers do not have an influence on long-term persistence.*

Hypothesis 6. *The influences of perceptions of social supports and barriers on short-term persistence are not moderated by gender.*

Family-related supports and barriers. Research findings indicate that employees who feel supported during their time of family planning and founding (e.g., regarding work-family balance) feel obligated to return the help e.g., by persisting in the company, whereas people who feel hindered by their company in their career progress or in maintaining work-family balance lack commitment and do not feel obligated to repay the company in terms of not quitting (Eisenberger, Huntington, Hutchison, & Sowa, 1986; Shore & Wayne, 1993; Wayne, Shore, & Linden, 1997). Further, research suggests that family-related supports and barriers are rather important during *long-term* persistence when people start thinking about family matters (Butts, Casper, & Yang, 2013), than during *short-term* persistence when family plans are not current issues. Therefore, we expect an influence of family-related supports and barriers on *long-term* persistence, but not on *short-term* persistence.

Moreover, empirical support is found that suggests a gendered pattern of family-related supports and barriers (Luzzo, 1995; Luzzo & Hutcheson, 1996; Slaney & Brown, 1983). Results by Slaney and Brown (1983) show that 14% of undergraduate college women reported marriage and family demands as their major career-related barrier, compared to only 1% of college men. Similar results from a study by Jungwirth & Roy (2015b) revealed greater perception of family-related barriers (such as juggling work and family responsibilities or making sacrifices to have children) and supports by female than by male students. As established above, family-related supports and barriers are rather relevant during *long-term* persistence than *short-term* persistence. Therefore, we will focus on the analysis of gender differences regarding family-related supports and barriers on *long-term* persistence and not on *short-term* persistence. Drawing on insights from above research findings, we offer the following hypotheses:

Hypothesis 7a. *The perceptions of family-related supports and barriers do not have an influence on short-term persistence.*

Hypothesis 7b. *The perceptions of family-related supports and barriers have an influence on long-term persistence.*

Hypothesis 8. *The influences of perceptions of family-related supports and barriers on long-term persistence are moderated by gender.*

DATA AND METHODS

Sampling

We identified the top 10 universities in India that graduate women and men in computing and engineering disciplines. The deans of Indian Institutes of Technology (IITs) or other public universities were contacted and invited to be part of the study. More than half of the universities responded affirmatively, and in the end, six universities agreed to participate. Some of the universities provided us with email addresses, so that we could send an online-link to the students; other universities allowed us to visit the courses and to conduct the survey on the spot with printed questionnaires. Universities broadly represented every region of the country and included very large institutions that are known for technology (Anna University, Indian Institute of Management Bangalore, International Institute of Technology Bangalore, Indraprastha Indian Institute of Technology Delhi, Indian Institute of Technology Delhi, Indian Institute of Technology Madras).

Participants were 723 students majoring, or intending to major, in a computing discipline at one of six Indian universities. Their mean age was 20.62 years, $SD = 4.19$. First, second and beyond year students accounted, respectively, for 38% ($n = 279$), 36% ($n = 263$), and 26% ($n = 181$) of the sample. Relatively few students were married (5%) or in a serious relationship (10%). Overall, the sample included 220 (30.4%) women and 503 (69.6%) men. In terms of nationality/ethnicity, 90% self-identified as Asians (India) and 10% reported other national/ethnic identifications (Europeans, Americans, Sri Lankans, and Ethiopians). The most frequently endorsed majors were computer science and engineering, mechanical engineering, and information technology, but most of the other majors that students listed included variations of these fields or related fields (e.g., civil engineering, electrical and computer engineering, computer information systems, management information systems).

Measures

An overview over the used items and scales in this study is given in *Appendix A*.

a) Dependent variables

Persistence as a choice goal. Students' intentions to persist in their computing discipline were measured with a 2-item scale adapted from Cech et al. (2011). Students rated their level of *short-term* persistence with answering the question "How likely is it that you will be a professional in your field in 5 years?" along a 5-point scale (anchored at 1 = very unlikely and 5 = very likely). Higher scores indicate higher ambitions regarding their *short-term* persistence in a computing discipline after joining an occupation. Consistent with our theoretical considerations (e.g., Cech et al., 2011; Lent et al., 2008), we included an item referring to the intended commitment after joining an occupation. Respondents rated their level of *long-term* persistence with answering the question "How long (in years) do you feel committed to remain employed in your specialized branch?" along five answering options ranging from 1-5 years to above 20 years. Greater number of years indicates higher values of *long-term* persistence. We focus on "commitment" as this serves as an indicator for *long-term* persistence. As we are analyzing students and not employees, we are not interested in their actual duration of stay in an occupation; but we are interested in analyzing how committed they are to their occupation and hence measure whether they at all intend to stay and which factors already at a university level increase or lower these intentions.

Consistent with our theoretical elaborations, it is noteworthy that females reveal a significant lower average *long-term* persistence ($p < .01$) than males, while there are no significant gender differences in the average *short-term* persistence observable. This supports our starting point indicating that the problem rather lies in the retention of females in computing disciplines in the *long-term* than in the *short-term* perspective.

To sum up, we assessed persistence with two single-item measures: 1. likelihood of being a professional (*short-term*) and 2. commitment (*long-term*).

b) Independent variables

Independent variables were measured on a 5-point Likert scale. Higher values indicate higher assessment of the measured variable.

Self-efficacy beliefs. According to Betz and Hackett (2006) “there is no entity called ‘career self-efficacy’ except as an umbrella term for self-efficacy beliefs with respect to possible career-related domains of behavior” (Betz & Hackett, 2006: 6). Hence, it is necessary to define the domain that the assessment of self-efficacy beliefs should refer to. Consistent with Lörz and Schindler (2011) we measured self-efficacy beliefs asking for a self-assessment of the students’ technical aptitude as we analyze abilities regarding a STEM-field and particularly computing disciplines.

Hence, we assessed self-efficacy beliefs with a single-item measure: technical aptitude.

Outcome expectations. Consistent with our theoretical considerations (e.g., Fouad & Guillen, 2006; Lent & Brown, 2006), we used a 6-item scale to assess outcomes that could result from earning a degree in a computing discipline and being persistent in that field (e.g., earn an attractive salary, career promotions, achieving desired job). Participants responded by indicating how important or unimportant they rated the outcomes.

Hence, we assessed outcome expectations with a 6-item measure: importance of expected outcomes.

Expanded interests. Based on theory (e.g., Engeser et al., 2008; Jungwirth & Roy, 2015a, 2015b; Schinzel et al., 1999; Stewart, 2003), we used a 7-item scale that addressed three categories of drivers for choosing a college major. These categories addressed the perceived image of the job field (career esteem, promising job prospective), external pressure (e.g., family pressure, pressure to take over a (family) business), and personal interests (academic interests in the subject, experiences on the job). We included the aspect of external pressure assuming that in India students may be guided by their parents and extended family members regarding their choice of a college major or an occupation and it may not be the students’ decision (solely), but a family decision.

Hence, we assessed expanded interests with 7-items that addressed three categories: 1. image of the job field, 2. external pressure and 3. personal interests.

Career salience. Students’ career salience was measured with a 4-item scale adapted from Greenhaus (1971) to make items appropriate for students of the generation Y majoring in the computing disciplines. We focused on two areas ‘general attitudes towards work & planning and thinking about a career’ and ‘the relative value & im-

portance of work and a career'. In the latter area we addressed issues regarding the willingness of mobility ("I would move to another country if I thought it would help advance in my career."). This is a crucial affordance of computing and software industry and may lead to gender differences with women not being as mobile and flexible as male employees due to traditional gender roles (Shanker, 2008). Respondents rated their level of agreement with each statement.

Hence, we assessed career salience with a 4-item scale that addressed two categories: 1. planning and thinking about a career and 2. willingness of mobility.

Supports. The support scales were adapted from Lent et al. (2003) and Swanson and Woitke (1997). Wording of the scales rather focused on the subjective perception of supports and barriers than their actual existence as "the perception of events provides the more influential force on career behavior" (Swanson & Woitke, 1997: 446). Hence, we aimed at analyzing whether simply the perception of supports would lead to an increase of *short-* and *long-term* persistence. Students were presented 6 items regarding two types of supports: social supports and family-related supports by companies that were supposed to help respondents in balancing work and family-related aspects. Respondents indicated the likelihood of perceiving each support.

Hence, we assessed supports with a 6-item scale that addressed two categories of supports: 1. social supports and 2. family-related supports.

Barriers. Also the barrier scales were adapted from Lent et al. (2003) and Swanson and Woitke (1997). Analogous to the assessment of supports, the wording of the scales focused on the perception of barriers rather than on their actual existence. Students were presented a 7-item scale regarding social and family-related barriers and were asked to indicate how likely they were to perceive different types of barriers if they chose and planned to persist in a computing field. Respondents indicated the likelihood of perceiving each of the barriers separately.

Hence, we assessed barriers with a 7-item scale that addressed two categories of barriers: 1. social barriers and 2. family-related barriers.

Analytic procedure

We tested the scales for measurement invariance before assessing the hypothesized relationships. It is necessary to identify equivalent phenomena for both groups

(male and female students) when analyzing across gender (Lent et al., 2008). We performed separate analyses that involved raw data as input for each of the gender groups (Anderson & Gerbing, 1988). All constructs in the two samples were composed of identical items. Constructs were found to be invariant across groups indicating that they were measured comparably across groups (see *Appendix B*). The Cronbach's α values ranged from 0.65 to 0.79 (see *Appendix A*), indicating an acceptable reliability of our scales (Nunnally & Bernstein, 1994). However, we observe exceptions regarding the Cronbach's α value e.g., external pressure (Cronbach's $\alpha = .45$). This is probably due to the self-developed character of the scale at early stages of research, which will need further consideration.²

Following Lent et al. (2008) we used a multi-group analysis with gender as a categorical moderator to examine our proposed model. In detail, we firstly analyzed the main effects, namely the impacts of person and context factors on *short-* and *long-term* persistence. For this we used the full sample of female and male students. In a second step, we used subgroup analysis to identify gender differences in the impacts of core components on *short-* and *long-term* persistence. We firstly analyzed the impacts of core components on *short-* and *long-term* persistence in the female and male subgroup. Subsequently, we compared the results of these two subgroups and identified gender differences among the impacts of core components on *short-* and *long-term* persistence. Overall, the independent variables and controls³ are identical in the full sample as well as in the gender subgroups.

RESULTS

Scale means, standard deviations, and correlations for the full sample are summarized in *Appendix C*. To address the tenability of the SCCT choice model, as shown

² According to Schecker (2014) there is no objective critical value for Cronbach's α to decide when a scale can be used and when not. A construct with a Cronbach's α that is below 0.7, which cannot be increased through deletion of particular items, can still be used for analysis if the „measure has other desirable properties, such as meaningful content coverage of some domain and reasonable unidimensionality, [...] low reliability may not be a major impediment to its use“ (Schmitt, 1996: 352). We follow this line of thought and argue that our scale covers crucial aspects of our analysis and cannot be excluded from interpretation.

³ We used the last grade in a science-related subject as control variable as good grades may have an influence on career choices (Lent, Lopez, & Bieschke, 1993).

in *Figure 1*, we tested model fit for the full sample. We employed robust maximum likelihood estimation procedures and relied on the comparative fit index (CFI) and the root-mean-square error of approximation (RMSEA) to assess model-data fit. Our model yielded evidence for acceptable fit, CFI= .905, RMSEA= .051 (Browne & Cudeck, 1992; Hoyle & Panter, 1995). The results of our multivariate results of path analysis are summarized in *Table 1*.

Table 1: Results of multi-group analysis

	Short-term persistence				Long-term persistence			
	Full sample	Male subgroup	Female subgroup	Gender difference ^b	Full sample	Male subgroup	Female subgroup	Gender difference ^b
Person factors								
Self-efficacy beliefs	.219** (H 1a ✓)	.221**	.177*	-.430 (H 2a ✗)	.120 (H 1b ✗)	.099	.103	.025 (H 2b ✗)
Importance of outcome expectations	.302** (H 1a ✓)	.308**	.299**	-.067 (H 2a ✗)	.122 (H 1b ✗)	.099	.196	.425 (H 2b ✗)
Expanded interests								
Image of the job field	.122** (H 3a ✓)	.088	.296**	-2.006* (H 4a ✓) ⁴	.051 (H 3b ✗) ⁵	.03	.085	-.328 (H 4b ✗)
External pressure	-.089 [†] (H 3a ✓)	-.142*	.038	-1.924 [†] (H 4a ✓) ⁴	-.126 (H 3b ✗) ⁵	-.128	-.149	.137 (H 4b ✗)
Personal interests	.12** (H 3a ✓)	.111*	.096	.176 (H 4a ✗) ⁴	.23** (H 3b ✓) ⁵	.216**	.27**	-.407 (H 4b ✗)
Career Salience								
Planning and thinking about a career	.075* (H 3a ✓)	.093*	.048	.599 (H 4a ✗) ⁴	.115* (H 3b ✓) ⁵	.135*	.121	.114 (H 4b ✗)
Willingness of mobility	.105** (H 3a ✓)	.081 [†]	.126**	-.683 (H 4a ✗) ⁴	-.02 (H 3b ✗) ⁵	-.041	.022	-.608 (H 4b ✗)
Context factors								
Supports								
Social supports	.118* (H 5a ✓)	.079	.196*	-1.073 (H 6 ✓)	.071 (H 5b ✓)	.051	.07	-.111
Family-related supports	-.022 (H 7a ✓)	.017	-.099	1.064	.012 (H 7b ✗)	.104	.281 [†]	.913 (H 8 ✗)
Barriers								
Social barriers	-.112* (H 5a ✓)	-.108 [†]	-.117	-.083 (H 6 ✓)	-.007 (H 5b ✓)	-.013	-.014	-.608
Family-related barriers	-.04 (H 7a ✓)	-.074	.064	-1.467	-.054 (H 7b ✗)	-.147 [†]	-.112	.981 (H 8 ✗)
Grade of science-related subject	.019	-.033	.105	.630	.012	.081	-.139	-.617

** $p < .01$, * $p < .05$, [†] $p < .1$.

^b Gender differences are assessed based on z-scores.

⁴ Due to the mixed results regarding the categories of expanded interests (image of the job field and external pressure are significant and personal interest is insignificant) and due to the overall mixed results regarding Hypothesis 4a (career salience is insignificant while parts of expanded interests are significant) we state that Hypothesis 4a is not fully, but partially supported.

⁵ Due to the mixed results regarding the categories of expanded interests (image of the job field and external pressure are insignificant and personal interests is significant) and career salience (planning and thinking about a career is significant and willingness of mobility is insignificant) we state that Hypothesis 3b is not fully, but partially supported.

In the following section we will concentrate on giving a brief overview over our main results. *Appendix D* gives an overview over which hypotheses are fully, partially and not supported by our data.

Person Factors

Self-efficacy beliefs and outcome expectations. In line with our expectations we find self-efficacy beliefs ($B = .219, p < .01$) and outcome expectations ($B = .302, p < .01$) to have a significant positive influence on *short-term* persistence. Contrary to our expectations we do not find these paths to have a significant influence on *long-term* persistence.

Moreover, in contrast to our assumptions, we do not find significant gender differences regarding the influence of self-efficacy beliefs and outcome expectations neither on *short-* nor on *long-term* persistence. However, these results support recent research work by Cech et al. (2011) and Lent, Lopez, Sheu, and Lopez (2011) suggesting that self-assessment of skills and outcome expectations have a positive influence on choice goals, but are not moderated by gender.

Expanded interests and career salience. In agreement with our expectations, all paths from expanded interests and career salience show a significant influence on *short-term* persistence in the full sample.

Regarding the influence of expanded interests on *long-term* persistence we find expanded interests in terms of personal interests ($B = .23, p < .01$) to have a significant positive influence on *long-term* persistence, whereas, contrary to our assumptions, the other paths (image of the job field and external pressure) are insignificant.

Regarding career salience we find career salience in terms of planning and thinking about a career ($B = .115, p < .05$) to have a significant positive influence on *long-term* persistence, whereas career salience in terms of willingness of mobility is insignificant. This is (partly) in line with our expectations.

Conforming to our expectations we find the influence of expanded interests in terms of image of the job field and external pressure to be moderated by gender in the *short-term* persistence. Our results indicate that the positive influence of the image of the job field on *short-term* persistence is significantly higher for female students whereas the negative influence of external pressure on *short-term* persistence is significantly

higher for male students. Contrary to our theoretical considerations, the paths from career salience and expanded interests in terms of personal interests are not moderated by gender in the *short-term* persistence.

Comparing the subgroups regarding the *long-term* persistence we do find several paths to be significant in the full sample as well as in the separate subgroups e.g., expanded interests in terms of personal interests is significant in the female ($B = .27, p < .01$) as well as in the male ($B = .216, p < .01$) subgroup. However, contrary to our theoretical considerations, we do not find evidence for these paths to be moderated by gender in the *long-term* persistence.

Context factors

Social and family-related supports and barriers. In line with our expectations, social supports ($B = .118, p < .05$) have a significant positive influence on *short-term* persistence, while social barriers ($B = -.112, p < .05$) show a significant negative influence on *short-term* persistence.

Contrary to our assumptions, the paths from family-related supports and barriers to *long-term* persistence are insignificant in the full sample.

Results regarding gender differences of social supports and barriers on *short-term* persistence are in line with our considerations, showing that there are no gender differences observable. This indicates that the perception of these supports and barriers has equally strong effect on *short-term* persistence of female and male students.

Regarding the paths from family-related supports and barriers to *long-term* persistence we do not find evidence for them to be moderated by gender. On the one hand, this is an unexpected result as evidence for a gendered pattern of family-related supports and barriers has been found in other research (e.g., Luzzo, 1995; Luzzo & Hutcheson, 1996; Slaney & Brown, 1983). On the other hand, it is consistent with our prior findings as gender differences are not likely to occur if the main effect is insignificant. Nevertheless, we observe interesting findings in the subgroups showing that family-related barriers have a negative impact on males', but not females' *long-term* persistence. We will elaborate on this in the discussion part of this paper.

Robustness checks

As we gathered our data in a one-time survey and our data are self-reported, it is necessary to control for effects of the common method bias. We conducted Harman's one-factor test to test the presence of common method effect. We entered all 34 variables into an exploratory factor analysis in order to determine the number of factors that are necessary to account for the majority of variance in the variables (e.g., Andersson & Bateman, 1997; Greene & Organ, 1973; Krishnan, Martin, & Noorderhaven, 2006; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff, Todor, Grover, & Huber, 1984; Schriesheim, 1979; Steensma, Tihanyi, Lyles, & Dhanaraj, 2005). The factor analysis revealed the presence of twelve distinct factors with eigenvalue greater than 1.0, rather than a single factor. The twelve factors together accounted for 65.43% of the total variance; the first (largest) factor did not account for a majority of the variance (12.6%). Thus, no general factor is apparent. The result of this analysis suggests that common method variance does not affect our results.

DISCUSSION**Person factors**

Contrary to our theoretical considerations, where we stated that the impacts of person factors are not likely to change between *short-* and *long-term* persistence, we observe that person factors do have different impacts on these two perspectives of persistence.

Self-efficacy beliefs and outcome expectations. In detail, we observed that self-efficacy beliefs and outcome expectations showed a significant positive influence on *short-* but not on *long-term* persistence. The significant path to *short-term* persistence is in line with prior research work, where self-efficacy beliefs and outcome expectations have been found to be significant predictors for choice goals with computing and engineering students (e.g., Betz, 2000; Byars-Winston & Fouad, 2008; Byars-Winston et al., 2010; Correll, 2001; Dahling & Thompson, 2010; Larose et al., 2006; Luzzo & McWhirter, 2001; Pajares & Miller, 1994). However, our main finding in this regard is that contrary to our expectations the impact of person factors varies over time. This might be because strong self-efficacy beliefs as well as outcome expectations are rather

important at the beginning of a career, where confidence in one's own abilities and a clear idea of the career-related expectations are necessary in order to decide for a certain career field. However, it will be interesting to further scrutinize why self-efficacy beliefs and outcome expectations have different impacts on *short-* and *long-term* persistence in order to tailor measures regarding the retention of females accordingly to these two life spans. To approach this question, it will be useful to elaborate on factors that lead to changes in the influence of self-efficacy beliefs and outcome expectations on *long-term* persistence of computing students.

Expanded interests and career salience. Interestingly, regarding our extension of the SCCT we find significant paths from expanded interests and career salience to *short-term* and *long-term* persistence of students. Moreover, our self-developed interests scale is the only predictor that depicts significant gender differences with respect to the dimensions of perceived image of the job field and external pressure regarding the influence of person factors on *short-* and *long-term* persistence. These results support our extension of the interests scale.

Focusing on the female subgroup we observe a shift regarding the dimensions of the variable 'expanded interests' across the *short-* and *long-term* persistence. On the one hand, we observe the image of the job field to have a significant influence on *short-term* persistence (but not on *long-term* persistence). On the other hand, we find personal interest to have a significant influence on *long-term* persistence (but not on *short-term* persistence). This indicates a self-selection process, in which females who are mainly driven by the image of the job field report higher levels of *short-term* persistence, whereas females who are mainly driven by personal interests report higher levels of *long-term* persistence. Our main finding in this regard is that we find personal interests to be a relevant component for females as well as males for their *long-term* persistence. This finding may also be interesting for motivation research showing that extrinsically motivated females (image of the job field) and intrinsically motivated females (personal interests) show differences in their planned persistence. Also, we argue that image campaigns such as undertaken by Nasscom and Indian government may attract females to the computing field for a short-period of time; however, they do not lead to *long-term* persistence. This is in line with a study by Jungwirth and Roy (2015a) who question the long-term effect of 'image' as a driver for career choices.

Results also support the predictive usefulness of career salience regarding persistence of computing students and should be included in future research. In contrast to prior research from different decades (e.g., Gerstein et al., 1988; Leung et al., 1994; Mednick & Thomas, 1993; Moya et al., 2000) we do not find significant gender differences regarding career salience suggesting that female and male students in our sample value their careers equally high. This indicates that career perceptions have changed across gender and along generations. In contrast to prior research findings, females and males of generation Y in our data set value their career in the same way. However, there might be external circumstances that force them to adjust and make sacrifices regarding their careers.

Context factors

Regarding context factors our data support our assumption concerning a shift in the impact of the perception of supports and barriers on *short-* and *long-term* persistence.

Social and family-related supports and barriers. We find social supports and barriers to have a significant influence on *short-term* persistence (but not on *long-term* persistence), whereas family-related supports and barriers have a significant influence on *long-term* persistence (but not on *short-term* persistence). Moreover, we observe that supports in general tend to have significant influence on females' persistence, whereas the paths from barriers to persistence are insignificant in the female subgroup. In contrast, barriers tend to have significant influence on males' persistence, whereas the paths from supports to persistence are insignificant in the male subgroup. Our interpretation of these results is in line with Peus and Welppe (2011), stating that women seem to have accepted traditional gender-roles that have been present for centuries and are still imposed by society and social environment. Therefore, women do not perceive aspects such as juggling work and family or making sacrifices to have children as family-related barriers, whereas male students in our sample perceive this as hindrance to their career. This is in line with previous research suggesting that family-related issues have a negative impact on males' rather than on females' persistence (e.g., Cech et al., 2011).

IMPLICATIONS AND DIRECTIONS FOR FUTURE RESEARCH

In this study we were particularly interested in understanding which core components of the SCCT influence the *short-* and *long-term* persistence of female in comparison to male computing students to stay in computing professions. Based on our analysis we derive implications for theory and practitioners, who aim at increasing the persistence of females in computing disciplines and give directions for future research.

Implications

Regarding theory, we highlight that our approach complements the prevailing approach of focusing on a *short-term* perspective of persistence by including a *long-term* perspective and therefore enriches emerging literature on persistence in computing disciplines. Moreover, we complement SCCT by including variables that, to the best of our knowledge, have not been quantitatively assessed in the context of SCCT. Our results suggest that consideration of these variables contribute to a better understanding of persistence and should be included in further theoretical considerations. To be precise we make the following suggestions: First, is to expand the theoretical concept of “personal interests” as our study shows that other drivers, such as the image of the job field, have a significant influence as well. Second, it is necessary to consider the theoretical concept of career salience, but to question the existence of gender differences regarding the generation Y as there are no differences evident in our sample.

Regarding practical implications, our data provide support for distinguishing between two perspectives of persistence and propose that *short-* and *long-term* persistence require different policies in order to retain females in computing disciplines. We acknowledge that first steps have been undertaken in order to increase the number of women in STEM-fields. Hence, high numbers at the entry level and therewith high *short-term* persistence can be observed. Our data suggest that a good image of the job field as well as acceptance, involvement and support by parents, spouses and significant others are factors that increase *short-term* persistence of females. Hence, in order to hold high numbers of females at the entry-level practitioners are advised to further strengthen the image of the ICT-industry e.g., by creating transparency regarding good working conditions, career advancement possibilities, etc. Moreover, the implementa-

tion of social support systems at early stages will be helpful e.g., career counsellors at college-level or mentoring programs, networking activities.

Looking at the *long-term* perspective our results indicate that women who assessed high interests in the field showed higher persistence. Our data suggest that there is a general necessity for developing science-related interests in female students and efforts that aim at developing personal interests in computing disciplines. That is, especially the social environment, primary schools, and high schools need to introduce girls to computing aspects through adequate books, toys, hobbies, courses, etc. giving them the same opportunity to develop their science-related interests and explore their science-related aptitudes. This is consistent with research suggesting that early access to computers may reduce intimidation with technology and that same-sex education may serve to reduce career bias against computing fields (Adya & Kaiser, 2005).

Our data also suggest that women who perceived supports regarding their work-family balance showed higher *long-term* persistence. Therefore, it might be beneficial to increase supportive measures. As established above, our data show that females and males value their careers similarly high and have similar career expectations. Therefore, it might be supportive to acknowledge the concept of “women as breadwinners” and offer them equal opportunities to advance in their career and hence increase *long-term* persistence.

Directions for future research

Like all research, our research has limitations that suggest opportunities for future research. First, our self-developed scale has a low Cronbach’s α value. There is a need for developing better measures. Second, we have based our analysis on the inquiry of students. On the one hand, one might argue that this limits our study as students may have difficulties imagining the perception of context factors in a work environment. On the other hand, our results indicate that students’ awareness and perception of different context factors varies between *short-* and *long-term* persistence, as the influence of these factors differs between the two perspectives of persistence. Also, it shows that there are factors that students perceive to be so crucial that they influence their intention to stay in an occupation related to their studies even though they are still at the university. Nevertheless, it might be interesting to run a similar analysis with employees in

computing disciplines and to compare the results with our students. Last, with using an Indian sample we follow the call of Lent et al. (2010) for more research involving non-Western samples; still, our findings are limited to the cultural and national lines of the Indian context.

CONCLUSION

In this study, we extend the traditional view of persistence by adding a *long-term* perspective. We provide evidence that person and context factors affect females' and males' *short-* and *long-term* persistence differently. Further, we introduce two novel concepts to SCCT by including expanded interests and career salience that we find to play a role in persistence of female and male students of computing disciplines. Our results show that female and male students of our sample reveal a farsightedness considering family-related aspects in terms of adjusting their planned persistence when taking these aspects into account. We offer an explanation for high attrition rates and suggest that an early-rooted development of females' interest in computing disciplines as well supportive measures regarding family-related matters will help increasing *long-term* persistence of females. We hope that this study will stimulate further development of gendered persistence theory and further empirical research in the area of persistence of female workforce in technology-based industries. From the practice point of view, managers and practitioners are advised to adopt an approach that acknowledges changes of priorities in different life spans of individuals.

REFERENCES

- Adya, M., & Kaiser, K. M. 2005. Early determinants of women in the IT workforce: A model of girls' career choices. *Information Technology & People*, 18(3): 230-259.
- Allen, S., & Ortlepp, K. 2002. Conceptualising and operationalizing work versus career salience. *Journal of Industrial Psychology*, 28(2): 7-14.
- Anderson, J. C., & Gerbing, D.W. 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3): 411-23.
- Andersson, L. M., & Bateman, T. S. 1997. Cynicism in the workplace: Some causes and effects. *Journal of Organizational Behavior*, 18(5): 449-469.
- Bailyn, L. 2003. Academic Careers and Gender Equity: Lessons Learned from MIT. *Gender, Work, and Organization*, 10(2): 137-53.
- Betz, N. E. 2000. Self-Efficacy theory as a basis for career assessment. *Journal of Career Assessment*, 8(3): 205-222.
- Betz, N. E. 2008. Advances in vocational theories. In S. D. Brown & R. W. Lent (Eds.), *Handbook of counseling psychology* (4th ed.): 357-374. Hoboken, NJ: Wiley.
- Betz, N. E., & Hackett, G. 1981. The relationship of career-related self-efficacy expectation to perceived career options in college women and men. *Journal of Counseling Psychology*, 28(5): 399-410.
- Betz, N. E., & Hackett, G. 1983. The relationship of mathematics self-efficacy expectations to the selection of science-based college majors. *Journal of Vocational Behavior*, 23(3): 329-345.
- Betz, N. E., & Hackett, G. 2006. Career self-efficacy theory: Back to the future. *Journal of Career Assessment*, 14(1): 3-11.
- Blanco, A. 2011. Applying social cognitive career theory to predict interests and choice goals in statistics among Spanish psychology students. *Journal of Vocational Behavior*, 78(1): 49-58.
- Browne, M. W., & Cudeck, R. 1992. Alternative ways of assessing model fit. *Sociological Methods and Research*, 21(2): 230-258.
- Budhwar, P. S., & Baruch, Y. 2003. Career management practices in India: An empirical study. *International Journal of Manpower*, 24(6): 699-719.
- Butts, M. M., Casper, W. J., & Yang, T. S. 2013. How important are work-family support policies? A meta-analytic investigation of their effects on employee outcomes. *Journal of Applied Psychology*, 98(1): 1-25.
- Byars-Winston, A. M., Estrada, Y., Howard, C., Davis, D., & Zalapa, J. 2010. Influence of social cognitive and ethnic variables on academic goals of under-represented students in science and engineering: A multiple-groups analysis. *Journal of Counseling Psychology*, 57(2): 205-218.
- Byars-Winston, A. M., & Fouad, N. A. 2008. Math and science social cognitive variables in college students: Contributions of contextual factors in predicting goals. *Journal of Career Assessment*, 16(4): 425-440.
- Cech, E., Rubineau, B., Silbey, S., & Serond, C. 2011. Professional role confidence and gendered persistence in engineering. *American Sociological Review*, 76(5): 641-666.

- Cooper, C. L., Argyris, C., & Channon, D. F. 1998. *The concise Blackwell Encyclopedia of management*. New York, NY: Blackwell Publishers.
- Correll, S. J. 2001. Gender and the career choice process: The role of biased self-assessments. *American Journal of Sociology*, 106(6): 1691-1730.
- Dahling, J. J., & Thompson, M. N. 2010. Contextual supports and barriers to academic choices: A policy-capturing analysis. *Journal of Vocational Behavior*, 77(3): 374-382.
- Davey, F. H. 2001. The relationship between engineering and young women's occupational priorities. *Canadian Journal of Counseling*, 35(3): 221-228.
- Eisenberger, R., Huntington, R., Hutchison, S., & Sowa, D. 1986. Perceived organizational support. *Journal of Applied Psychology*, 71(3): 500-507.
- Engeser, S., Limbert, N., & Kehr, H. 2008. *Closing report regarding the analysis of choosing informatics at college level (translated from German)*. Working paper, University of Munich, Germany.
- Evertsson, M. 2013. The importance of work: Changing work commitment following the transition to motherhood. *Acta Sociologica*, 56(2): 139-153.
- Fouad, N. A., & Guillen, A. 2006. Outcome expectations: Looking to the past and potential future. *Journal of Career Assessment*, 14(1): 130-142.
- Fouad, N. A., & Smith, P. L. 1996. A test of a social cognitive model for middle school students: Math and science. *Journal of Counseling Psychology*, 43(3): 338-346.
- Gainor, K. A., & Lent, R. W. 1998. Social cognitive expectations and racial identity attitudes in predicting the math choice intentions of Black college students. *Journal of Counseling Psychology*, 45(4): 403-413.
- Gerstein, M., Lichtman, M., & Barokas, J. V. 1988. Occupational plans of adolescent women compared to men: A cross-sectional examination. *Career Development Quarterly*, 36(3): 222-230.
- Gilbert, L. A. 1993. *Two careers/one family: The promise of gender equality*. Newbury Park, CA: Sage.
- Glass, J. L., Sassler, S., Levitte, Y., & Michelmore, K. M. 2013. What's so special about STEM? A comparison of women's retention in STEM and professional occupations. *Social forces*, 92(2): 723-756.
- Greene, C. N., & Organ, D. W. 1973. An evaluation of causal models linking the received role with job satisfaction. *Administrative Science Quarterly*, 18(1): 95-103.
- Greenhaus, J. H. 1971. An investigation of the role of career salience in vocational behavior. *Journal of Vocational Behavior*, 1(3): 209-216.
- Hackett, G., & Betz, N. E. 1981. A self-efficacy approach to the career development of women. *Journal of Vocational Behavior*, 18(3): 326-336.
- Hackett, G., Betz, N. E., Casas, J. M., & Rocha-Singh, I. A. 1992. Gender, ethnicity, and social cognitive factors predicting the academic achievement of students in engineering. *Journal of Counseling Psychology*, 39(4): 527-538.
- Hakim, C. 2000. *Work-Lifestyle Choices in the 21st Century: Preference Theory*. Oxford: Oxford University Press.
- Hill, C., Corbett, C., & Rose, A. 2010. *Why so few? Women in science, technology, engineering, and mathematics*. Washington, DC: American Association of University Women.
- Hock, E., & DeMeis, D. K. 1990. Depression in mothers of infants: The role of maternal employment. *Developmental Psychology*, 26(2): 285-291.

- Hoyle, R. H., & Panter, A. T. 1995. Writing about structural equation models. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications*: 158-176. Thousand Oaks, CA: Sage.
- Inda, M., Rodríguez, C., & Peña, J. V. 2013. Gender differences in applying social cognitive career theory in engineering students. *Journal of Vocational Behavior*, 83(3): 346-355.
- Jungwirth, C., & Roy, N. 2015a. *Why do Indian women choose a career in ICT? And why don't they stay? Core components of career choices in ICT-industry - A qualitative study*. Paper presented at the annual meeting of the Academy of Management, Philadelphia, USA.
- Jungwirth, C., Roy, N. 2015b. Ein gut bezahlter Job interessiert mich schon, aber langweilen will ich mich nicht! - Eine Analyse der Neigung deutscher Studentinnen und Studenten einen IT-Beruf zu ergreifen [I am interested in a well-paid job but I do not want to bore myself! - An analysis of female and male students' tendency of choosing an IT-job]. In E. Hanappi-Egger & R. Bendl (Eds.), *Diversität, Diversifizierung, (Ent)Solidarisierung in der Organisationsforschung: eine Standortbestimmung im deutschen Sprachraum*: 171-188. Wiesbaden: Springer.
- Kelkar, G., & Nathan, D. 2002. *Information and communication technologies: Gender and culture*. Bangalore, KA: Institute for Social Sciences.
- Kelkar, G., Shrestha, G., & Veena, N. 2002. IT industry and women's agency: Explorations in Bangalore and Delhi, India. *Gender, technology and development*, 6(1): 63-84.
- Krishnan, R., Martin, X., & Noorderhaven, N. G. 2006. When Does Trust Matter to Alliance Performance? *Academy of Management Journal*, 49(5): 894-917.
- Lannon, J. 2013. *Research Initiative: Women in India's IT Industry*. The Centre for Internet and Society. <http://cis-india.org/internet-governance/blog/women-in-indias-it-industry> [Last retrieved 9.12.2015].
- Larose, S., Ratelle, C. F., Guay, F., Senécal, C., & Harvey, M. 2006. Trajectories of science self-efficacy beliefs during the college transition and academic and vocational adjustment in science and technology programs. *Educational Research and Evaluation*, 12(4): 373-393.
- Legault, M. J., & Chasserio, S. 2013. Family Obligations Or Cultural Constraints? Obstacles In The Path Of Professional Women. *Journal of International Women's Studies*, 4(3): 108-125.
- Lent, R. W. 2005. A social cognitive view of career development and counseling. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work*: 101-130. Hoboken, NJ: Wiley.
- Lent, R. W. 2013. Social cognitive career theory. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling* (2nd ed.): 115-146. New York, NY: Wiley.
- Lent, R. W., & Brown, S. D. 2006. On conceptualizing and assessing social cognitive constructs in career research: A measurement guide. *Journal of Career Assessment*, 14(1): 12-35.
- Lent, R. W., Brown, S. D., Brenner, B., Chopra, S. B., Davis, T., Talleyrand, R., & Suthakaran, V. 2001. The role of contextual supports and barriers in the choice of math/science educational options: A test of social cognitive hypotheses. *Journal of Counseling Psychology*, 48(4): 474-483.

- Lent, R. W., Brown, S. D., & Hackett, G. 1994. Toward a unifying social cognitive theory of career and academic interest, choice and performance. *Journal of Vocational Behavior*, 45(1): 79-122.
- Lent, R. W., Brown, S. D., & Hackett, G. 2000. Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology*, 47(1): 36-49.
- Lent, R. W., Brown, S. D., & Larkin, K. C. 1984. Relation of self-efficacy expectations to academic achievement and persistence. *Journal of Counseling Psychology*, 31(3): 356-362.
- Lent, R. W., Brown, S. D., & Larkin, K. C. 1986. Self-efficacy in the prediction of academic performance and perceived career options. *Journal of Counseling Psychology*, 33(3): 265-269.
- Lent, R. W., Brown, S. D., Schmidt, J., Brenner, B., Lyons, H., & Treistman, D. 2003. Relation of contextual supports and barriers to choice behavior in engineering majors: Test of alternative social cognitive models. *Journal of Counseling Psychology*, 50(4): 458-465.
- Lent, R., Brown, S., Sheu, H., Schmidt, J., Brenner, B., Gloster, C., Wilkins, G., Schmidt, L., Lyons, H., & Treistman, D. 2005. Social cognitive predictors of academic interests and goals in engineering: Utility for women and students at historically black universities. *Journal of Counseling Psychology*, 52(1): 84-92.
- Lent, R. W., Lopez, F. G., & Bieschke, K. J. 1991. Mathematics self-efficacy: Sources and relation to science-based career choice. *Journal of Counseling Psychology*, 38(4): 424-430.
- Lent, R. W., Lopez, F. G., & Bieschke, K. J. 1993. Predicting mathematics-related choice and success behaviors: Test of an expanded social cognitive model. *Journal of Vocational Behavior*, 42(2): 223-236.
- Lent, R. W., Lopez Jr, A. M., Lopez, F. G., & Sheu, H. B. 2008. Social cognitive career theory and the prediction of interests and choice goals in the computing disciplines. *Journal of Vocational Behavior*, 73(1): 52-62.
- Lent, R. W., Lopez, F. G., Sheu, H., & Lopez, A. M. 2011. Social cognitive predictors of the interests and choices of computing majors: Applicability to under-represented students. *Journal of Vocational Behavior*, 78(2): 184-192.
- Lent, R. W., Singley, D., Sheu, H. B., Schmidt, J. A., & Schmidt, L. C. 2007. Relation of social-cognitive factors to academic satisfaction in engineering students. *Journal of Career Assessment*, 15(1): 87-97.
- Leung, S. A., Conoley, C. W., & Scheel, M. J. 1994. The careers and educational aspirations of gifted high school students: A retrospective study. *Journal of Counseling Development*, 72(3): 298-303.
- Lörz, M., & Schindler, S. 2011. Gender-specific differences regarding the transition to college. In A. Hadjar (Ed.), *Gender-specific differences in education* (1st ed.): 99-124. Wiesbaden: Springer.
- Luzzo, D. A. 1995. Gender differences in college students' career maturity and perceived barriers in career development. *Journal of Counseling and Development*, 73(3): 319-322.
- Luzzo, D. A., & Hutcheson, K. G. 1996. Causal attributions and sex differences associated with perceptions of occupational barriers. *Journal of Counseling and Development*, 75(2): 124-130.

- Luzzo, D. A., & McWhirter, E. H. 2001. Sex and ethnic differences in the perception of educational and career-related barriers and levels of coping efficacy. *Journal of Counseling & Development*, 79(1): 61-67.
- Major, D. A., Morganson, V. J., & Bolen, H. M. 2013. Predictors of occupational and organizational commitment in information technology: Exploring gender differences and similarities. *Journal of Business and Psychology*, 28(3): 301-314.
- Marcinkus, W. C., Whelan-Berry, K. S., & Gordon, J. R. 2007. The relationship of social support to the work – family balance and work outcomes of midlife women. *Women in Management Review*, 22(2): 86-111.
- Mednick, M. T., & Thomas, V. G. 1993. Women and the psychology of achievement: A view from the eighties. In F. L. Denmark & M. A. Paludi (Eds.), *Psychology of women. A handbook of issues and theories* (1st ed.): 585-626. Westport: Greenwood Press.
- Moya, M., Exposito, F., & Ruiz, J. 2000. Close relationships, gender, and career salience. *Sex Roles*, 42(9): 825-846.
- NASSCOM 2013. *Electronics and information technology: Annual report 2012-2013*. New Delhi: NASSCOM Publishing.
- NASSCOM-Mercer 2009. *Gender inclusivity in India: Building empowered organisations*. New Delhi: NASSCOM-Mercer Publishing.
- Nauta, M. N., & Epperson, D. L. 2003. A longitudinal examination of the social-cognitive model applied to high school girls' choices of nontraditional college majors and aspirations. *Journal of Counseling Psychology*, 50(4): 448-457.
- Noble, S. M., Haytko, D. L., & Phillips, J. 2009. What drives college-age Generation Y consumers? *Journal of Business Research*, 62(6): 617-628.
- Nunally, J. C., & Bernstein, I. H. 1994. *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Pajares, F., & Miller, M. D. 1994. Role of self-efficacy and self-concept beliefs in mathematical problem solving: A path analysis. *Journal of Educational Psychology*, 86(2): 193-203.
- Peus, C., & Welpe, I. M. 2011. Women in management positions: What companies want to know (translated from German). *Organisationsentwicklung*, 2(1): 47-55.
- Pfost, K. S., & Fiore, M. 1990. Pursuit of nontraditional occupations: Fear of success or fear of not being chosen? *Sex Roles*, 23(1/2): 15-24.
- Pintrich, P. R. 2003. A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95(4): 667-686.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. 2003. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5): 879-903.
- Podsakoff, P. M., Todor, W. D., Grover, R. A., & Huber, V. L. 1984. Situational moderators of leader reward and punishment behaviors: Fact or fiction? *Organizational Behavior and Human Performance*, 34(1): 21-63.
- Post, P., Stewart, M. A., & Smith, P. L. 1991. Self-efficacy, interest, and consideration of math/science and non-math/science occupations among Black freshmen. *Journal of Vocational Behavior*, 38(2): 179-186.

- Post-Kammer, P., & Smith, P. L. 1985. Sex differences in career self-efficacy, consideration, and interests of eighth and ninth graders. *Journal of Counseling Psychology*, 32(4): 551-559.
- Quimby, J. L., Seyala, N. D., & Wolfson, J. L. 2007. Social cognitive predictors of interest in environmental science: Recommendations for environmental educators. *Journal of Environmental Education*, 38(3): 43-52.
- Ramalingam, A. 2012. *IT's a woman's world*. New Delhi: NASSCOM Publishing.
- Rodrigues, R., Guest, D., & Budjanovcanin, A. 2013. From anchors to orientations: Towards a contemporary theory of career preferences. *Journal of Vocational Behavior*, 83(2): 142-152.
- Rothboeck, S., Vijayabaskar, M., & Gayathri, V. 2001. *Labor in the new economy: The case of the Indian software labor market*. New Delhi: International Labor Organization.
- Schaefers, K. G., Epperson, D. L., & Nauta, M. M. 1997. Women's career development: Can theoretically derived variables predict persistence in engineering majors? *Journal of Counseling Psychology*, 44(2): 173-183.
- Schecker, H. 2014. Verifying the consistence of item groups with Cronbach's Alpha (translated from German). In D. Krüger, I. Parchmann & H. Schecker (Eds.), *Methoden der Naturwissenschaftsdidaktischen Forschung*, Springer Spektrum: Berlin, Germany.
- Schinzel B., Kleinn, K., Wegerle, A., & Zimmer, C. 1999. Studying informatics: Situation of female and male students (translated from German). *Informatik-Spektrum*, 22(1): 13-23.
- Schmitt, N., 1996. Uses and abuses of coefficient alpha. *Psychological Assessment*, 8(4): 350-353.
- Schriesheim, C. A. 1979. The similarity of individual directed and group directed leader behavior descriptions. *Academy of Management Journal*, 22(2): 345-355.
- Seymour, E., & Hewitt, N. M. 1997. *Talking about leaving: Why undergraduates leave the sciences*. Boulder, CO, Oxford: Westview Press.
- Shanker, D. 2008. Gender relations in IT companies: An Indian experience. *Gender Technology and Development*, 12(2): 185-207.
- Sheu, H. B., Lent, R. W., Brown, S. D., Miller, M. J., Hennessy, K. D., & Duffy, R. D. 2010. Testing the choice model of social cognitive career theory across Holland themes: A meta-analytic path analysis. *Journal of Vocational Behavior*, 76(2): 252-264.
- Shore, L. M., & Wayne, S. J. 1993. Commitment and employee behavior: Comparison of affective commitment and continuance commitment with perceived organizational support. *Journal of Applied Psychology*, 78(5): 774-780.
- Silva, A. P., Ahmad, A., Omar, Z., & Rasdi, R. M. 2012. Personal social support and non-support in career aspirations towards senior management amongst women in middle management: Multiple dimensions and implications on measurement. *Asian Social Science*, 8(11): 205-218.
- Singh, R., Fouad, N. A., Fitzpatrick, M. E., Liu, J. P., Cappaert, K. J., & Figueredo, C. 2013. Stemming the tide: Predicting women engineers' intentions to leave. *Journal of Vocational Behavior*, 83(3): 281-294.
- Slaney, R. B., & Brown, M. T. 1983. Effects of race and socioeconomic status on career choice variables among college men. *Journal of Vocational Behavior*, 23(3): 257-269.

- Steensma, H. K., Tihanyi, L., Lyles, M. A., & Dhanaraj, C. 2005. The evolving value of foreign partnerships in transitioning economies. *Academy of Management Journal*, 48(2): 213-235.
- Stephan, P. E., & Levin, S. G. 2005. Leaving careers in IT: gender differences in retention. *The Journal of Technology Transfer*, 30(4): 383-396.
- Stewart, G. 2003. *Motivation of women to study informatics* (translated from German). Working paper, Bayerisches Institut für Hochschulforschung und Hochschulplanung, Munich, Germany.
- Swanson, J. L., & Woitke, R. 1997. Theory into practice in career assessment for women: Assessment and interventions regarding perceived career barriers. *Journal of Career Assessment*, 5(4): 443-462.
- Wayne, S. J., Shore, L. M., & Linden, R. C. 1997. Perceived organizational support and leader-member exchange: A social exchange perspective. *Academy of Management Journal*, 40(1): 82-112.
- Zimmerman, B. J. 2000. Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1): 82-91.

APPENDIX

Appendix A

Overview over items and scales

	Items	Min	Max	Mean	S.D.
Persistence	Short-term persistence^b, 1 item				
	Likelihood of being a professional in 5 years.	1	5	3.96	1.022
	Long-term persistence^b, 1 item				
	Commitment to remain employed in specialized branch.	1	5	2.72	1.483
Self-efficacy beliefs	Technical aptitude^b, 1 item				
	Self-assessment of technical aptitude.	1	5	3.63	.760
Outcome expectations	Importance of expected outcome, 6 items, Cronbach's $\alpha = .79$				
	Importance of achieving the desired job.	1	5	4.49	.785
	Importance of working self-reliant in the job.	1	5	4.26	.807
	Importance of career promotion possibilities.	1	5	4.16	.859
	Importance of high income.	1	5	4.23	.859
	Importance of career esteem.	1	5	4.34	.775
	Importance of family and leisure time (beside the job).	1	5	4.43	.830
Expanded interests	Image of the job field, 2 items, Cronbach's $\alpha = .69$				
	Influence of career esteem on choice of studies.	1	5	4.00	.921
	Influence of high job prospective on choice of studies.	1	5	3.96	.982
	External pressure, 3 items, Cronbach's $\alpha = .45$				
	Influence of a study-related family business on choice of studies.	1	5	1.62	.963
	Influence of family pressure on choice of studies.	1	5	2.04	1.228
	Influence of a role model on choice of studies.	1	5	2.91	1.325
	Personal interests, 2 items, Cronbach's $\alpha = .46$				
	Influence of interest in the subject on choice of studies.	1	5	4.13	.837
Influence of previous experience in the field on choice of studies.	1	5	2.56	1.405	
Career salience	Planning and thinking about a career, 2 items, Cronbach's $\alpha = .46$				
	I look at a career as a means of expressing myself.	1	5	3.11	1.124
	I started thinking about jobs and careers when I was young.	1	5	3.06	1.358
	Willingness of mobility, 2 items, Cronbach's $\alpha = .75$				
	I would move to another part of my country if it would help advance my career.	1	5	3.80	1.205
I would move to another country if I thought it would help advance my career.	1	5	3.62	1.309	
Supports	Social supports, 3 items, Cronbach's $\alpha = .67$				
	Encouragement by friends and other significant people (e.g., teachers, etc.).	1	5	4.02	.976
	Having a mentor or role model related to the aspired vocation.	1	5	3.80	1.061
	Provision of career-related apprenticeships on the university campus.	1	5	3.65	1.066

ARTICLE 3

		Min	Max	Mean	S.D.
	Family-related support, 3 items, Cronbach's α = .65				
	Child care center in the company.	1	5	3.10	1.150
	Day-care for older people and dependents.	1	5	2.97	1.198
	Provision of a women's representative in the organization/ worker's union.	1	5	3.29	1.175
Barriers	Social barriers, 3 items, Cronbach's α = .76				
	Other people's beliefs that certain careers are not appropriate for women/men.	1	5	2.21	1.320
	Fields which are non-traditional for my sex.	1	5	2.27	1.341
	Being discriminated by future employer due to my marital status.	1	5	2.24	1.241
	Family-related barriers, 4 items, Cronbach's α = .72				
	Having children.	1	5	2.58	1.365
	Conflict between my marriage/family plans and my career plans.	1	5	2.75	1.352
	Not being able to find good day-care services for my children.	1	5	2.61	1.315
	Employment at remote locations without infrastructure.	1	5	2.94	1.412
Grade	Science grade^b, 1 item				
	Grade in science-related subject.	1.0	3.0	1.315	.350

^b Comprised of single-items; therefore Cronbach's α cannot be computed.

Appendix B

Measurement invariance tests

Measurement Invariance	χ^2 (d.f.)	χ^2 /d.f.	$\Delta \chi^2$ (Δ d.f.)	CFI (Δ CFI)	RMSEA	PCLOSE	Decision
Model 1: Configural invariance	99.878 (68)	1.469	-	.962 (-)	.025	1.000	accepted
Model 2: Metric invariance	123.973 (92)	1.348	24.095 (24)	.962 (-)	.022	1.000	accepted
Model 3: Scalar invariance	173.423 (108)	1.606	49.45 (16)	.921 (.041)	.029	1.000	accepted

Appendix C

Correlations, means, and standard deviations

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Short-term persistence	3.96	1.022													
2. Long-term persistence	2.72	1.483	.238**												
3. Self-efficacy beliefs	3.63	.760	.191**	.123**											
4. Importance of outcome expectations	4.32	.567	.216**	.048	-.046										
5. Image of the job field	3.98	.829	.121**	.020	.033	.290**									
6. External pressure	2.19	.815	-.036	-.094*	-.025	.115**	.247**								
7. Personal interests	3.35	.897	.134**	.159**	.309**	-.024	.027	-.024							
8. Planning and thinking about a career	3.09	1.039	.140**	.063	.095*	.237**	.157**	.122**	.084*						
9. Willingness of mobility	3.71	1.127	.167**	.035	-.006	.121**	.066	.054	.080*	.254**					
10. Social supports	3.82	.802	.178**	.042	.022	.190**	.101**	.038	.065	.153**	.123**				
11. Family-related supports	3.69	.855	.053	-.071	-.033	.117**	.049	.140**	-.037	.126**	-.041	.325**			
12. Social barriers	2.23	1.063	-.032	-.147**	-.114**	.037	.063	.196**	-.056	.145**	-.060	.018	.211**		
13. Family-related barriers	2.72	.999	-.020	-.064	-.063	.078*	.119**	.100**	-.022	.050	-.027	.078*	.224**	.436**	
14. Grade in science-related subject	1.32	.350	-.050	-.024	-.133**	-.076*	-.097**	.009	-.080*	-.006	.019	-.124**	-.041	-.006	-.057

** Correlations are significant at the $p < .01$ level.

* Correlations are significant at the $p < .05$ level.

Appendix D

Summary of fully, partially and not supported hypotheses

Hypothesis 1a. Self-efficacy beliefs and outcome expectations have a positive influence on short-term persistence.	Fully supported ✓
Hypothesis 1b. Self-efficacy beliefs and outcome expectations have a positive influence on long-term persistence.	Not supported ✗
Hypothesis 2a. The influences of self-efficacy beliefs and outcome expectations on short-term persistence are moderated by gender.	Not supported ✗
Hypothesis 2b. The influences of self-efficacy beliefs and outcome expectations on long-term persistence are moderated by gender.	Not supported ✗
Hypothesis 3a. Expanded interests and career salience have an influence on short-term persistence.	Fully supported ✓
Hypothesis 3b. Expanded interests and career salience have an influence on long-term persistence.	Partially supported (✓)
Hypothesis 4a. The influences of expanded interests and career salience on short-term persistence are moderated by gender.	Partially supported (✓)
Hypothesis 4b. The influences of expanded interests and career salience on long-term persistence are moderated by gender.	Not supported ✗
Hypothesis 5a. The perceptions of social supports and barriers have an influence on short-term persistence.	Fully supported ✓
Hypothesis 5b. The perceptions of social supports and barriers do not have an influence on long-term persistence.	Fully supported ✓
Hypothesis 6. The influences of perceptions of supports and barriers on short-term persistence are not moderated by gender.	Fully supported ✓
Hypothesis 7a. The perception of family-related supports and barriers do not have an influence on short-term persistence.	Fully supported ✓
Hypothesis 7b. The perceptions of family-related supports and barriers have an influence on long-term persistence.	Not supported ✗
Hypothesis 8. The influences of perceptions of family-related supports and barriers on long-term persistence are moderated by gender.	Not supported ✗

The mixture makes the difference – A motivation-based taxonomy of ICT-students

Working Paper

Carola Jungwirth and Nobina Roy

ABSTRACT

In recent years companies in the industry of information and communication technology (ICT-industry) have reported an imminent shortage of skills as well as difficulties in recruiting qualified employees, which endangers their growth opportunities. Especially employees with adequate technical and science-related skills are scarce. Therefore, this article seeks to offer an insight into the heterogeneous motivation profiles of people that are attracted to the ICT-industry. This will support us to encounter the shortage of skills by developing appropriate incentives and derive implications that are best suited for their motivation profiles. Moreover, it will enable recruiters and companies to align their strategies with the motivation profiles, aiming at increasing the probability of people entering the ICT-industry.

In this study we use a sample of 458 German students of computer sciences to examine their heterogeneous motivation profiles. Departing from the Social Cognitive Career Theory we distinguish three heterogeneous motivation profiles that we coin as *striver*, *geek*, and *opportunist* and find significant differences regarding their probability of entering the ICT-industry. Our findings suggest that in order to encounter the shortage of skills it is important to understand the differences in the motivation profiles and to set incentives accordingly.

Keywords: ICT-industry, probability of entering the ICT-industry, taxonomy, motivation profiles

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The mixture makes the difference – A motivation-based taxonomy of ICT-students**INTRODUCTION**

The industry of information and communication technology (ICT-industry) has become the basis of nearly every industry and has developed itself into one of the key drivers for economic growth (EconomyWatch, 2010). Studies reveal that a lot of the industry's growth and productivity can be traced back to the important role of ICT-professionals, who ensure the development of innovative technologies and creative ideas (Arora & Athreye, 2002; Arora & Gambardella, 2006; Namvar, Fathian, Gholamin, & Akhavan, 2010; Powell, & Snellman, 2004; Youndt, Subramaniam, & Snell, 2004). Despite their global importance, in recent years companies in the ICT-industry have reported an imminent shortage of skills as well as difficulties in recruiting qualified employees, which endangers their growth opportunities (BDA, 2009; BDA, 2010; BITKOM, 2014). Especially employees with adequate technical and science-related skills are scarce. Research attributes reasons for shortage of skills to aspects that lead to an unattractiveness of workplaces in the ICT-industry such as flat wage structures (Friedrichsen, 2012) or the phenomenon of technical obsolescence that is characteristic for the ICT-industry (Allen & deGrip, 2012). Contrary to other professions where basic knowledge remains the same over decades, the half-life of knowledge and skills in the ICT-profession is estimated at less than two years (Ang & Slaughter, 2000; Dubin, 1990). This is because ICT-companies implement new technologies every two years (Taganas & Kaul, 2006), which implies an ephemerality of the technologies and requires a constant education of the employees in order to keep them and the company competitive (Allen & deGrip, 2012; Pazy, 1990). However, there are also characteristics that indicate an attractiveness of the industry such as the security to find a job in that field (VDI, 2010) or bright future visions for the ICT-industry and its employees due to its rapid growth and increasing global importance.

Considering the conflictive characteristics of the ICT-industry where we have seemingly unattractive workplaces on the one hand, and high needs of qualified employees that are willing to accept these restrictions on the other hand, we are interested to understand the motivation profiles of people that are attracted to the ICT-industry.

The assumption is that an insight into these motivation profiles will help companies and recruiters to derive suitable implications that are best fitted to the motivation profiles and to align their recruiting strategies accordingly. Further, the identification of distinct motivation profiles allows us, to directly address people who may not have considered joining the ICT-industry (e.g., females) but who would fit well, based on their motivation structure. Therefore, this analysis will assist us in encouraging more people to join the ICT-industry and therewith to encounter the shortage of skills.

When considering motivation profiles of people related to the ICT-industry one might assume that mainly intrinsic motivation elements play a major role for entering the ICT-industry, meaning that people are led by their interests and affinity for ICT-related matters. This might be due to the knowledge-intensity of the industry, which is also characterized as “knowledge industry” (BITKOM, 2007) where companies urge ICT-professionals to keep abreast with new knowledge and skills. The assumption is supported by research work that suggests that intrinsic motivation is predominantly important in knowledge-intensive and learning environments (Lee, Cheung, & Chen, 2005; Lee, McInerney, Liem, & Ortiga, 2010; Pokay & Blumenfeld, 1990). More support can be found in the fact that people working in the ICT-industry are often stereotyped as nerds, who are singularly focused on computers, displaying a high aptitude towards ICT-related matters and lacking interpersonal skills (Cheryan, Plaut, Handron & Hudson, 2013). Hence, they are often considered as being introvert and socially challenged (Köver, 2011) and to be more intrinsically motivated by their interests and passion for the ICT-matters instead extrinsically motivated. Thus, it could be expected that primarily people who are mainly intrinsically motivated decide for a career in the ICT-industry.

On the other hand, there are also factors that support the assumption that also extrinsic motivation elements may play a role regarding a career in the ICT-industry, meaning that people are led by external incentives that stem from the environment. We identify three main extrinsic motivation elements. First, the relatively high demand for ICT-professionals due to a constant economic growth of the industry offers a security for individuals that they are very likely to find a job in that field (Götsch, 2013). Secondly, we think that the image may play a role as the industry is perceived as a future-oriented and promising industry that offers white collar jobs for highly-skilled workers.

Studies show that especially fast growing companies in the ICT-industry put an increased value on recruiting employees that have a graduate degree as they assume that these people will be more able to adjust to the fast pace of the industry and absorb the knowledge more quickly (Licht & Steiner, 2001; Menez, Munder, & Töpsch, 2001). This kind of prestige, skills and education level is something that people want to associate themselves with. Third, wage at the entry-level is compared to other industries relatively high, which sets a financial incentive for people to join the industry. Statistics show that the wage at the entry-level in the ICT-industry within the first two years is among the highest of the top ten wages (Staufenbiel, 2015).

Hence, this is an industry that offers an opportunity for people to satisfy their intrinsic urge to gain knowledge and engage themselves with mental and cognitive challenging work. This would support the assumption that people who are mainly intrinsically motivated are attracted to the ICT-industry. At the same time, it offers the possibility to meet extrinsic expectations regarding one's career. Therefore, this industry may not solely attract mainly intrinsically motivated people, but also people that are mainly extrinsically motivated or even people that reveal strong traits of intrinsic as well as extrinsic motivation. In order to understand which combination of intrinsic and extrinsic motivation elements is mainly attracted to the ICT-industry and to derive suitable implications, we are particularly interested in the question if and how different compositions of intrinsic and extrinsic motivation differ in their probability of entering the ICT-industry.

In order to answer this question this study follows an explorative approach by first of all configuring a motivation-based taxonomy of distinct motivation profiles in order to investigate which different compositions of intrinsic and extrinsic motivation profiles are distinguishable regarding the ICT-industry. In a second step, we analyze differences in their probability of entering the ICT-industry and therewith also identify the motivation profile which displays the highest probability of entering the ICT-industry.

Our sample consists of 458 German ICT-students. We particularly focus on understanding the motivation profiles of students to increase their probability of entering the ICT-industry or better to ensure their entry into the ICT-industry by deriving adequate implications and incentives that are best fitted to their motivation profiles. With

that we address potential employees much earlier in their career process, namely at university-level and encounter drop-outs at a very early stage.

Departing from the Social Cognitive Career Theory (SCCT; Lent, Brown, & Hackett, 1994, 2000) we configure three distinct motivation-based profiles of ICT-students that we coin as *striver*, *geek*, and *opportunist* and examine differences regarding their probability of entering the ICT-industry. By doing so, we reduce the complex nature of career choices to distinct motivation profiles that differ in their vocational behavior. Moreover, we reveal which motivation profile of the ICT-students has the highest probability of entering the industry, and therewith are able to point out which type is the most promising group of people that should be addressed primarily. In a long-term perspective, this study can serve as a starting point for developing strategies regarding the shortage of skills in the ICT-industry.

In the remainder of this paper we first start with a selective review of the SCCT literature highlighting aspects of the theory most relevant for our study. We then present our procedure for data collection and methods for data analysis. In the subsequent sections we report and discuss our results, and derive implications for future research.

THEORETICAL BACKGROUND

Vocational psychology researchers have long been concerned with factors that promote or impede career paths and, in recent years, social cognitive career theory has offered one theoretical platform for such inquiry as it incorporates person and context factors. Lent et al. (1994) refer to person factors as “internal cognitive and affective states and physical attributes” (Lent et al., 1994: 82), such as gender, ethnicity, outcome expectations, motivation, intellectual abilities, etc. Context factors reflect the opportunity structures within which career choices are made (Lent et al., 1994). However, studies have analyzed the influence of context factors on career choices and have shown that the influence is minor in comparison to person factors (Cuzzocrea, Larcan, & Murdaca, 2012; Lent et al., 2002). Thus, a lot of studies focus on the influence of person factors on career choices instead of context factors (Lent et al., 2000). We will follow this direction of research and concentrate on person factors and especially the role of motivational aspects in career choices exclusively.

Motivation literature

Decades of research have focused on the concept of motivation that indicates “why” people think and behave in the way they do (Deci & Ryan, 1985). While intrinsic motivation refers to doing an activity simply out of interest and for the enjoyment of the activity itself (Deci, Connell, & Ryan, 1989; Ryan & Deci, 2000; Vallerand & Bissonnette, 1992; Wilkesmann, Fischer, & Virgillito, 2012)¹, extrinsic motivation describes an activity that is done in order to achieve a separable outcome (Ryan & Deci, 2000).²

There is a long debate on the interplay between intrinsic and extrinsic motivation, discussing whether they are positively or negatively interrelated. On the one hand, there are researchers that expect a positive relation between intrinsic and extrinsic motivation. For example, Porter and Lawler (1968) assume that intrinsic and extrinsic motivation relate in an additive way to each other. Further, Stajkovic and Luthans (2003) meta-analytically depict that intrinsic and extrinsic motivation have a synergistic effect on outcome variables suggesting that intrinsic motivation is strengthened by extrinsic incentives. On the other hand, there are also researchers that reveal negative relations between intrinsic and extrinsic motivation. For example, Weibel, Rost, and Osterloh (2010) analyze the hidden costs in the interplay between intrinsic and extrinsic motivation. Furthermore, Cerasoli, Nicklin, and Ford (2014) offer meta-analytical evidence for an undermining effect of extrinsic on intrinsic motivation, which is supported by various research works over the past three decades (Cameron, Banko, & Pierce, 2001; Cameron & Pierce, 1994; Deci, Koestner, & Ryan, 1999, 2001; Eisenberger & Cameron, 1996; Eisenberger, Pierce, & Cameron, 1999; Rummel & Feinberg, 1988; Tang & Hall, 1995; Wiersma, 1992).

However, this debate has been led over decades producing numerous results for and against a positive or negative relation between intrinsic and extrinsic motivation.

¹ Elements of *intrinsic* motivation include enthusiastic task involvement, personal interest in the tasks (Gottfredson, 1996), desire to experience adventure and novelty, striving for excellence in one’s work, trying to understand something and wishing to improve, and seeing a purpose in what one is doing (Fredricks, Blumenfeld, & Paris, 2004; Lee et al., 2010; McInerney & McInerney, 2010; Reeve, Deci, & Ryan, 2004). Intrinsic motivation is also described as a particular aptitude or talent, as the belief to be good at something encourages people to behave in a certain way (Centers & Bugental, 1966; Gottfried, 1996).

² Common elements of extrinsic motivation are rewards such as material benefits like money or financial incentives, social benefits such as gaining prestige or career opportunities (Grouzet et al., 2005; Lee et al., 2010; Vallerand & Losier, 1999; Vallerand & Ratelle, 2002; Wilkesmann, Fischer, & Virgillito, 2012).

Thus, in this study we are not particularly interested in analyzing the additive or undermining effects in the interplay of intrinsic and extrinsic motivation, but in understanding the co-existence of intrinsic and extrinsic motivation. By focusing on the co-existence of intrinsic and extrinsic motivation we do not consider the normative relationships between these two types of motivation, but their parallel existence without considering the positive or negative relationship among them. By doing so, we are interested in configuring different motivation profiles of ICT-students based on different combinations of intrinsic and extrinsic motivation elements and analyze differences in their probability of entering the ICT-industry. In this regard research has offered the approach of forming taxonomies based on intrinsic and extrinsic motivation elements.

The motivation-based configuration of taxonomies segments the entire group of interest into manageable sub-groups based on their motivation structure. This explorative approach aims at classifying people into different groups or clusters that share common traits of motivation in order to reduce the complexity to few and easy to remember categories and to align strategies accordingly (de Jong & Marsili, 2006). In the ICT-context there has been little study done on the classification of people related to the ICT-industry. However, there are few attempts to classify different types of ICT-careers (Chesebrough & Davis, 1983; Ginzberg & Baroudi, 1988; Joseph, Boh, Ang, & Slaughter, 2012; Kaiser, 1983; Zabusky & Barley, 1996). For example, Joseph, Boh, Ang, and Slaughter (2012) develop a career taxonomy comprising three distinct careers: ICT careers, professional labor market careers and secondary labor market careers. Moreover, they reveal differences regarding their pay, while no difference regarding career success is observable. Further, Colomo-Palacios, Tovar-Caro, García-Crespo, and Gómez-Berbís (2010) distinguish seven consecutive profiles based on the competency level of ICT-professionals.

Despite the few attempts of categorizing ICT-professionals according to distinct characteristics, it is noteworthy that studies have focused on the categorization of ICT-careers, but have not considered motivational aspects in their configurations. Based on prior research findings that have revealed the crucial role that motivational aspects play in the career choices and also in explaining differences in career choices (Carpenter & Strawser, 1970; Felton, Buhr, & Northey, 1994; Lowe & Simons, 1997; Paolillo & Estes, 1982; Skatova & Ferguson, 2014; Umar, 2014), we state that it is particularly im-

portant to consider motivational aspects in the development of the taxonomy. Another shortcoming is that prior studies focused on employees instead of focusing on students. We further state that it is particularly important to also focus on students in order to encounter drop-outs at an earlier stage and to ensure a constant supply of skilled workers. Thus, we will develop our taxonomy focusing on motivational aspects and students.

DATA AND VARIABLES

Data

We gathered data from nine German universities that graduate women and men in computing and engineering disciplines. We contacted some of the students via email and sent them an online link; other universities allowed us to visit the courses and to conduct the survey with printed questionnaires. Universities broadly represented every region of the country and included institutions that are well known for their technological focus (e.g., Karlsruhe Institute of Technology, Technical University of Berlin, Technical University of Munich).

Participants were 458 students majoring, or intending to major, in a computing discipline at one of nine universities. Their mean age was 22.49 years, $SD = 3.19$. First, second and beyond year students accounted, respectively, for 4.8% ($n = 22$), 47.2% ($n = 216$), and 48% ($n = 220$) of the sample. Some of the students were married (1.9%) or in a serious relationship (38%). Overall, the sample included 100 (21.8%) women and 358 (78.2%) men. In terms of nationality/ethnicity, 91.3% self-identified as Germans and 10% reported other national/ethnic identifications (Americans, Asians, East Europeans, and Turkish). The most frequently endorsed majors were computer science and engineering, and information technology, but most of the other majors that students listed included variations of these fields or related fields (e.g., mobile embedded systems management, software system management).

Variables used for cluster analysis

To develop the taxonomy of motivation profiles we applied techniques of cluster analysis. As cluster analysis has proven to be sensitive to the selection and number of variables (de Jong & Marsili, 2006; Milligan & Cooper, 1987) we concentrated on main

variables that are sufficiently representative for intrinsic and extrinsic motivation elements in our context as we have displayed above. For a detailed overview over clustering variables used in this study see *Appendix A*.

Intrinsic motivation. We measured intrinsic motivation with two items. Based on Manhardt (1972) students were first asked to indicate how strong their choice to study computer science was guided by an *interest in the subject*. Students revealed the level of influence of interest along a 5-point Likert scale (anchored at 1 = very low and 5 = very high) answering the question “To what extent did interest in the subject influence your choice of your college major?”. They were then asked to assess their *technical aptitude* along a 5-point Likert scale (anchored at 1 = very low and 5 = very high). Higher scores on both scales indicated higher levels of intrinsic motivation.

Extrinsic motivation. We measured extrinsic motivation with three items. Based on Manhardt (1972) the wording of scales addressed the importance that motivation elements had in the context of career choices. The scales focused on three main elements of extrinsic motivation in career context. Students were asked to indicate how important they rated *high income*, *career prospects* and *gaining prestige*. Respondents indicated their level of importance of each element of extrinsic motivation along a 5-point Likert scale (anchored at 1 = very unimportant and 5 = very important). Higher importance scores implied higher ratings of extrinsic motivation.

Variables used for further validation and description of the taxonomy

To assess the validity and to gain deeper insight into the motivation profiles, we used a new set of variables that were not used in the cluster analysis, but are otherwise expected to vary across the motivation profiles (Hair, Anderson, Tatham, & Black, 1998; Milligan & Cooper, 1987). This was to analyze whether the significant differences between the motivation profiles is limited to the variables used in cluster analysis or whether they also differ regarding further variables. Moreover, with this analysis we are able to give the motivation profiles more substance and gain deeper insights into their career-related behavior. For this purpose, we addressed three aspects. First we used three variables that offer an insight into how members of the motivation profiles expect their nature of work to be e.g., bureaucratic work instead of technical work. We used

this to get an insight into which motivation profile best suits to which type of work. Further, we asked four questions how the students view and value their careers e.g., willingness to make career-related sacrifices. This was to understand how career-oriented the students are and how big the role is that the career plays in their lives. Moreover, we asked four questions, under which circumstances students would leave their jobs. For example, items included questions regarding the lack of knowledge gain, lack of recognition for their work, etc. This aimed at analyzing which aspects need to be ensured in order to make the students stay once they have entered the ICT-industry.

These variables can be assumed to vary across the motivation profiles. For example, if a motivation profile is highly intrinsically motivated, we expect it to show more intentions regarding job changes if there is a lack of knowledge gain compared to a motivation profile that reveals high extrinsic motivation.

Finally, for further description of the motivation profiles, we investigated differences across gender, age, number of semester that students were enrolled and the last grade in a science-related subject.

For a detailed overview over the variables used for further validation and description of the motivation profiles see *Appendix B*.

Variables used for regression analyses

To analyze differences regarding the probability of entering the ICT-industry between the developed motivation profiles we performed regression analyses. We used the probability of entering the ICT-industry as dependent variable and the three motivation profiles as independent variables.

Probability of entering the ICT-industry. Students' intentions to pursue a career in the ICT-industry was measured with an item asking the students about their probability of entering the ICT-industry. Students rated their level of probability with answering the question "To what extent are you sure that you will enter a profession which is within your field of studies?" along 6 answering categories (anchored at 1= 0% and 6 = 100%). Higher scores indicate higher values of probability to enter a profession in the ICT-industry after graduation (see *Appendix A*).

Control variables. We also included some control variables. These were participants' gender, age, and semester in which they were currently enrolled. We also controlled for the last grade in a science-related subject as good grades might encourage students to opt for a career in that particular field (Lent, Lopez, & Bieschke, 1993).

METHODS

We proceeded in three steps. In the first step, we used intrinsic and extrinsic motivation elements³ as clustering variables in order to develop distinct heterogeneous motivation profiles of the ICT-students via a two-step cluster analysis. In the first step of the two-step cluster analysis we used cluster analysis procedures (Log Likelihood) to analyze the motivation heterogeneity of our sample and to group it into motivation profiles. Specifically, we employed the two-step cluster analysis procedure to analyze the distance matrix and to determine the number of viable clusters in the data. The two-step clustering algorithm is well suited to analyze large data sets in which there are no predetermined numbers of clusters. Accordingly, we did not limit the two-step clustering algorithm to produce a specific number of clusters, but allowed it to determine, automatically, up to a maximum of 15 clusters⁴. The clustering algorithm derives the candidate number of clusters by comparing model AIC fit statistics (Akaike's Information Criterion; Akaike, 1974) across different clustering solutions.⁵

In a second step we performed variance analysis in order to validate and describe the identified motivation profiles using the variables for further validation and description of the profiles.

In a third step, we performed regression analyses using the probability of entering the ICT-industry as dependent and the identified motivation profiles as independent

³ In a pre-analysis we analyzed via regression analysis that all considered motivation elements had significant effects on the probability of entering the ICT-industry. Results of this analysis are depicted in *Appendix C*.

⁴ The maximum number of 15 clusters is the default in SPSS.

⁵ The cluster solution that fits the data best is indicated by the greatest ratio of change in the AIC fit statistic between a cluster solution within clusters and a two-cluster solution (Bozdogan, 1987).

variables in order to examine significant differences regarding their probability of entering the ICT-industry⁶. We also included the above mentioned control variables.

RESULTS

Consistent with our methodological procedure we will display our results in the following section in three steps. First we will portray the results regarding the development of the motivation-based taxonomy. Subsequently, we will show results regarding the further validation and description of the motivation profiles. Last, we will reveal the results regarding differences in their probability of entering the ICT-industry.

Motivation-based taxonomy of ICT-students

The AIC fit index indicated that a three cluster solution fits the data best. The smallest cluster contains 112 cases whereas the biggest cluster contains 190 cases. Before analyzing the three motivation profiles in depth we conducted further analysis in order to reveal significant differences among the motivation profiles in more detail. One of the basic requirements is that all clustering variables that have been used to develop the taxonomy vary across the motivation profiles (Milligan & Cooper, 1987). Multivariate analysis of variance tests reveal via Wilk's Lambda-Test ($F(10, 902) = 120.35, p = 0.00$; Wilk's $\Lambda = .184$) and Pillai's Trace ($F(10, 904) = 117.19, p = 0.00$; Pillai's Trace = 1.13) that the three motivation profiles are significantly different. We also conducted variance analyses with post-hoc Scheffé tests in order to depict significant characteristics of the motivation profiles based on the clustering variables. *Table 1* gives an overview over the three motivation profiles and results of the variance analyses.

Moreover, we performed t-tests among the clusters regarding each clustering variable. This allowed a finer comparison of the variables among the motivation profiles. Our results are summarized in *Appendix D*. We also tested for homogeneity of each cluster by estimating the F-values of each clustering variable in each motivation

⁶ When analyzing choices, it is a common approach to use probit or logit regression analysis as the "choice variable" is often measured as a dummy (yes/no). We decided to measure our choice variable "probability of entering the ICT-industry" with a continuous scale as the categories of "yes/no" would have been too broad in our case and would have absorbed too much of information about the peoples' tendencies of their probability of entering the ICT-industry. Therefore, we used linear OLS-regression in our analysis.

profile.⁷ In accepted cluster solutions all or at least the majority of variables should have values below 1. Results reveal that this is fulfilled in our analysis. Additionally, we calculated t-values. T-values above 0 indicate which variables are stronger represented in that particular cluster in comparison to the unclustered sample (t-values below 0 analogous). The results assist us in interpreting the motivation profiles in more depth. Our results are summarized in *Appendix E*.

⁷ F-values above 1 indicate that the variance in the cluster is higher than in the unclustered sample, meaning that the cluster is not homogenous regarding that particular variable.

Table 1: Description of the three motivation profiles and results of variance analysis

Motivation element	Variable	Motivation profile 1 (N= 156)		Motivation profile 2 (N= 112)		Motivation profile 3 (N= 190)		Scheffé results ¹	F
		Mean	s.d.	Mean	s.d.	Mean	s.d.		
Intrinsic motivation	Interest in the subject	4.99	.080	4.83	.377	3.93	.566	1>2; 1>3; 2>3	330.21**
	Technical aptitude	4.21	.551	4.20	.604	3.58	.727	1>3; 2>3	52.91**
Extrinsic motivation	Importance of high income	4.05	.631	2.79	.912	3.86	.764	1>2; 1>3; 3>2	99.22**
	Importance of career prospects	4.06	.655	2.39	.676	3.73	.851	1>2; 1>3; 3>2	174.63**
	Importance of prestige	3.20	.943	1.89	.689	2.96	1.047	1>2; 1>3; 3>2	69.82**
Label of motivation profile		Striver		Geek		Opportunist			

** $p < .01$.¹ Scheffé results are significant at the $p < .05$ level.

Motivation profile 1: Striver (N = 156). We label motivation profile 1 the ‘*striver*’. ICT-students belonging to the *striver* reveal the highest and above-average values of all intrinsic as well as extrinsic motivation elements which have been used to develop the taxonomy. All variables show the highest mean values as compared to motivation profile 2 and 3. ICT-students belonging to this motivation profile are characterized as very interested in ICT-related matters and as having a high affinity and aptitude towards these subjects. At the same time high values of extrinsic motivation point to their strong wish for financial incentives in their careers and promising career prospects. Moreover, our results reveal that gaining some sort of prestige by choosing a career in the ICT-industry seems to be particularly relevant for ICT-students belonging to the *striver*. To sum up, we suggest that ICT-students in this motivation profile strive at promising career possibilities that are connected to high income and social rewards by utilizing their skills and knowledge.

Motivation profile 2: Geek (N = 112). We label motivation profile 2 the ‘*geek*’. ICT-students belonging to the *geek* reveal higher scores of intrinsic motivation compared to motivation profile 3. Compared to the *striver* the scores for interest in the subject are significantly lower, while there is no significant difference in the aptitude between ICT-students belonging to the *geek* and *striver*. Hence, in terms of intrinsic motivation they take over a mid-position in the overall comparison between the three motivation profiles. However, ICT-students belonging to this motivation profile reveal lowest scores regarding the variables of extrinsic motivation. ICT-students grouped into the motivation profile of the *geek* distinguish themselves by lesser importance that they put on promising career prospects, financial or social rewards. Extrinsic incentives do not seem to have a very high priority compared to the other motivation profiles. Overall, ICT-students belonging to the *geek* seem to be rather motivated by their strong interest and high affinity towards the subject than extrinsic incentives.

Motivation profile 3: Opportunist (N = 190). We label motivation profile 3 the ‘*opportunist*’. ICT-students belonging to the *opportunist* display higher scores of extrinsic motivation compared to the *geek*. Compared to the *striver* the scores for financial incentives, promising career prospects and gaining prestige are significantly lower. Hence, in terms of extrinsic motivation they take over a mid-position in the overall comparison between the three motivation profiles. However, ICT-students belonging to

this motivation profile reveal the lowest scores regarding the variables of intrinsic motivation. ICT-students grouped into the motivation profile of the *opportunist* distinguish themselves by lesser interest and aptitude towards ICT-subjects. Intrinsic motivation does not seem to be an important driver in their career choice compared to ICT-students in the other two motivation profiles. Overall, we suggest that ICT-students belonging to the *opportunist* have not chosen to study computer science because of personal interest or affinity, but because they view it as means to career-related advantages which they connect to the ICT-industry.

Further validation and description of the motivation profiles

In order to offer a more detailed analysis and to further validate the motivation profiles we assessed variables via variance analyses that were not used to develop the taxonomy. Our results are summarized in *Table 2*.

Results regarding the nature of job reveal that ICT-students belonging to the *opportunist* show the highest scores in their willingness and affinity towards doing bureaucratic work, while ICT-students belonging to the *geek* and *striver* rank highest regarding their willingness to do work that requires their technical and theoretical skills. Results indicate that ICT-students belonging to the *opportunist* distinguish themselves from the ICT-students belonging to the *geek* and *striver* by seeking for job positions that are more of administrative nature and not particularly connected to ICT-related matters.

Regarding the questions how they view and value their careers, we found that ICT-students belonging to the *striver* and *opportunist* view their careers as means of expressing themselves and evaluate the planning of and succeeding in their careers as their primary concerns, whereas ICT-students belonging to the *geek* display the lowest scores regarding these aspects. This complies with the above considerations by indicating that ICT-students belonging to the *striver* and *opportunist* seek for possibilities of career advancement while ICT-students belonging to the *geek* are less career-minded. Moreover, ICT-students belonging to the *striver* and the *opportunist* reveal the highest scores (but not significantly different) regarding their willingness to make career-related sacrifices and cut-offs regarding their family-time, if it helped them to advance in their career and to achieve their career goals. ICT-students belonging to the *geek* display

lowest scores regarding their willingness to make sacrifices and efforts to make career advancements indicating that their careers are not their primary concern.

We also asked students under which circumstances they would change their job positions. Results reveal that ICT-students belonging to the *striver* reveal highest scores regarding a possible change due to financial reasons or if they lack possibilities of career advancement, while ICT-students belonging to the *geek* display lowest scores in this regard. Moreover, ICT-students belonging to the *striver* and *opportunist* reveal the highest scores (but not significantly different) regarding a change of job if they perceive a lack of recognition for their work, whereas ICT-students belonging to the *geek* reveal lowest scores regarding this aspect. However, ICT-students belonging to the *geek* display high scores regarding the fact that they would change their job, if they felt the company did not offer enough possibilities to upgrade their skills and gain new knowledge. All in all, results support the above descriptions of the motivation profile indicating that ICT-students would even consider a change of jobs, if their motivational demands were not met.

Further descriptive analysis revealed that the group of the *opportunist* displayed significant higher ratio of female students compared to the *geek* and *striver*. Moreover, the grades of ICT-students belonging to the *opportunist* are below-average. Results regarding age and number of semesters reveal a homogenous distribution across all three motivation profiles.

Table 2: Validation and further description of the three motivation profiles and results of variance analysis

Variables for validation and further description	Variable	Striver		Geek		Opportunist		Scheffé results ¹	F
		Mean	s.d.	Mean	s.d.	Mean	s.d.		
Nature of work	Bureaucratic work/ skills	1.98	.916	1.70	.739	2.29	.913	1>2; 3>1; 3>2	16.53**
	Technical/ practical skills	4.23	.783	3.97	.766	3.75	.751	1>2 [†] ; 1>3; 2>3	16.80**
	Theoretical skills	3.68	.972	3.60	1.074	3.29	.936	1>2; 1>3; 2>3	7.8**
View and value of career	Sacrificing family-time for career advancement	2.74	1.038	2.35	.975	2.73	1.047	1>2; 3>2	5.9**
	General sacrifices to get ahead	2.72	.980	2.23	1.021	2.64	1.006	1>2; 3>2	8.7**
	Career as means of expressing oneself	2.43	1.034	1.90	.961	2.41	1.022	1>2; 3>2	11.02**
	Career as a primary concern	2.44	1.103	1.77	.828	2.38	1.026	1>2; 3>2	17.18**
Change of jobs	Financial aspects	3.95	.794	3.02	.892	3.76	.774	1>2; 3>2	46.24**
	Lack of recognition	3.69	.838	3.21	.960	3.49	.913	1>2; 3>2	9.36**
	Less promotion chances	3.62	.868	2.71	.872	3.42	.939	1>2; 3>2	35.55**
	Lack of knowledge gain	3.71	.922	3.77	.878	3.48	.914	1>3; 2>3	4.5**
Other descriptive variables	Gender	1.84	.368	1.84	.369	1.70	.459	1>3; 2>3	6.5**
	Age	22.06	3.036	22.88	3.216	22.61	3.272		2.4 [†]
	Semester	3.741	2.702	3.657	2.268	3.303	2.232		1.6
	Grade in a science-related subject	3.71	.492	3.67	.551	3.43	.674	1>3; 2>3	10.92**

** $p < .01$, * $p < .05$, [†] $p < .1$.

¹ Scheffé results are significant at the $p < .05$ level, if not indicated otherwise.

Differences between the motivation profiles regarding their probability of entering the ICT-industry

Scale means, standard deviations, and correlations for the full sample are summarized in *Appendix F*.

We used three separate linear regression analyses to examine whether the three motivation profiles differed regarding their probability of entering the ICT-industry.

Table 3 shows our results.

Table 3: Results of three linear regression analyses
(dependent variable: probability of entering the ICT-industry)

Variables	Model 1	Model 2	Model 3
Intercept	3.648** (.406)	3.724** (.411)	4.090** (.413)
Striver	.289** (.087)		
Geek		.095 (.095)	
Opportunist			-.351** (.084)
Gender	.158 (.099)	.179 [†] (.100)	.127 (.099)
Age	-.013 (.014)	-.020 (.014)	-.016 (.013)
Semester	.035 [†] (.018)	.040* (.018)	.035 [†] (.018)
Grade in a science-related subject	.283** (.068)	.308** (.068)	.257** (.068)
R²	9.3	7.3	10.6
F (df)	9.306 (5)	7.119 (5)	10.687 (5)

** $p < .01$, * $p < .05$, [†] $p < .1$.
Standard error in parentheses.

As we used a categorical variable as predictor for our regression analyses, we had to split the predictor variable groups in such a way that allowed us to enter them into the regression analyses. Therefore, we composed three new ‘dummy’ variables, labeled *striver*, *geek*, and *opportunist*. Each of these new variables was used to represent the presence of membership in a category of the predictor. Each case was coded as 1 if

it was a member in a group on each of the dummy variables. All other cases were coded as 0.

Results indicate that the group of the *striver* has a significant positive effect ($B = .289, p < .01$) on the probability of entering the ICT-industry suggesting that ICT-students belonging to the *striver* show a significant higher or better the highest probability of entering the ICT-industry. In contrast, results regarding the *geek* show that this group does not have a significant effect on the probability of entering the ICT-industry. The *opportunist* displays a negative effect ($B = -.351, p < .01$) on the probability of entering the ICT-industry indicating that members of the *opportunist* are less likely to decide in favor of the ICT-industry compared to members of the *striver* and *geek*.

Gender has a significant influence in the *geek* group indicating that females in that particular group reported higher probability of entering the ICT-industry than male students. Gender does not have a significant effect in the *striver* and *opportunist* groups. The influence of age is insignificant throughout the three models. Whereas the influence of semester is significant in all three models indicating the farther the members of all three motivation profiles have preceded in their studies the higher their probability of entering the ICT-industry. The last grade in a science-related subject has a positive influence in all three regression models suggesting the better the grade was in a science-related subject the higher the probability of entering the ICT-industry.

DISCUSSION

It was the aim of this study to configure motivation profiles of ICT-students and to analyze differences in their probability of entering the ICT-industry in order to offer starting points for companies how to align their recruiting strategies for encountering the shortage of skills in the ICT-industry.

We identify three significantly different motivation profiles. The motivation structure of the *striver* offers interesting insights into the motivation structure of ICT-students who choose to enter the ICT-industry with a very high probability.

Compared to the *geek* and *opportunist* the *striver* is probably most likely able to deal with the technical obsolescence in the ICT-industry. This is because people belonging to the *striver* are very knowledgeable and also willing to invest time and effort in

developing new skills and gaining ICT-related knowledge. One might argue that ICT-students belonging to the *geek* are also able to encounter the technical obsolescence in the ICT-industry as they are also knowledgeable and talented regarding ICT-related matters and reveal high values of intrinsic motivation. However, the difference between ICT-students belonging to the *geek* and ICT-students belonging to the *striver* seems to be that the *geek* does not pursue a superordinate or greater career-related goal with the usage of his/ her knowledge. ICT-students belonging to the *geek* are enthusiastic about their subject and decided to study computer science because they are interested in ICT-based matters and not because they pursue any vocational achievements. This is also supported by the significantly lower value that the *geek* puts on his/ her career. Further, also the value of ‘importance of prestige’ is significantly lower suggesting that members of the *geek* group did not decide to study computer science for recognition of others, but for their own satisfaction.

More support is found in the result that no significant relationship of ICT-students belonging to the *geek* and the probability of entering the ICT-industry is revealed. On the one hand, this is a surprising result as we would expect someone who is highly interested in the subject to also join the industry. On the other hand, this undermines the impression that we get from the *geek* as it seems that the engagement with ICT-related matters is not necessarily linked to vocational motives, but rather personal satisfaction and curiosity. Moreover, it reveals that the subjects that are of interest for ICT-students belonging to the *geek* are not necessarily compatible with the subjects that are of interest for the companies. The high importance that they put on the development and advancement of their ICT-related skills can be seen in the fact that they would even change their job if possibilities for knowledge gain were not offered.

Moreover, if people are mainly intrinsically motivated, as we observe in the *geek* group, the technical obsolescence of the industry may create a challenge for them as it requires people to constantly learn new software, programming languages, technical skills, etc. This results in the fact that people do not learn one thing thoroughly, but a lot of things in regular intervals. This may not satisfy an intrinsic motivated person who is more idealistic and has higher demands to permeate matters and gain a comprehensive knowledge. He/ she might prefer to be perfect in handling one particular technology or software system than superficially learning new technologies every few years. People

with a rather intrinsic motivation profile might also feel exploited when they are asked to learn new skills every few years for competitive reasons that advance the companies in the global competition. In contrast to that ICT-students belonging to the *striver* seem to be pragmatic and willing enough to utilize their abilities and knowledge in order to achieve their career-related goals.

Further, one might assume the *striver* and *opportunist* to be very similar to each other as they are both very career-oriented, willing to make career-related sacrifices and spend a lot of time planning their careers. However, the difference between *striver* and *opportunist* is that the *opportunist* is not bound to the ICT-industry in particular. We assume that ICT-students belonging to the *opportunist* are rather pragmatic and view their career in the ICT-industry as a means to achieve their personal goals and expressing themselves instead of being guided by their passion and interest for ICT-subjects. One might also say that any other industry that offers comparable facilities would be as good as the ICT-industry for the *opportunist* to pursue his/ her career-related goals. This is supported by the fact that ICT-students belonging to the *opportunist* prefer administrative work that is not necessarily linked to ICT-related matters whereas ICT-students belonging to the *striver* value work that requires their technical and theoretical ICT-related knowledge much higher.

Moreover, the result that students belonging to the *opportunist* display a significant lesser probability of entering the ICT-industry is consistent with this impression. This is because ICT-students belonging to the *opportunist* do not necessarily pursue a career in the ICT-industry, but may also decide for industries that are related to their ICT-education and offer better possibilities to maximize their benefits and achieve their career-related goals. Hence, the portfolio of career-related possibilities is broader for students belonging to the *opportunist* to make their career choice which explains their lesser probability of entering the ICT-industry.

Looking at the technical obsolescence from the view of the *opportunist* it might be that people belonging to this group are overburdened when they are asked to gain a new set of skills in regular intervals. This is supported if we look at the grades and technical aptitude of the ICT-students belonging to the *opportunist* in our sample, which are significantly lower compared to the other two motivation profiles. Extrinsic motivated people join the ICT-industry for the above established characteristics, but not because of

personal interest, good grades or aptitude. Hence, the *opportunist* approaches his/ her career in the ICT-industry from a more pragmatic point of view where he/ she uses his/ her ICT-knowledge as means to an attractive working place.

Now, the *striver*, as a mixture of both facets, seems to makes the difference regarding the probability of entering the ICT-industry. ICT-students belonging to the *striver* are very knowledgeable and skilled and at the same time ambitious and career-oriented. This means that this group of people on the one hand brings along the cognitive requirements to constantly and quickly learn new technologies, and on the other hand is flexible and pragmatic enough to use its ICT-knowledge in order to achieve its goals regarding the ICT-industry and move up the career ladder. Hence, while the *striver* is attracted to the ICT-industry due to extrinsic reasons, he/ she is at the same time willing and able enough to handle the technical obsolescence through a constant education and making career-related sacrifices. We suggest that members of this group are aware of the value that they add to a company and their vocational surrounding. Thus, they demand this back from their career in terms of highest income expectations, career advancement possibilities and social rewards.

IMPLICATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Based on our analyses we derive implications for theory and practitioners, who aim at encountering the shortage of skills in the ICT-industry and give directions for future research.

Implications

Regarding theory, our results complement research work by Chesebrough and Davis (1983), Ginzberg and Baroudi (1988), Joseph et al. (2012), Kaiser (1983) and Zabusky and Barley (1996) who studied profiles regarding career paths in the ICT-industry, but did not base their analysis on motivational considerations. We advance research by considering ICT-students and not focusing on employees that are already part of the industry and offer a taxonomy of three distinct and easy to remember motivation profiles. With that we contribute to the young body of literature which engages with the ICT-industry and opportunities to encounter the shortage of skills.

Regarding practice, we believe the identification of the *striver* and his/ her higher probability of entering the ICT-industry is good news for the ICT-companies. On the one hand, these are employees who engage with the subject willingly and are willing to educate themselves. This seems to be an important requirement in a knowledge-based industry and for overcoming technical obsolescence. On the other hand, at the same time these are individuals who can be motivated and attracted by set screws that companies are able to influence like income, career prospects, reward systems, possibilities for further education, etc.

Looking at the *geek* we suggest that, if they enter the ICT-industry, then these are people who are suitable for R&D companies or divisions and do not necessarily pursue managerial positions. We state that they enjoy to engage themselves with knowledge-based topics intensively, develop new ideas and to apply their knowledge. The *opportunist* may be more suitable for managerial or administrative positions that not necessarily need to be very close to the product or the services that the companies offer. Hence, companies need a balanced portfolio of measures that address intrinsic and extrinsic motivation by offering possibilities for further education in order to address intrinsic motivation and ensure transparency regarding wage structure, career prospects, etc.

Further, it is necessary for companies to scrutinize, why ICT-students belonging to the *geek* group display a non-significant effect of entering the ICT-industry. An assumption would be that compared to ICT-students belonging to the *opportunist* and *striver* group the *geek* may attach more importance to the fit between their expectations and values with company's mission statements and visions. As their knowledge and skills are very important to them, they may not want to utilize it for purposes that they do not support. This is in line with research work by Götsch (2013) who reveals that there is a group of ICT-students that is driven by idealistic as well as altruistic motives and the urge to contribute to a better (technical) world in order to ease the daily-life of the user. Hence, it will be useful for companies to align their mission statements with values of ICT-students belonging to the *geek* group, as they are due to their vast knowledge and willingness to further educate themselves valuable assets for the companies.

Lastly, a strong cooperation among educational institutions and companies seems to be necessary as requirements of the industry and education of the students according to their motivation profiles can be aligned in order to encounter the shortage of skilled employees more efficiently.

Directions for future research

Our results offer avenues for future research. As stated above, it might be that the *opportunist* is more suitable for interface work, whereas the *geek* or *striver* is more suitable for complex and developmental work. Therefore, it would be interesting to analyze which profile is most suitable for which type of work in order to utilize the abilities in an optimal way.

Further, one might discuss why we have termed the mainly intrinsically motivated group in our sample ‘*geek*’ and not ‘nerd’ as we have established above that people engaged in the ICT-industry are often perceived as nerds due to their focus on computers and ICT-related matters. However, another factor that characterizes the nerd is the lack of interpersonal skills and empathy. We have limited our study to motivation elements when configuring the taxonomy, and therefore cannot make any statements on the social skills of our asked students. Therefore, we term the mainly intrinsically motivated group of ICT-students in our sample ‘*geek*’, highlighting the most prominent features of this group, which are the high interest in the ICT-subject and distinct skills in this regard. Future research work may further analyze the personal and social skills of the developed motivation profiles in order to analyze the necessity of policies regarding personal development and soft skill training.

Also, we focused on a European sample, which captures a Western perspective on the ICT-industry. It might be that these results be quite different with another sample as studies show that for example Asian countries have other motives to join the ICT-industry and hence view the ICT-industry and ICT-professionals differently (e.g., Jungwirth & Roy, 2015; Shanker, 2008).

CONCLUSION

To conclude, our study is, to the best of our knowledge, among the first to configure a motivation-based taxonomy of ICT-students and to analyze differences in their vocational behavior. By conducting explorative cluster analysis we develop three heterogeneous motivation profiles which we label *striver*, *geek* and *opportunist* and show that a combination of high intrinsic and high extrinsic motivation is a successful and promising mixture for the ICT-industry. Our results indicate that, based on motivation elements, there is a broad range of set screws that companies can regulate in order to attract more people to the ICT-industry. We hope that our identified profiles will establish themselves in the literature of motivation research regarding ICT-industry. We believe that further empirical research can elaborate on these profiles e.g., by analyzing their career paths, by comparing them to motivation profiles of people in other industries, or by including more aspects and shed more lights on the profiles themselves. We have put foot on a research field that has not yet been considered much; we hope that further research will find various points of contact to our study and expand research in this field.

REFERENCES

- Akaike, H. 1974. A new look at the statistical model identification. *IEEE Transactions on Automatic Control*, 19(6): 716-723.
- Allen, J., & de Grip, A. 2012. Does skill obsolescence increase the risk of employment loss? *Applied Economics*, 44(25): 3237-3245.
- Ang, S., & Slaughter, S. A. 2000. The missing context of information technology personnel: A review and future directions for research. In R. Zmud (Ed.), *Framing the domains of IT management: Projecting the future through the past*: 305-327. Cincinnati, OH: Pinnaflex Education Resources, Inc.
- Arora, A., & Athreye, S. 2002. The software industry and India's economic development. *Information economics and policy*, 14(2): 253-273.
- Arora, A., & Gambardella, A. 2006. *From underdogs to tigers: The rise and growth of the software industry in Brazil, China, India, Ireland, and Israel*. New York, NY: Oxford University Press.
- BITKOM 2007. *Standpunkte zum geistigen Eigentum: Die Wissensindustrie auf dem Weg in das 21. Jahrhundert*. BITKOM e.V., Berlin.
https://www.bitkom.org/files/documents/BITKOM_bro_21032007final.pdf
 [Last retrieved 03.12.2015].
- BITKOM 2014. *In Deutschland fehlen 41.000 IT-Experten*. BITKOM e.V., Berlin.
<https://www.bitkom.org/Presse/Presseinformation/In-Deutschland-fehlen-41000-IT-Experten.html> [Last retrieved 03.12.2015].
- Bundesvereinigung der deutschen Arbeitgeber 2009. *Trotz Krise fehlen mehr als 60.000 Fachkräfte im Bereich Mathematik, Informatik, Naturwissenschaften und Technik*. http://www.arbeitgeber.de/www/arbeitgeber.nsf/id/DE_PI04809-Gem [Last retrieved 12.03.2016].
- Bundesvereinigung der deutschen Arbeitgeber 2010. *Engpass bei MINT-Nachwuchs hemmt Wachstum und Innovationen*.
http://www.arbeitgeber.de/www/arbeitgeber.nsf/id/DE_MINT [Last retrieved 12.03. 2016].
- Bozdogan, H. 1987. Model selection and Akaike's Information Criterion (AIC): The general theory and its analytical extensions. *Psychometrika*, 52(3): 345-370.
- Cameron, J., Banko, K. M., & Pierce, W. D. 2001. Pervasive negative effects of rewards on intrinsic motivation: The myth continues. *The Behavior Analyst*, 24(1): 1-44.
- Cameron, J., & Pierce, W. D. 1994. Reinforcement, reward, and intrinsic motivation: A meta-analysis. *Review of Educational Research*, 64(3): 363-423.
- Carpenter, C. G., & Strawser, R. H. 1970. Job selection preferences of accounting students. *Journal of Accountancy*, 129(6): 84-86.
- Centers, R., & Bugental, D. E. 1966. Intrinsic and extrinsic job motivations among different segments of the working population. *Journal of Applied Psychology*, 50(3): 193-197.

- Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. 2014. Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year meta-analysis. *Psychological Bulletin*, 140(4): 1-29.
- Cheryan, S., Plaut, V. C., Handron, C., & Hudson, L. 2013. The stereotypical computer scientist: Gendered media representations as a barrier to inclusion for women. *Sex roles*, 69(1-2): 58-71.
- Chesebrough, P. H., & Davis, G. B. 1983. Planning a Career Path in Information Systems. *Journal of Systems Management*, 34(1): 6-13.
- Colomo-Palacios, R., Tovar-Caro, E., García-Crespo, Á., & Gómez-Berbís, J. M. 2010. Identifying technical competences of IT Professionals: The case of software engineers. *International Journal of Human Capital and Information Technology Professionals*, 1(1): 31-43.
- Cuzzocrea, F., Larcán, R., & Murdaca, A. M. 2012. Contextual and internal factors that can influence the development of vocational guidance and career planning in Italian students. *Education Research Journals*, 2(7): 239-246.
- De Jong, J. P., & Marsili, O. 2006. The fruit flies of innovations: A taxonomy of innovative small firms. *Research policy*, 35(2): 213-229.
- Deci, E. L., Connell, J. P., & Ryan, R. M. 1989. Self-determination in a work organization. *Journal of applied psychology*, 74(4): 580-590.
- Deci, E. L., Koestner, R., & Ryan, R. M. 1999. The undermining effect is a reality after all- Extrinsic rewards, task interest, and selfdetermination: Reply to Eisenberger, Pierce, and Cameron (1999) and Lepper, Henderlong, and Gingras (1999). *Psychological Bulletin*, 125(6): 692-700.
- Deci, E. L., Koestner, R., & Ryan, R. M. 2001. Extrinsic rewards and intrinsic motivation in education: Reconsidered once again. *Review of Educational Research*, 71(1): 1-27.
- Deci, E. L., & Ryan, R. M. 1985. *Intrinsic motivation and self-determination in human behavior*. New York, NY: Springer US.
- Dubin, S. S. 1990. Maintaining competence through updating. In S. L. Willis & S. S. Dubin (Eds.), *Maintaining professional competence*: 9-43. San Francisco, CA: Jossey-Bass.
- EconomyWatch 2010. *IT Industry, Information Technology Industry*. <http://www.economywatch.com/business-and-economy/information-technology-industry>. [Last retrieved 14.12. 2015].
- Eisenberger, R., & Cameron, J. 1996. The detrimental effects of reward: Myth or reality? *American Psychologist*, 51(11): 1153-1166.
- Eisenberger, R., Pierce, W. D., & Cameron, J. 1999. Effects of reward on intrinsic motivation: Negative, neutral, and positive. *Psychological Bulletin*, 125(6): 677-691.
- Felton, S., Buhr, N., & Northey, M. 1994. Factors influencing the business students' choice of a career in chartered accountancy. *Issues in Accounting Education*, 9(1): 131-141.

- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. 2004. School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1): 59-109.
- Friedrichsen, H. 2012. Gehaltsreport: *Was ICT-Mitarbeiter verdienen*. KarriereSpiegel. <http://www.spiegel.de/karriere/berufsleben/gehaltsreport-einkommen-fuer-informatiker-in-der-ict-branche-a-832124.html> [Last retrieved 6.12. 2015].
- Ginzberg, M. J., & Baroudi, J. J. 1988. MIS Careers - A Theoretical Perspective. *Communications of the ACM*, 31(5): 586-594.
- Gottfredson, L. S. 1996. Gottfredson's theory of circumscription and compromise. In D. Brown & L. Brooks (Eds.), *Career choice and development* (3rd ed.): 179-232. San Francisco, CA: Jossey-Bass.
- Gottfried, A. E. 1996. A Longitudinal Study of Academic Intrinsic Motivation in Intellectually Gifted Children: Childhood Through Early Adolescence. *Gifted Child Quarterly*, 40(4): 179-183.
- Götsch, M. 2013. ‚Das fängt natürlich an mit irgendwelchen Spielekonsolen‘ - oder: Was dazu motiviert, Informatik (nicht) zu studieren. *Informatik-Spektrum*, 36(3): 267-273.
- Grouzet, F. M., Kasser, T., Ahuvia, A., Dols, J. M. F., Kim, Y., Lau, S., Ryan, R. M., Saunders, S., Schmuck, P., & Sheldon, K. M. 2005. The structure of goal contents across 15 cultures. *Journal of Personality and Social Psychology*, 89(5): 800-816.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C., 1998. *Multivariate Data Analysis* (5th ed.). Englewood Cliffs, NJ: Prentice Hall.
- Joseph, D., Boh, W. F., Ang, S., & Slaughter, S. A. 2012. The career paths less (or more) traveled: A sequence analysis of ICT-career histories, mobility patterns, and career success. *MIS Quarterly*, 36(2): 427-452.
- Jungwirth, C., & Roy, N. 2015. *Why do Indian women choose a career in ICT? And why don't they stay? Core components of career choices in ICT-industry - A qualitative study*. Paper presented at the annual meeting of the Academy of Management, Philadelphia, USA.
- Kaiser, K. M. 1983. DP Career Paths. *Datamation*, 29(12): 178-188.
- Köver, C. 2011. *Ihr coolen Streber!* Zeit Campus 04/2011, <http://www.zeit.de/campus/2011/04/nerds> [Last retrieved 8.10.2014].
- Lee, M. K. O., Cheung, C. M. K., & Chen, Z. 2005. Acceptance of Internet-based learning medium: The role of extrinsic and intrinsic motivation. *Information & Management*, 42(8): 1095-1104.
- Lee, J. Q., McInerney, D. M., Liem, G. A. D., & Ortiga, Y. P. 2010. The relationship between future goals and achievement goal orientations: An intrinsic-extrinsic motivation perspective. *Contemporary Educational Psychology*, 35(4): 264-279.

- Lent, R. W., Brown, S. D., & Hackett, G. 1994. Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, 45(1): 79-122.
- Lent, R. W., Brown, S. D., & Hackett, G. 2000. Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology*, 47(1): 36-49.
- Lent, R. W., Brown, S. D., Talleyrand, R., McPartland, E. B., Davis, T., Chopra, S. B., Alexander, M. S., & Chai, C. M. 2002. Career choice barriers, supports, and coping strategies: College students' experiences. *Journal of Vocational Behavior*, 60(1): 61-72.
- Lent, R. W., Lopez, F. G., & Bieschke, K. J. 1993. Predicting Mathematics-Related Choice and Success Behaviors: Test of an Expanded Social Cognitive Model. *Journal of Vocational Behavior*, 42(2): 223-236.
- Licht, G., & Steiner, V. 2001. *IKT-Fachkräftemangel und Qualifikationsbedarf. Empirische Analysen für das Verarbeitende Gewerbe und ausgewählte Dienstleistungssektoren in Deutschland*. Zentrum für Europäische Wirtschaftsforschung GmbH, Mannheim, Germany.
- Lowe, D. R., & Simons, K. 1997. Factors influencing choice of business majors - some additional evidence: A research note. *Accounting Education*, 6(1): 39-45.
- Manhardt, P. J. 1972. Job orientation of male and female college graduates in business. *Personnel Psychology*, 25(2): 361-368.
- McInerney, D. M., & McInerney, V. 2010. *Educational psychology: Constructing learning* (5th ed.). Frenchs Forest, NSW: Pearson.
- Menez, R., Munder, I., & Töpsch, K. 2001. *Qualifizierung und Personaleinsatz in der ICT-Branche: Auswertung der Online-Studie BICT-S* (Befragung von ICT-Unternehmen der Region Stuttgart).
- Milligan, G. W., & Cooper, M. C., 1987. Methodology review: clustering methods. *Applied Psychological Measurement*, 11(4): 329-354.
- Namvar, M., Fathian, M., Gholamin, M. R., & Akhavan, P. 2010. *Exploring the role of human capital on firm's structural capital in Iranian e-business industry*. International Conference on Management Technology and Applications (ICMTA), Singapore.
- Paolillo, J. G., & Estes, R. W. 1982. An Empirical Analysis of Career Choice Factors among Accountants, Attorneys, Engineers, and Physicians. *The Accounting Review*, 57(4): 785-793.
- Pazy, A. 1990. The threat of professional obsolescence: How do professionals at different career stages experience it and cope with it? *Human Resource Management*, 29(3): 251-269.
- Pokay, P., & Blumenfeld, P. C. 1990. Predicting achievement early and late in the semester: The role of motivation and use of learning strategies. *Journal of Educational Psychology*, 82(1): 41-50.

- Porter, L. W., & Lawler, E. E. I. 1968. *Managerial attitudes and performance*. Homewood, IL: Irwin-Dorsey.
- Powell, W. W., & Snellman, K. 2004. The knowledge economy. *Annual review of sociology*, 30(1): 199-220.
- Reeve, J., Deci, E. L., & Ryan, R. M. 2004. Self-determination theory: A dialectical framework for understanding sociocultural influences on student motivation. In D. M. McInerney & S. V. Etten (Eds.), *Big theories: A volume in research on sociocultural influences on motivation and learning*: 31-60. Charlotte, NC: Information Age Publishing.
- Rummel, A., & Feinberg, R. 1988. Cognitive evaluation theory: A meta-analytic review of the literature. *Social Behavior and Personality: An International Journal*, 16(2): 147-164.
- Ryan, R. M., & Deci, E. L. 2000. Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, 25(1): 54-67.
- Shanker, D. 2008. Gender relations in IT companies: An Indian experience. *Gender, Technology and Development*, 12(2): 185-207.
- Skatova, A., & Ferguson, E. 2014. Why do different people choose different university degrees? Motivation and the choice of degree. *Frontiers in psychology*, 5(1244): 1-15.
- Stajkovic, A. D., & Luthans, F. 2003. Behavioral management and task performance in organizations: Conceptual backgrounds, meta-analysis, and test of alternative models. *Personnel Psychology*, 56(1): 155-194.
- Staufenbiel 2015. *Top Ten der bestbezahlten Jobs*.
<https://www.staufenbiel.de/ratgeber-service/gehalt/gehaltsvergleich/bestbezahlte-jobs.html> [Last retrieved 6.12.2015].
- Taganas, R. A. L., & Kaul, V. K. 2006. Innovation systems in India's IT industry: An empirical investigation. *Economic and Political Weekly*, 41(39): 4178-4186.
- Tang, S. H., & Hall, V. C. 1995. The overjustification effect: A meta-analysis. *Applied Cognitive Psychology*, 9(5): 365-404.
- Umar, I. 2014. Factors Influencing Students' Career Choice in Accounting: The Case of Yobe State University. *Journal of Finance and Accounting*, 5(17): 59-63.
- Vallerand, R. J., & Bissonnette, R. 1992. Intrinsic, extrinsic, and amotivational styles as predictors of behavior: A prospective study. *Journal of personality*, 60(3): 599-620.
- Vallerand, R. J., & Losier, G. F. 1999. An integrative analysis of intrinsic and extrinsic motivation in sport. *Journal of Applied Sport Psychology*, 11(1): 142-169.
- Vallerand, R. J., & Ratelle, C. F. 2002. Intrinsic and extrinsic motivation: A hierarchical model. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research*: 37-64. Rochester, NY: University of Rochester Press.

- Weibel, A., Rost, K., & Osterloh, M. 2010. Pay for performance in the public sector – Benefits and (hidden) costs. *Journal of Public Administration Research and Theory*, 20(2): 387-412.
- Wiersma, U. J. 1992. The effects of extrinsic rewards in intrinsic motivation: A meta-analysis. *Journal of Occupational and Organizational Psychology*, 65(2): 101-114.
- Wilkesmann, U., Fischer, H., & Virgillito, A. 2012. *Academic Motivation of Students – The German Case*. Discussion paper des Zentrums für Hochschulbildung Technische Universität Dortmund: 1-20, Dortmund, Germany.
- Zabusky, S. E., & Barley, S. R. 1996. Redefining success. In P. Ostermann (Ed.), *Broken ladders: Managerial careers in the new economy* (1st ed.): 185-214, New York, NY: Oxford University Press.

APPENDIX

Appendix A

Overview of variables used for developing the taxonomy and dependent variable used for regression analysis

	Variable	Min	Max	Mean	Std. Error
Clustering variables					
Intrinsic motivation	Interest in the subject	1	5	4.51	.644
	Self-assessment of technical aptitude	1	5	3.95	.711
Extrinsic motivation	Importance of income	1	5	3.66	.911
	Importance of career prospects	1	5	3.51	.992
	Importance of prestige	1	5	2.78	1.067
Dependent variable					
Career choice	Probability of entry	1	6	4.87	.896

Appendix B

Overview of variables used for further validation and description of the motivation profiles

	Variable	Min	Max	Mean	Std. Error
Nature of work	Bureaucratic work/ skills	1	5	2.04	.042
	Technical/ practical skills	1	5	3.97	.037
	Theoretical skills	1	5	3.50	.047
Value and view of the career	Sacrificing family-time for career advancement	1	5	2.64	.048
	General sacrifices to get ahead	1	5	2.57	.048
	Career as means of expressing oneself	1	5	2.29	.048
	Career as a primary concern	1	5	2.25	.049
Change of jobs	Financial aspects	1	5	3.64	.045
	Lack of recognition	1	5	3.49	.047
	Less promotion chances	1	5	3.31	.050
	Lack of knowledge gain	1	5	3.63	.047
Other descriptive variables	Gender	1	2	1.78	.414
	Age	17	35	22.49	3.189
	Semester	1	16	3.539	2.414
	Grade in a science-related subject ^a	1	4	1.41	.591

^a Please note that the scale of the grade in a science-related subject (originally anchored at 1 = very good and 4 = sufficient) has been recoded (anchored at 1 = sufficient and 4 = very good) for analysis reasons.

Appendix C

Results of regression analysis

(dependent variable: probability of entering the ICT-industry)

Variables	Model
Intercept	1.841 (.498)**
Interest in the subject	.318 (.066)**
Technical aptitude	.138 (.06)*
Importance of high income	.139 (.053)**
Importance of career prospects	.095 (.052) [†]
Importance of prestige	-.133 (.041)**
Gender	.055 (.099)
Age	-.019 (.013)
Semester	.039 (.017)*
Grade in a science-related subject	.212 (.068)**
R ²	18.2
F (df)	11.051** (9)

** $p < .01$, * $p < .05$, [†] $p < .1$.
Standard error in parentheses.

Appendix D

Results of t-tests

Motiva- tion Type (I)	Motiva- tion Type (J)	Variables	Mean dif- ference (I-J)	Std. Error	Sig.	95% Con- fidence Interval	
						Lower bound	Upper bound
1	2	Interest in the subject	.163	.031	.000	.102	.224
		Technical Aptitude	.011	.071	.874	-.129	.151
		Importance of income	1.255	.094	.000	1.070	1.441
		Importane of career prospects	1.662	.082	.000	1.500	1.824
		Importance of presti- ge	1.311	.105	.000	1.104	1.517
		Age	-.820	.385	.034	-1.579	-.061
		Semester	.085	.313	.788	-.532	.701
		Grade in a science- related subject	.373	.064	.562	-.089	.163
2	3	Interest in the subject	.901	.060	.000	.783	1.020
		Technical Aptitude	.620	.082	.000	.459	.780
		Importance of income	-1.066	.098	.000	-1.259	-.874
		Importane of career prospects	-1.335	.094	.000	-1.521	-1.150
		Importance of presti- ge	-1.064	.111	.000	-1.282	-.846
		Age	.271	.387	.485	-.491	1.033
		Semester	.353	.268	.187	-.1730	.880
		Grade in a science- related subject	.237	.072	.001	.966	.378
3	1	Interest in the subject	-1.065	.046	.000	.975	1.155
		Technical Aptitude	-.631	.071	.000	.492	.770
		Importance of income	-.189	.076	.014	-.339	-.039
		Importane of career prospects	-.327	.083	.000	-.491	-.164
		Importance of presti- ge	-.247	.108	.023	-.460	-.034
		Age	.549	.342	.110	-.124	1.222
		Semester	-.438	.265	.100	-.9595	.084
		Grade in a science- related subject	-.275	.063	.000	-.398	-.151

Appendix E

Results of validity checks

		Profile 1		Profile 2		Profile 3	
	Variables	F-Value	t-Value	F-Value	t-Value	F-Value	t-Value
Intrinsic motivation	Interest in the subject	.014	.745	.343	.5	.773	-.901
	Technical aptitude	.6	.366	.721	.352	.045	-.52
Extrinsic motivation	Importance of high income	.479	.593	1	-.955	.703	.22
	Importance of career prospects	.436	.554	.465	-.13	.734	.222
	Importance of prestige	.782	.394	.418	-.834	.965	.169
		Fully homogenous		Quasi-homogenous		Fully homogenous	

Appendix F

Correlations, scale means, and standard deviations

	Mean	S.D.	Correlations									
			1	2	3	4	5	6	7	8	9	
1. Probability of entry	4.87	.896										
2. Interest in the subject	4.51	.644	.308**									
3. Technical aptitude	3.95	.711	.231**	.325**								
4. Importance of high income	3.66	.911	.111*	-.106*	-.020							
5. Importance of career prospects	3.51	.992	.075	-.060	-.063	.596**						
6. Importance of prestige	2.78	1.067	-.089	-.086	-.044	.331**	.470**					
7. Gender	1.76	.414	.120**	.153**	.336**	-.031	-.045	-.033				
8. Age	22.49	3.189	-.030	-.005	-.022	-.030	-.059	-.107*	.058			
9. Semester	3.54	2.413	.105*	.039	.073	-.038	-.056	-.059	.148**	.344**		
10. Grade in a science-related subject	3.58	.600	.225**	.305**	.220**	-.075	-.111*	-.019	.109*	-.024	.038	

** Correlations are significant at the $p < .01$ level.

* Correlations are significant at the $p < .05$ level.

III. CONCLUSION

It was the aim of this thesis to shed light on the career choices of individuals regarding the ICT-industry, especially that of women, and the motivation structure of people entering the ICT-industry. To achieve that, I have used the SCCT (Lent, Brown, & Hackett, 1994, 2000) as a theoretical base and have focused on particular aspects of SCCT and diverse relationships among them. With that I have followed a usual research procedure of previous research work by contextualizing and adjusting the components and their suggested relationships to the particular research questions. In the following, I will sum up, the main conclusions of the thesis and its contributions.

In the first article *“Developing a model of career choices regarding females in the ICT-industry - A theoretical approach”*, I have derived a theoretical model of career choices of individuals and especially that of females regarding the ICT-industry. I conclude that a career choice is comprised of person as well as context factors which I embed in the considerations of the SCCT and include a novel aspect, the career salience. I discuss gender differences regarding the core components and point out that some core components are industry-specific (e.g., career-related barriers) while others are specific on an individual-level (e.g., career aspirations). The originality of this model lies in its empirical applicability to the ICT-industry, but also to other industries that are confronted with an under-representation of vocational groups in the workforce. While I have focused on female under-representation, this model may also be applied to the analysis of under-representation of ethnic minorities. In this case, ethnical career-related barriers and supports will have to be considered instead of gender-specific career-related barriers and supports; still the main core components will remain the same. With this, the theoretical model offers an information basis of which core components need to be considered in general when analyzing the career choice of individuals, in the way that I assume a career choice to be, especially that of women, and which need to be adjusted when applying the theoretical model to industries other than the ICT-industry or other under-represented vocational groups.

In article 2 *“Why do Indian women choose a career in ICT? And why don't they stay? Core components of career choices in the ICT-industry - A qualitative study”* we

take a first step at testing the theoretical model of article 1 which displays the way we assume a career choice takes place. There are two major observations that I want to point out. First, we assumed that the perception of barriers would take place in a two-step process. In a first step the individual would assess how likely a career-related barrier is to occur. If the barrier is likely to occur, the individual will in a second step, assess how likely it is that he/ she will be hindered by the perception of the career-related barrier. This is based on the evaluation of the individual's own abilities to negotiate or manage the barrier. In the theoretical model in article 1 I have coined this aspect, based on theoretical considerations by Swanson, Daniels, & Tokar (1996), the hindrance-factor.

However, while we were conducting the interviews for our study in article 2, we noticed that our participants did not evaluate the career-related barriers in a two-step process, but rather in a one-step process. As soon as they indicated to perceive a career-related barrier they perceived it as hindering. Thus, our participants did not make a separate step of evaluating the perceived career-related barrier against their own abilities. Therefore, we decided to refer in this and the following articles solely to the perception of career-related barriers. Reasons for the deviation between the theoretical model and our qualitative study could be that individuals in our sample are less likely to define something as a barrier, if they evaluate their abilities to cope with the barriers as effectively. Hence, it seems to be difficult for individuals in our sample to disentangle how much a particular barrier would disrupt their career choice from their confidence in their ability to cope with it. However, it seems noteworthy that there are studies that display a disentangled relationship among career-related barriers and individual's assessment to cope with those barriers (Lent et al., 2001; McWhirter, 1997; Thompson, 2013). Though these studies are in line with the suggested concept by Swanson et al. (1996) of considering a two-step process in order to disentangle these concepts, our results indicate that there is a conceptual overlap. However, research has yet to scrutinize the complex nature of career-related barriers and individuals' assessment of coping with them (Lent, Brown, & Hackett, 2000). An insight into this intertwined structure may assist career counsellors to strengthen individuals' beliefs in their coping-efficacy, to develop adequate coping strategies and therewith stabilize their career choices (Lent, Brown, Schmidt, Brenner, Lyons, & Treistman, 2003).

CONCLUSION

Second, we have included the variable ‘career aspirations’. This variable addressed the career-related outcome expectations and wishes unfettered by reality. The theoretical background of this variable is that such career-related outcome expectations are the heart of our career-related actions and guide our behavior. One of our findings indicates that women in Indian ICT-industry are not driven by career aspirations that are via definition ‘unfettered by reality’, but rather define outcome expectations that are within the parameters of the ICT-industry and are affected by the realistic circumstances. Though, career aspirations have theoretical relevance, we decided to refer to concrete outcome expectations in the following articles such as high income, to have enough leisure time, etc. rather than asking for career-related dreams and hopes. This insight as well as our results in article 4 let us come to the conclusion that people in the ICT-industry are rather pragmatic and realistic than guided by dreams and visions.

Moreover, we find in this article that one of the main reasons for females to join the Indian ICT-industry can be traced back to a combination of a positive image of the industry, personal interest and financial incentives. We reveal that the Indian ICT-industry is perceived as a very prestigious industry that offers white-collar jobs for its employees. People working in the ICT-industry are perceived as intelligent, well-educated and promising in terms of their career-progress. This perception may drive comparably more women to the industry. It depicts one of the main differences between the perception of the Indian ICT-industry and ICT-industries in other countries. People in ICT-industries of other countries are often perceived as “nerds” and socially challenged (Jepson & Perl, 2002; Jungwirth & Roy, 2015; Köver, 2011). Moreover, females mention “being called a nerd” as one of the main reasons for giving up their plans in ICT (Joshi & Kuhn, 2001; Thomas & Allen, 2006). We have shown that the Indian ICT-industry has successfully overcome this obstacle by creating an attractive image that people like to associate with and therewith attracted an increased number of females to the industry. This may be a starting point for further research and practitioners to analyze the influence of the perceived image on the career choice of females regarding the ICT-industry and to derive implications in order to actively create a more attractive image of people working in the ICT-industry.

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In the third article *“Interest beats image – At least in the long-run: An analysis of core components of career choices that influence the short- and long-term persistence of students in computing disciplines”* we focus on the *stability of choices* rather than on the career choice itself. Moreover, we elaborate on some aspects that we have identified as important in study 2 and apply them to the topic of persistence. For example, we elaborate on the variable ‘personal interest’ regarding ICT-related matters. We develop a new scale for this concept which includes other reasons for joining the ICT-field (e.g., image of the job field) and name it ‘expanded interests’. We conclude that the positive effect of perceived image is limited to a short-term perspective. In this regard, we also depict that this positive effect is significantly stronger for females than for males. Hence, the creation of a positive image of the industry and the people working in the industry may generally help to encourage more females to opt for the ICT-industry in a first step. Considering a long-term perspective we find the ‘personal interest’ to play a major role as women who assessed higher values of personal interests also indicated longer persistence in the industry. Hence, in order to attract, but also retain women in the ICT-industry, it is necessary to offer opportunities for skill enhancement and encouraging the development of interest in ICT-related matters. Practitioners are advised to begin with the encouragement in early stages at school- and college-level in order to ensure a deep rooted development of interest.

Also, we include the notion of career salience into our considerations. Our results reveal that career salience has a significant positive impact on the persistence of students. While career salience has originally been considered in order to explain differences in career attainment among females and males, we cannot find gender differences in our sample. We suggest that members of generation Y are regardless of gender very passionate about their career as they view it as means of expressing themselves and may define themselves through career attainment. Moreover, in line with research work by Dries, Pepermans and De Kerpel (2008) one could assume that their willingness to make career-related sacrifices and investments (e.g., building up specific knowledge, etc.) is an expression of their quest for vocational security and stability. It can be understood as an attempt to keep themselves employable and to enhance career advancement. However, it will be interesting for future research to elaborate on the value that a career has for members of the generation Y in order to derive appropriate implications and

adjust organizational actions. For example, if aspects such as security, stability and self-fulfillment are fundamental attributes regarding the career of generation Y individuals, it will be necessary to address them in recruitings, e.g., by considering them in regard to contract durations as short-term contracts may create a source of vocational insecurity. Also, possibilities of skill enhancement and career attainment will need to be made more transparent. Moreover, it will be fruitful to compare our results with members of other generations (e.g., generation x or generation baby boomers) in order to reveal whether the value of a career has changed along generations and gender and which drivers have influenced that change. Insights into drivers that led to such changes may also be important to consider when addressing members of future generations such as individuals of generation z. As they are also called the digital natives the assumption would be that they have a closer relationship to ICT-related matters and careers in that field are perceived as more natural for them compared to other generations. In order to secure members of this generation for the ICT-industry it will be important to know which factors affect their career salience and whether there are gender-specific differences.

In article 4 “*The mixture makes the difference – A motivation-based taxonomy of ICT-students*” we make an attempt to classify people who are attracted to the ICT-industry, namely ICT-students, based on their motivation structure. This is to understand which characteristics attract people to the ICT-industry, to derive adequate implications and to set correct incentives. Therefore, we develop a motivation-based taxonomy consisting of three significantly different motivation profiles that are attracted to the ICT-industry. We coin these three motivation profiles striver, geek and opportunist, highlighting their most dominant characteristics. Moreover, we show that the striver, which is characterized by highest values of intrinsic and extrinsic motivation elements, displays the highest probability of entering the ICT-industry. We state that this is a good news for the industry as the striver is on the one hand, highly motivated to constantly develop new skills; on the other hand, the striver can be attracted and motivated by external set screws that ICT-companies are able to regulate such as compensation packages, career prospects, etc.

We advance research by offering an easy to remember classification of people that are attracted to the ICT-industry. We suggest that in order to utilize their abilities in

the most effective way, it is necessary to understand the career-related ambitions of the motivation profiles and to set fitted incentives and measures. Moreover, we give an insight into what kind of incentives need to be given in order to attract the ‘right’ people to the industry and to increase their probability of entering the ICT-industry.

To come to an overall conclusion, this thesis contributes to the understanding of career choices of individuals regarding the ICT-industry, especially that of women, and the motivation structure of people entering the ICT-industry. It contributes to career theory by introducing a theoretical model that deals with the career choice of individuals in the ICT-industry and portrays its gender-specific differences. It especially contributes to SCCT by including career salience into the theoretical considerations and proves its relevance regarding the career choice in article 2 and 3 where its significant impacts are revealed. It also shows that certain core components of SCCT need to be differentiated when analyzing different spans of life, such as the distinction between social and family-related context factors (see article 3). Moreover, the thesis advances research by deriving a typology based on the motivation structure of people that enter the ICT-industry (see article 4). It gives an insight into which set screws need to be turned in order to attract people to the ICT-industry that create an asset for the ICT-companies. Overall, in this thesis we view the core components of SCCT in different settings and from various methodological angles, and adjust them to the ICT-industry. We derive implications for policy-makers and practitioners and identify set screws for encountering the shortage of skills in the ICT-industry by attracting an increased number of people to the industry and for addressing the under-representation of females in the ICT-industry. With this, we build the bridge to our starting point by arguing that general assumptions and explanations cannot be applied to the ICT-industry one to one, but the specific characteristics of the ICT-industry have to be taken into account. I am convinced that this thesis has given deep insight into the career choices of individuals regarding the ICT-industry, especially that of women, and the motivation structure of people entering the ICT-industry. At the same time it offers numerous connecting points for further research to build on.

REFERENCES

- Dries, N., Pepermans, R., & De Kerpel, E. 2008. Exploring four generations' beliefs about career: Is "satisfied" the new "successful"? *Journal of Managerial Psychology*, 23(8): 907-928.
- Jepson, A., & Perl, T. 2002. Priming the Pipeline. *SIGCSE Bulletin*, 34(2): 36-39.
- Joshi, K., & Kuhn, K. 2001. Gender differences in IS career choice: Examine the role of attitudes and social norms in selecting IS profession. *ACM Special Interest Group on Computer Personnel Research*, 121-124.
- Jungwirth, C., Roy, N. 2015. Ein gut bezahlter Job interessiert mich schon, aber langweilen will ich mich nicht! - Eine Analyse der Neigung deutscher Studentinnen und Studenten einen IT-Beruf zu ergreifen [I am interested in a well-paid job but I do not want to bore myself! - An analysis of female and male students' tendency of choosing an IT-job]. In: *Diversität, Diversifizierung, (Ent)Solidarisierung in der Organisationsforschung: eine Standortbestimmung im deutschen Sprachraum*, Eds. Hanappi-Egger, Edeltraud; Bendl, Regine, 171-188. Wiesbaden: Springer.
- Köver, C. 2011. Ihr coolen Streber! Zeit Campus 04/2011. <http://www.zeit.de/campus/2011/04/nerds> [Last retrieved 08.10.2014].
- Lent, R. W., Brown, S. D., & Hackett, G. 1994. Toward a unifying social cognitive theory of career and academic interest, choice and performance. *Journal of Vocational Behavior*, 45(1): 79-122.
- Lent, R. W., Brown, S. D., & Hackett, G. 2000. Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology*, 47(1): 36-49.
- Lent, R. W., Brown, S. D., Brenner, B., Chopra, S. B., Davis, T., Talleyrand, R., & Suthakaran, V. 2001. The role of contextual supports and barriers in the choice of math/science educational options: A test of social cognitive hypotheses. *Journal of Counseling Psychology*, 48(4): 474-483.
- Lent, R. W., Brown, S. D., Schmidt, J., Brenner, B., Lyons, H., & Treistman, D. 2003. Relation of contextual supports and barriers to choice behavior in engineering majors: Test of alternative social cognitive models. *Journal of Counseling Psychology*, 50(4): 458.
- McWhirter, E. H. 1997. Perceived barriers to education and career: Ethnic and gender differences. *Journal of Vocational Behavior*, 50(1): 124-140.
- Swanson, J. L., Daniels, K. K., & Tokar, D. M. 1996. Measuring perceptions of career-related barriers: The Career Barriers Inventory. *Journal of Career Assessment*, 4(2): 219-244.
- Thomas, T., & Allen, A. 2006. Gender Differences in Students' Perceptions of Information Technology as a Career. *Journal of Information Technology Education: Research*, 5(1): 165-178.

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Thompson, M. N. 2013. Career barriers and coping efficacy among Native American students. *Journal of Career Assessment*, 21(2): 311-325.

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Appendix 1: Guideline for interviewing Indian students, professors and practitioners

Guideline for interviewing students, professors and practitioners related to the Indian ICT-industry

A joint research project of:

Prof. Dr. Carola Jungwirth and Dipl. Kffr. Nobina Roy



Introduction

With this interview we want to get an insight into the Indian ICT-industry. We are asking ourselves: Why are so many women entering the ICT- industry, and why are they not staying? What are the reasons for the dropouts? Maybe you could give insights into that from your perspective. What do you think about it? What kind of goals do women have, who enter the ICT- industry? What do they expect from the industry? This is kind of a free flow interview about your thoughts and observations and we will anonymize the data.

1. **Could you please give a short introduction about yourself: How old are you? What is your field of specialization?, etc.**

2. **Which goals do/ did you pursue by entering the ICT-industry?**
 - Do you think there are differences between men and women in their pursued goals regarding the ICT-industry?
 - Do you personally know someone in the ICT-industry? Can you shortly describe his/ her career path?
 - Would you say his/ her career path represents a common career path in the ICT-industry?

3. **Can you think of drivers to join the ICT-industry?**
 [What about:
 - a) image of the industry/ brand names/ career esteem/ prestige
 - b) genuine (academic) interest in the field
 - c) high income
 - d) pressure by parents/ family
 - e) role model
 - f) good career prospective
 - g) safety issues
 - h) lack of alternatives
 - i) job security/ stability
 - j) former experiences in the field
 - k) anything else]
 - Do you think there are differences between men and women regarding their drivers to join the ICT-industry?
 - Would you agree that people (and especially women) join the ICT-industry because of its positive image and high expected income?
 - Do you think it's always the students' free choice to opt for the ICT-field?

4. **Do you think women value their career similarly high in comparison to men?**
 [What about:
 - a) willingness to make career-related sacrifices
 - b) willingness to move to another city for their career advancement
 - c) willingness to postpone family plans for career advancement
 - d) anything else]
 - To sum up your answers, would you agree that women are less/ more career-oriented than men and that traditional gender-roles hold/ do not hold for women in the ICT-industry?

5. **Do you think that if a woman enters an ICT-company, she would be more loyal to the company than a man? [phenomenon of job hopping]**
 - In previous studies and also from reports by NASSCOM we learned that women in ICT-industry tend to leave the field after a few years of working. I would like to talk with you about reasons for leaving the industry.

6. **Could you think of reasons and explanations for high drop-out rates of females in the ICT-industry?**
 - Do you think that sometimes the ICT-industry does not turn out to be what it was expected to be in terms of the image, job prospective, working culture, etc.?
 - Looking at the other side of the story, sometimes women also return to the industry: What could be reasons to return to the industry?

7. **According to your experiences and observations, do women and men have same or similar science-related skills and aptitudes?**

8. **Do you think that there are gender-specific barriers that especially women have to face when they enter the ICT-industry (or re-enter after a career break)?**

[What about:

 - a) certain expectations of society regarding gender-roles/ subtle discouragement by society and employers
 - b) lack of work-family balance
 - c) glass ceiling effect
 - d) old boys' network
 - e) anything else]

9. **Do you think there are ICT-specific barriers which are typical for the ICT-industry?**

[What about:

 - a) short life cycles of technologies
 - b) obsolescence of knowledge
 - c) a lot of project work
 - d) amount of work/ work pressure
 - e) offshoring/ time adjustment with foreign customers
 - f) high affordance of flexibility and mobility frequent travelling
 - g) anything else]

10. **Do you know someone who has experienced such barriers?**
 - In the last few questions we have talked about barriers in the ICT-industry. I also would like to talk to you about the other side: support systems.

11. **What kind of social support systems for women in ICT-industry could you think of? [e.g., parental support]**

12. **Do you know of women-friendly measures that companies offer?**

[What about:

 - a) flexible working hours/ reduced working hours
 - b) mentoring programs
 - c) reintegration programs after a career-break
 - d) extended maternity leave
 - e) bus shuttle services
 - f) anti-harassment policies
 - g) crèche in the company
 - h) anything else]

- Do you think the government should involve more regarding women-friendliness in ICT-industry?
 - *If yes, what kind of governmental supports are needed?*
 - [What about:*
 - a) passing laws for women quotas*
 - b) support at the educational level*
 - c) passing laws regarding safety-issues of women]*
- What else could be done to support women in ICT-industry?

Auxiliaries

- What is the profile of students who come to this institution? What is their social and academic background?
- What is the general gender-ratio in classes of the computer science and engineering department?
- Are there drop-outs at college-level? If yes, what reasons could you think of?
- How are recruitments and placements done in India?
- What kinds of skills or characteristics are expected in recruitments and placements?
- What are the odds? Do men and women have the same opportunities in recruitments and placement procedures?
- Do students meet the expectations of the companies when they leave this institution? Is there anything that could be changed and adjusted in the schedules or education system?
- Would you agree to the statement that the image of the Indian ICT-industry does not fit with reality in terms of gender-neutrality, women-friendliness and conscious efforts of companies to create equal opportunities for females and males?
- What is the role of the Nasscom in Indian ICT-industry? (If you google it, you will find a lot of reports from the Nasscom, stating how great the ICT-industry is, and creating a very positive image. Is that true?)
- Is gender-sensitivity a hot topic in Indian ICT-industry? (Is it something that companies are especially concerned with?)
- Is there a difference in salary for male and female employees in ICT-industry?
- Would you say that it is some kind of self-imposed pressure when women drop out for reasons like being a good mother or housewives, etc. or is the pressure imposed by the societal environment?
- Would you agree to the statement that Indian ICT-industry has changed from being an industry of followers to an industry of innovators?

Appendix 2: Questionnaire for surveying Indian students

**Analyzing determinants of the career decision-making process of Indian students
- An Empirical Study -**

A joint research project of:

Prof. Dr. Carola Jungwirth and Dipl. Kffr. Nobina Roy



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We kindly ask you for about 20 minutes of your time.

Goal of this study is to analyze gender-specific differences in the career decision-making of students in India. This analysis is expected to derive best-practices for governmental policy-makers, educational institutions and human resource management. We offer you a report of the central results after completion. We will extend our gratitude to the institution and the participants of this study in our publications. We also will cite faculty publications in our literature references, if possible.

In advance of this questionnaire:

- Participation is voluntary
- You are chosen as a key informant of the university you are matriculated in.
- We would like to emphasize that any information provided by you will be treated strictly confidential and will be analyzed anonymously. Results will be aggregated, so that no one will be able to determine your identity based on the answers provided.
- It is important that you answer all questions, even if you are not completely sure. An approximate answer is of more value than an incomplete questionnaire.
- There are no “true” or “false” answers, we only ask you for your opinion.
- There might be similar questions due to methodological reasons.
- If you have any questions concerning the questionnaire or regarding our research project, please do not hesitate to contact us.

Thank you very much for your participation!

APPENDIX

Please cross the relevant boxes.

Part A: In this part we will ask you some general questions.

1. Gender

Female Male

2. Studies

2a. Currently you are studying

Arts Commerce Sciences Other: _____

2b. Please mention the subject in the field of your studies _____

2c. What is your specialized branch? _____

2d. In which year of your course are you currently studying? _____ year

2e. Which of the following degree will you get on completion of this course?

Diploma Bachelor's Degree Master's Degree Other: _____

2f. What is your favourite subject? _____

3. Change of studies

3a. Have you changed/ are you planning to change your field of studies?

Yes, I am planning to change Yes, I have changed No (*Skip to question 4.*)

3b. In which stage have you changed/ will you change? After completion of

1st year 2nd year 3rd year 4th year

3c. From which field of study have you changed/ to which field of study will you change?

Arts Commerce Sciences Other: _____

3d. Please mention the subject _____

4. To what extent did the following factors influence your choice of studies?

	1 None	2 Very low	3 Low	4 High	5 Very high
Previous experience in the field (e.g., internship, work etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Role model in the family or friends circle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interest in the subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good school marks in the subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High job prospectives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Career esteem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Study-related family business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any other reason _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Approximate gender ratio (in %) in your class (male:female)

90:10 (male:female) 80:20 70:30 60:40 50:50
 40:60 30:70 20:80 10:90 (male:female)

6. Work experience

6a. Have you gained work experience in the field of your study? (*Multiple answers possible.*)

No (*Skip to question 7.*) Internship Trainee Part-time job
 Full-time job Other: _____

6b. Duration of work experience

< 3 months 3-6 months 7-12 months 13-24 months 25-36 months >36 months

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6c. Work experience was (*Multiple answers possible.*)

- Compulsory part of course Voluntary

7. Change of specialized branch of studies

7a. Your specialized branch of studies

- Will not change (*Skip to question 8.*) Will change May change
 Has changed

7b. Please specify the change: From (branch of studies) _____ To (branch of studies) _____

7c. In which year have you changed/ will you change? After completion of

- 1st year 2nd year 3rd year 4th year

7d. Change is due to the following reasons (*Multiple answers possible.*)

- Education (faculty, facilities, etc.) is better
 Not expected performance
 No satisfaction
 Wrong decision
 Not sure of making a career in the field of specialization
 No long-term future prospective
 Better job opportunities
 Family reasons
 More economic gains
 Change of interests
 Other: _____

8. Which final educational qualification are you planning to achieve?

- Diploma Bachelor's Degree Master's Degree PhD
 Other: _____

9. To what extent is financial aspect decisive for your future education plans? (e.g., college fees, books, hostel, etc.)

- not at all negligible to some extent major
 decisive

10. Performance

10a. What was your approximate grade point average last term? _____

10b. What was your best grade/ marks in any science subject last term?

Grade: _____ Subject: _____

10c. What was your best grade/ marks in any non-science subject last term?

Grade: _____ Subject: _____

11. Self-assessment

11a. Would you consider yourself as student.

- ...best ...very good ...above average ...average
 ...below average

11b. Where would you place your performance in the class? Among the

- First 10% Second 10% Third 10% Fourth 10%
 Fifth 10%

11c. What percentage of marks would you consider appropriate for your efforts? _____

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11d. How would you evaluate your aptitude for

	1 Very low	2 Low	3 Average	4 High	5 Very high
--	---------------	----------	--------------	-----------	----------------

- | | | | | | |
|---------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Languages skills | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Technical skills | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

11e. How confident are you that you will complete your higher education successfully?
 100% 99-75% 74-50% 49-25% 24-1% 0%

11f. How likely is it for you to find an employment in your vocational qualification?
 100% 99-75% 74-50% 49-25% 24-1% 0%

12. To what extent should your aspired job be related to the following factors?

	1 Very low	2	3	4	5 Very high
Social commitment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Self-realization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Job security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Job satisfaction (at the cost of job security)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bureaucratic work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applied technical know-how	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applied theoretical knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Future plans

13a. How likely is that you will be a professional in your field in 5 years?

1 Very unlikely	2	3	4	5 Very likely
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13b. To what extent are you sure that you will enter a profession which is

a) Within your field of studies?
 100% 99-75% 74-50% 49-25% 24-1% 0%

b) Directly connected to your specialized branch?
 100% 99-75% 74-50% 49-25% 24-1% 0%

13c. How long do you feel committed to remain employed in your specialized branch?

1-5 years 6-10 years 11-15 years 16-20 years >20

13d. How long do you feel committed to remain in your specialized branch before you may decide for a change?

1-5 years 6-10 years 11-15 years 16-20 years >20

13e. What is your personal minimum commitment towards your first job in your specialized branch?

< 2 years 2-4 years 5-7 years 8-10 >10

13f. To what extent is each of the following factors decisive for a potential change of job to another branch of specialization?

	1 Very low	2	3	4	5 Very high
Work atmosphere	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Financial aspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of knowledge gain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of team spirit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of recognition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Less promotion chances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of freedom of decision-making	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any other reason _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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13g. When do you perceive to have realized your ultimate expectation from your career? At the age of
 <35 years 36-40 years 41-50 years 51-60 years >60 years

14. How important are the following factors to you?

	1 Very unimportant	2	3	4	5 Very important
Achievement of desired job	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To work self-reliant in your job	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Career promotion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High income	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Career esteem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family and leisure time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part B: We would also like to ask you about your career plans.

To what extent do you agree or disagree with each of the following statements:

	1 Strongly disagree	2	3 Neither agree nor disagree	4	5 Strongly agree
1 I hope to become a leader in my career field.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 I would be satisfied just doing my job that I am interested in.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 I plan to become an expert in my field of choice.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 I intend to pursue the job of my choice even if it cuts deeply into my family time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 It is more important to have some leisure time after work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 To me, a job should be viewed primarily as a way of making good money.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 It is difficult to find satisfaction in life unless you enjoy your job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Work is one of those necessary evils.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 Deciding on a career is just about the most important decision of a young person.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 I don't think too much about what type of job I'll be in ten years from now on.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 I would move to another <i>part of my</i> country if it would help advance my career	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 I'm ready to make many sacrifices to get ahead in my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 I look at a career as a means of expressing myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 I would consider myself extremely "career minded."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 I started thinking about jobs and careers when I was young.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 Planning for and succeeding in a career is my primary concern.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 I often find myself thinking about whether I enjoy my chosen field.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 Planning for a specific career usually is not worth the effort; it doesn't matter too much what you do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 I would move to another country if I thought it would help advance my career.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Part C: In this section we will ask you about some career-related barriers.

A "barrier" is a factor that interferes with your career choice, progress in your job or career plans. Please think about each of the common barriers listed below in terms of your own case. Then, for each, please indicate:

- a) How likely you think it is that you may experience each of these barriers, and:
 b) How much each barrier would hinder or interfere with your career choice?

	How likely do you think it is that you may experience these career-related barriers?					Provided you experienced these barriers to what extent would each one of them hinder your career choice?				
	1 Very unlikely	2	3 Neither likely nor unlikely	4	5 Very likely	1 Very unlikely	2	3 Neither likely nor unlikely	4	5 Very likely
1 Lacking information about possible jobs/ careers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Being undecided about what job/ career I would like.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Being limited to certain career choices because of my ethnicity/ race.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Other people's beliefs that certain careers are not appropriate for women/ men.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Fields which are non-traditional for my sex.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Being discriminated by future employer due to my marital status.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Lacking the necessary practical experience for a job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Not wanting to move away from my friends and family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 Lack of job opportunities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Not knowing the "right people" to get a job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 Racial discrimination in recruitment for a job/ promotion in a job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 Sex discrimination in recruitment for a job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 Lacking the required skills to perform my job well.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 Being dissatisfied with my job/ career.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 Not receiving support from my co-workers/ supervisors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 Fear of being considered unattractive to the opposite sex because of my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 Difficulty in dealing with intrigues at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 Sex discrimination in promotions in job/ career.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 Sexual harassment on the job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 Lack of respect from co-workers/ supervisor because of my gender.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 Just fulfilling the quota of my gender in my vocational field.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22 Just fulfilling the quota of my ethnicity in my vocational field.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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23 Having children.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24 Not feeling supported by my family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25 Conflict between my marriage/ family plans and my career plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26 Not being able to find good day-care services for my children.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27 Feeling guilty about working while my children are young.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28 Having an inflexible work schedule that interferes with my family responsibilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29 Necessity of travelling a lot.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30 Employment at remote locations without infrastructure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please note down any other barriers that would interfere with your career choice:

Part D: Now, we are interested in your opinion about career-related support systems.

Please think about each of the common support systems listed below in terms of your own case. Then, for each, please indicate:

- a) How likely you think it is that you may experience each one of them, and:
- b) How much each support system would encourage or support your choice?

	How likely do you think it is that you may experience each one of these career-related supports?					Provided you experienced these supports to what extent would each one of the support system encourage your career choice?				
	1 Very unlikely	2	3 Neither likely nor unlikely	4	5 Very likely	1 Very unlikely	2	3 Neither likely nor unlikely	4	5 Very likely
1 Encouragement by parents to opt for the aspired vocation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Encouragement by friends and other significant people (e.g., teachers).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Having a role model or mentor related to the aspired vocation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Provision of career-related apprenticeships on the university campus.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Having the possibility to study my subject at a pure women's/ men's college.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Provision of academic or career counselling.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Employment possibilities for my partner in case of my transfer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 At least one person of the same sex in the recruitment committee.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 Provision of security-guards at the work place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Opportunity of flexible working hours.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 Implemented sexual harassment policies and complain centres.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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12 Organizational provision of networking groups or gender-specific communities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 Home working possibilities e.g., with the help of personal laptops, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 Gender sensitisation programs for the opposite sex.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 Possibility of upgrading my career-related skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 Private transport facilities, if I have to work at odd hours.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 Financial increments instead of promotions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 Child care centre in the company.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 Reintegration program after returning from a career break (e.g., parental leave).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 Day-care for older people and dependents.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 Provision of a women's representative in the organization/worker's union.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22 Possibility for partners to work in the same company.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please note down any other supports that would encourage your career choice:

Part E: In this section we would like to ask you about your life at the institution.

We are also interested to know to what extent you agree or disagree with each of the following statements:

	1 Strongly Disagree	2	3 Neither agree nor disagree	4	5 Strongly agree
1 My interpersonal relationships with other students have had a positive influence on my personal/intellectual growth and values.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 It has been difficult for me to meet and make friends with other students who have the same values like me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Few of the students I know would be willing to listen to me and help me if I had a personal problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 My non-classroom interactions with faculty staff have had a positive influence on my personal and intellectual growth and values.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 My non-classroom interactions with faculty staff have had a positive influence on my career goals and aspirations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 I am satisfied with the opportunities to meet and interact informally with faculty members.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Some faculty members are willing to spend private time to discuss issues of interest and importance to students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Most of the faculty I have had contact with are interested in helping students to grow in more than just academic areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 I am satisfied with the extent of my intellectual development since enrolling in this university.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 My interest in ideas and intellectual matters has increased since coming to this university.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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- | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 11 It is important for me to graduate from college. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12 I am confident that I made the right decision in choosing to attend this university. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13 Getting good grades is important to me. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Part F: We are interested to know what you think about the following statements.

- | | 1 | 2 | 3 | 4 | 5 |
|--|--------------------------|--------------------------|----------------------------------|--------------------------|--------------------------|
| | Strongly
Disagree | | Neither
agree nor
disagree | | Strongly
agree |
| 1 People in higher positions should make most decisions without consulting people in lower positions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 People in higher positions should not ask the opinions of people in lower positions too frequently. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 People in higher positions should avoid social interact with people in lower positions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 People in lower positions should not disagree with decisions by people in higher positions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 People in higher positions should not delegate important tasks to people in lower positions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 It is important to have instructions spelled out in detail so that I always know what I am expected to do. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 It is important to closely follow instructions and procedures. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 Rules and regulations are important because they inform me of what is expected of me. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9 Standardized work procedures are helpful. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10 Instructions for operations are important. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11 Individuals should sacrifice self-interest for the group. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12 Individuals should stick with the group even through difficulties. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13 Group welfare is more important than individual rewards. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14 Group success is more important than individual success. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15 Individuals should only pursue their goals after considering the welfare of the group. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16 Group loyalty should be encouraged even if individual goals suffer. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17 It is more important for men to have a professional career than it is for women. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18 Men usually solve problems with analytical analysis; women usually solve problems with intuition. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19 Solving difficult problems usually requires an active, forcible approach, which is typical of men. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20 There are some jobs that a man can always do better than a woman. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21 Careful management of money is important to me. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 22 Going on resolutely in spite of opposition is important to me. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23 Long-term planning is important to me. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24 Giving up today's fun for success in the future is important to me. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25 Working hard for success in the future is important to me. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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Part G: At last, please provide us with some demographical information about yourself. (We would like to emphasize that any of your information will be treated strictly confidential and analyzed anonymously.)

Please answer the following questions to the best of your ability.

1. Demographics

1a. Nationality _____

1b. Ethnical background (State you belong to) _____

1c. Age _____

1d. Current marital status

Married In a relationship Single No answer

1e. Do you have children or are you planning to have children after marriage?

Yes, I have children. No, I don't intend to have children.
 No, I intend to have children. Don't know if I want to have children.

1f. After being a parent: (*Multiple answers possible.*)

You will probably not change your current career plan.
 You will make some work place adjustments (part-time, flexible work hours, home office, no shift work, etc.).
 You will quit the job and may return to the same profession after few years.
 You will probably quit the work for the sake of your family.

1g. Have you studied abroad?

Yes No

2. Economical Issues

2a. Your education (*Multiple answers possible.*)

Is free of cost Involves education fee Involves other expenses (e.g., hostel)

2b. Your approximate annual education expenses (gross) are

< 12,000 Rs. 12,000 - 15,999 Rs. 16,000 - 20,999 Rs.
 21,000 - 25,999 Rs. 26,000 - 30,999 Rs. > 30,999 Rs.

2c. How are you financing your education?

Self-employment Parents Employment Savings
 Scholarship Bank loan Public sponsors Other: _____

3. What is your expected monthly salary (gross) on picking up an employment in your educational field?

<10,000 Rs. 10,000 - 24,999 Rs. 25,000 - 49,999 Rs.
 50,000 - 64,999 Rs. 75,000 - 99,999 Rs. 100,000 - 124,999 Rs.
 125,000 - 150,000 Rs. > 150,000 Rs.

4. What is your aspired profession?

Teaching Research & Development Consultancy
 Entrepreneurship Service-sector Public sector
 Private sector Other: _____

5. Your future income will primarily support (*Multiple answers possible.*)

Parents/ family Spouse and children Own needs

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6. Parents: Educational & Employment status

Mention the profession of...	Highest achieved education level		Employment status during most of your childhood			
	Father		Mother	Father		Mother
-Father:	<input type="checkbox"/>	Never been to school	<input type="checkbox"/>	<input type="checkbox"/>	Unemployed	<input type="checkbox"/>
	<input type="checkbox"/>	Class 1-9	<input type="checkbox"/>	<input type="checkbox"/>	Temporary Employment	<input type="checkbox"/>
-Mother:	<input type="checkbox"/>	High school	<input type="checkbox"/>	<input type="checkbox"/>	Part-time	<input type="checkbox"/>
	<input type="checkbox"/>	Vocational training	<input type="checkbox"/>	<input type="checkbox"/>	Full-time	<input type="checkbox"/>
	<input type="checkbox"/>	College	<input type="checkbox"/>	<input type="checkbox"/>	Self-employment	<input type="checkbox"/>
	<input type="checkbox"/>	Higher education (BA, MA)	<input type="checkbox"/>	<input type="checkbox"/>	Honorary worker	<input type="checkbox"/>
				<input type="checkbox"/>	None, he/ she was a homemaker	<input type="checkbox"/>

Your email address (optional): _____

Further comments, if any: _____

Thank you very much for your participation!

Appendix 3: Questionnaire for surveying German students

**Analyse von Determinanten des Karriereentscheidungsprozesses von deutschen Studierenden
- Eine empirische Untersuchung -**

Ein gemeinsames Forschungsprojekt von:

Prof. Dr. Carola Jungwirth and Dipl. Kffr. Nobina Roy



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Wir bitten Sie um 20 Minuten Ihrer Zeit.

Ziel der Studie ist es, genderbezogene Unterschiede im Karriereentscheidungsverhalten von Studierenden in Deutschland zu analysieren. Diese Untersuchung dient dazu, Best-Practices und Handlungsimplicationen für politische Entscheidungsträger, Bildungsinstitutionen und das Human Resource Management von Unternehmen abzuleiten. Wir bieten Ihnen eine Zusammenfassung unserer zentralen Ergebnisse nach Abschluss der Studie an. Wir werden unseren Dank für Ihre Teilnahme in unseren Publikationen ausdrücken und sofern möglich, Publikationen Ihrer Institution zitieren.

Vorab:

- Die Teilnahme ist freiwillig.
- Sie wurden als adäquate Auskunftsperson für diese Studie ausgewählt.
- Wir möchten hervorheben, dass die bereitgestellten Informationen streng vertraulich und anonymisiert analysiert werden. **Wir arbeiten mit den aggregierten Daten, so dass kein Rückschluss auf Einzelpersonen und –antworten möglich ist.**
- **Es ist wichtig, dass Sie alle Fragen vollständig beantworten**, auch wenn Sie sich nicht ganz sicher sind. Eine tendenzielle Antwort ist für uns von mehr Wert als ein unvollständiger Fragebogen.
- Es gibt keine richtigen oder falschen Antworten. Uns interessiert Ihre persönliche Meinung.
- Aus methodischen Gründen ähneln sich einige Fragen etwas.
- Bitte kontaktieren Sie uns, sollten Sie Fragen bezüglich des Fragebogens oder unseres Forschungsprojekts haben.

Vielen Dank für Ihre Teilnahme!

Bitte kreuzen Sie die für Sie zutreffenden Kästchen an.

Teil A: In diesem Abschnitt stellen wir Ihnen einige allgemeine Fragen.

1. Geschlecht

Weiblich Männlich

2. Studium

2a. Derzeit studieren Sie im Studienbereich

Sozialwissenschaften Geisteswissenschaften
 Naturwissenschaften Ingenieurwissenschaften
 Wirtschaftswissenschaften Andere: _____

2b. Bitte nennen Sie Ihren Studiengang _____

2c. Was ist Ihr Schwerpunkt innerhalb dieses Studiengangs? _____

2d. In welchem Fachsemester studieren Sie derzeit? _____ Fachsemester

2e. Welchen Abschluss erhalten Sie nach Beendigung Ihres derzeitigen Studiums?

Diplom Bachelor Master Doktor Sonstiges: _____

2f. Haben Sie vor zu promovieren? ja nein

2g. Welches ist Ihr Lieblingsfach? _____

3. Wechsel des Studiengangs

3a. Haben Sie bereits bzw. planen Sie Ihren Studiengang zu wechseln?

Ja, ich plane einen Studiengangwechsel Ja, ich habe bereits gewechselt
 Nein (*Weiter mit Frage 4.*)

3b. Wann haben Sie/ werden Sie Ihren Studiengang wechseln? Nach Beendigung des _____ Fachsemesters.

3c. Von welchem Studienbereich haben Sie gewechselt bzw. zu welchem Studienbereich werden Sie wechseln?

Sozialwissenschaften Geisteswissenschaften Naturwissenschaften
 Ingenieurwissenschaften Wirtschaftswissenschaften Andere: _____

3d. Bitte nennen Sie den exakten Studiengang _____

4. Zu welchem Ausmaß haben die folgenden Faktoren Ihre Studienfachwahl beeinflusst?

	1 Gar nicht	2 Sehr niedrig	3 Niedrig	4 Hoch	5 Sehr hoch
Vorangegangene Erfahrungen in dem Berufsfeld (z.B. Praktikum, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vorbild in der Familie oder Freundeskreis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Druck von der Familie	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interesse am Fach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gute Schulnoten in verwandten Schulfächern	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vielversprechende Berufsaussichten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ansehen des Berufs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Studienbereich ist verbunden mit Familienunternehmen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sonstige Faktoren _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Geschätztes Geschlechterverhältnis (in %) in Ihrem Studiengang (männlich:weiblich)

90:10 80:20 70:30 60:40 50:50
 40:60 30:70 20:80 10:90 (männlich:weiblich)

6. Berufserfahrung

6a. Haben Sie bereits Berufserfahrung im Bereich Ihres Studienfachs sammeln können? (*Multiple Antwortmöglichkeiten.*)

- Nein (*Weiter mit Frage 7.*) Praktikum Trainee Teilzeit- bzw. Nebenjob
 Vollzeitjob Andere: _____

6b. Dauer der gesamten Berufserfahrung

- < 3 Monate 3-6 Monate 7-12 Monate 13-24 Monate 25-36 Monate >36 Monate

6c. Die Berufserfahrung war (*Multiple Antwortmöglichkeiten.*)

- Pflichtbestandteil des Studiums Freiwillig

7. Wechsel des Schwerpunkts innerhalb Ihres Studienfachs

7a. Sie werden Ihren Schwerpunkt

- Nicht wechseln (*weiter mit Frage 8.*) Wechseln
 Vielleicht wechseln Sie haben bereits gewechselt

7b. Bitte spezifizieren Sie den Schwerpunktwechsel: Von (Schwerpunkt) _____ Zu _____

7c. In welchem Semester haben Sie bzw. werden Sie wechseln? Nach Beendigung des _____ Fachsemesters

7d. Der Schwerpunktwechsel hat aufgrund der folgenden Faktoren stattgefunden (*Multiple Antwortmöglichkeiten.*)

- Bessere Studienbedingungen (Fachbereich, Fakultäten, Lehre, etc.)
 Nicht-Eintreten des erwarteten Studienerfolgs
 Unzufriedenheit mit dem Studiengang
 Fehlentscheidung
 Unsichere Aufstiegsmöglichkeiten in dem Schwerpunkt
 Keine langfristigen Zukunftsperspektiven
 Bessere Berufsaussichten
 Familiäre Gründe
 Bessere Verdienstmöglichkeiten
 Interessenwechsel
 Sonstige: _____

8. Welchen finalen akademischen Grad streben Sie im Rahmen Ihrer Ausbildung an?

- Diplom Bachelor Master Dr.
 Sonstiges: _____

9. Wie entscheidend ist der finanzielle Aspekt für Ihre zukünftigen Ausbildungspläne? (z.B. Studiengebühren, Miete, etc.)

- Überhaupt nicht Unbedeutend Geringfügig Wichtig
 Entscheidend

10. Performanz

10a. Was war Ihr etwaiger Notendurchschnitt im letzten Semester? _____

10b. Was war Ihre letzte beste Note in irgendeinem naturwissenschaftlichen Fach? (in Oberschule oder Universität)

Note: _____ Fach: _____

10c. Was war Ihre letzte beste Note in irgendeinem nicht-naturwissenschaftlichen Fach? (in Oberschule oder Universität)?

Note: _____ Fach: _____

11. Selbsteinschätzung

11a. Wie würden Sie sich selbst einschätzen? Als

- Besten Studierenden in Ihrem Jahrgang Sehr guten Studierenden
 Überdurchschnittlich guten Studierenden Durchschnittlichen Studierenden
 Unterdurchschnittlichen Studierenden

11b. Wo würden Sie Ihre Leistung in Relation zu Ihrem Jahrgang selbst einordnen? Unter den

- Besten 10% Besten 20% Besten 30% Besten 40%
 Besten 50%

11c. Welchen Notendurchschnitt empfinden Sie als angemessen im Verhältnis zu Ihren Anstrengungen?_

11d. Bitte bewerten Sie Ihre

- | | 1 | 2 | 3 | 4 | 5 |
|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | Sehr
niedrig | Niedrig | Durch-
schnittlich | Hoch | Sehr hoch |
| a) Sprachliche Begabung | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Technische Begabung | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

11e. Wie sicher sind Sie, dass Sie Ihr Studium erfolgreich abschließen?

- 100% 99-75% 74-50% 49-25% 24-1% 0%

11f. Wie sicher sind Sie, dass Sie einen studiumsbezogenen Beruf erlangen?

- 100% 99-75% 74-50% 49-25% 24-1% 0%

12. Wie stark sollte Ihr angestrebter Beruf mit den folgenden Faktoren in Zusammenhang stehen?

- | | 1 | 2 | 3 | 4 | 5 |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | Sehr niedrig | | | | Sehr hoch |
| Soziales Engagement | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Selbstverwirklichung | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Arbeitsplatzsicherheit | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Arbeitszufriedenheit (anstelle von Arbeitssicherheit) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Bürokratische Tätigkeit | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Anwendung von technischem Wissen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Anwendung von theoretischem Wissen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

13. Zukunftspläne

13a. Wie wahrscheinlich ist es, dass Sie in 5 Jahren ein Fachmann Ihres angestrebten Berufsfeldes sind?

- | 1 | 2 | 3 | 4 | 5 |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Sehr unwahrscheinlich | | | | Sehr wahrscheinlich |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

13b. Wie sicher sind Sie, dass Sie einen Beruf ergreifen, der
-im direkten Zusammenhang zu Ihrem Studiengang steht?

- 100% 99-75% 74-50% 49-25% 24-1% 0%

-im direkten Zusammenhang zu Ihrem Studienschwerpunkt steht?

- 100% 99-75% 74-50% 49-25% 24-1% 0%

13c. Wie lange (in Jahren) fühlen Sie sich, gegenüber sich selbst, verpflichtet in Ihrem Studienschwerpunkt zu arbeiten?

- 1-5 Jahre 6-10 Jahre 11-15 Jahre 16-20 Jahre >20 Jahre

13d. Wie lange fühlen Sie sich verpflichtet einen Beruf in Ihrem Studienschwerpunkt auszuüben, bevor Sie über einen Wechsel nachdenken würden?

- 1-5 Jahre 6-10 Jahre 11-15 Jahre 16-20 Jahre >20 Jahre

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13e. Mindestdauer Ihrer Selbstverpflichtung im *ersten* Arbeitsplatz Ihres Studienschwerpunkts zu verbringen:

< 2 Jahre 2-4 Jahre 5-7 Jahre 8-10 Jahre >10 Jahre

13f. Wie entscheidend sind die folgenden Faktoren für einen möglichen Arbeitsplatzwechsel zu einem anderen Schwerpunktbereich?

	1	2	3	4	5
	Sehr niedrig				Sehr hoch
Arbeitsatmosphäre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finanzielle Aspekte	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mangelnde Möglichkeiten zur Wissenserweiterung	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mangelnder Teamgeist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mangelnde Anerkennung	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mangelnde Beförderungsmöglichkeiten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mangelnde Entscheidungsfreiheit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andere Gründe _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13g. Nach Ihrer Vorstellung, wann haben Sie Ihre endgültigen Karriereziele erreicht? Im Alter von

<35 Jahren 36-40 Jahren 41-50 Jahren 51-60 Jahren >60 Jahren

14. Wie wichtig sind Ihnen die folgenden Faktoren?

	1	2	3	4	5
	Sehr unwichtig				Sehr wichtig
Verwirklichung des Berufswunsches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Selbstständige Tätigkeit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beruflicher Aufstieg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hohes Einkommen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Erwerben von Prestige	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Familie und Freizeit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. Image

15a. Wie schätzen Sie das Image des Studiengangs Informatik ein?

1	2	3	4	5
Sehr schlecht				Sehr gut
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15b. Wie schätzen Sie das Image Ihres Studiengangs aus der Sicht von externen Personen ein?

1	2	3	4	5
Sehr schlecht				Sehr gut
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Teil B: Wir möchten Sie auch etwas über Ihre Karrierepläne fragen.

Inwiefern stimmen Sie den folgenden Aussagen zu bzw. nicht zu:

	1	2	3	4	5
	Stimme über- haupt nicht zu		Weder noch		Stimme sehr zu
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Teil C: In diesem Abschnitt stellen wir einige Fragen zu karrierebezogenen Barrieren.

Eine "Barriere" ist ein Faktor, der mit der Karrierewahl, der Karriereentwicklung oder den Karriereplänen kollidiert. Bitte wenden Sie jede aufgelistete Barriere auf Ihren persönlichen Fall an und überlegen Sie sich:

- a) Wie wahrscheinlich ist es, dass Sie jede einzelne dieser Barrieren wahrnehmen?, und:
 b) Wie stark würde die wahrgenommene Barriere mit Ihren Karriereplänen kollidieren bzw. diese behindern?

		a) Wie wahrscheinlich ist es, dass Sie mit den folgenden Barrieren konfrontiert werden?					b) Wie stark würden diese mit Ihren Karriereplänen kollidieren bzw. diese behindern?				
		1	2	3	4	5	1	2	3	4	5
		Sehr unwahrscheinlich		Weder noch		Sehr wahrscheinlich	Nicht sehr stark		Weder noch		Sehr stark
1	Informationsmangel bezüglich möglicher Berufs- und Karriereoptionen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Unentschiedenheit darüber, welchen Beruf ich eigentlich verfolgen möchte.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Beschränkung auf bestimmte Berufszweige aufgrund der ethnischen Herkunft.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Meinung Anderer, dass bestimmte Berufe für mein Geschlecht ungeeignet sind.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Berufsfeld, das ungewöhnlich für Personen meines Geschlechts ist.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Diskriminierung durch zukünftigen Arbeitgeber aufgrund des Ehestandes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Mangel an notwendigen praxisorientierten Berufserfahrungen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Notwendigkeit, von Familie und Freunden wegziehen zu müssen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Mangel an Arbeitsplätzen, im angestrebten Berufsfeld.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Ich kenne nicht die richtigen Leute, um einen Platz in meinem angestrebten Berufsfeld zu erlangen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Diskriminierung beim Recruiting oder Beförderungen aufgrund der ethnischen Herkunft.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Geschlechterdiskriminierung bei Recruitingverfahren.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Mangel an fachspezifischen Fähigkeiten, um Beruf gut ausführen zu können.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Unzufriedenheit in meinem Beruf oder meiner Arbeitsstelle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Mangelnde Unterstützung von Kollegen/-innen und Vorgesetzten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Angestrebter Beruf könnte auf Personen des anderen Geschlechts unattraktiv wirken.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Schwierigkeiten in der Bewältigung von Intrigen am Arbeitsplatz.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Geschlechterdiskriminierung bei Beförderungen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Sexuelle Belästigung am Arbeitsplatz.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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20	Mangelnder Respekt von Mitarbeitern/-innen und Vorgesetzten aufgrund des Geschlechts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Einstellung aufgrund von genderbezogenen Quotenregelungen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Einstellung aufgrund von Quotenregelungen zu ethnischen Minderheiten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Familiengründung / Kinderplanung	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Mangelnde Unterstützung von der Familie.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	Konflikte zwischen Familien- und Karriereplänen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	Schwierigkeiten, gute Kindertagesstätten für meine Kinder zu finden.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27	Schlechtes Gewissen zu arbeiten, solange die Kinder klein sind.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28	Unflexible Arbeitszeiten, die mit familiären Pflichten kollidieren.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29	Notwendigkeit, zu viel reisen zu müssen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30	Anstellung an einem abgelegenen Standort ohne gute Infrastruktur.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Teil D: In diesem Abschnitt möchten wir Sie über karrierebezogene Support Systeme befragen.

Bitte wenden Sie jedes aufgelistete Support System auf Ihren persönlichen Fall an und überlegen Sie sich:

a) Wie wahrscheinlich ist es, dass Sie jedes einzelne dieser Support Systeme wahrnehmen?, und:

b) Wie stark würde das wahrgenommene Support System Ihre Karrierepläne unterstützen und stärken?

		a) Wie wahrscheinlich ist es, dass Ihnen die folgenden Support Systeme zur Verfügung stehen?					b) Wie stark würde das wahrgenommene Support System Ihre Karrierepläne unterstützen und stärken?				
		1	2	3	4	5	1	2	3	4	5
		Sehr unwahrscheinlich		Weder noch		Sehr wahrscheinlich	Nicht sehr stark		Weder noch		Sehr stark
1	Ermütigung der Eltern für die angestrebte Berufswahl.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Ermütigung von Freunden und Bezugspersonen (Lehrer, etc.) für die angestrebte Berufswahl.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Vorhandensein eines Vorbilds oder Mentors im angestrebten Berufsfeld.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Bereitstellung von karriereorientierten Praktikumsplätzen durch die Hochschule.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Möglichkeit das Studienfach an einer reinen unisex Hochschule zu studieren.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Bereitstellung von Berufsberatung und akademischer Beratung an der Hochschule.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Beschäftigungsmöglichkeit für meinen Lebenspartner an demselben Standort im Falle meiner Versetzung.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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8	Mindestens eine Person des gleichen Geschlechts im Recruitingkomitee.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Bereitstellung von Sicherheits- und Wachpersonal am Arbeitsplatz.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Möglichkeit flexibler Arbeitszeiten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Implementiertes Beschwerdemanagement bei sexueller Belästigung.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Vom Unternehmen organisierte Netzwerkgruppen und genderspezifische Communities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Möglichkeit des Home Offices z.B. mithilfe von persönlichen Laptops, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Gendersensibilisierungsprogramme für Mitarbeiter/-innen und Vorgesetzte des anderen Geschlechts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Möglichkeiten das fachspezifische Wissen zu erweitern (z.B. Workshops, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Private Transportmöglichkeiten, bei unregelmäßigen Arbeitszeiten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Gehaltserhöhung anstelle von Beförderungen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Kindergarten im Unternehmen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Eingliederungsmaßnahmen nach Beschäftigungsunterbrechung (z.B. Elternzeit, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Tagesstätten für Senioren und pflegebedürftige Angehörige.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Ernennung einer Frauenbeauftragten im Unternehmen/ Betriebsrat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Gezielte Bemühungen des Unternehmens, Lebenspartner im selben Betrieb zu beschäftigen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bitte notieren Sie weitere Faktoren, die Ihre Karrierepläne behindern oder unterstützen könnten:

Part E: In diesem Abschnitt möchten wir Ihnen einige Fragen über Ihre Zufriedenheit mit Ihrer Hochschule stellen.

	1 Stimme überhaupt nicht zu	2	3 Weiß nicht	4	5 Stimme sehr zu
1 Meine Beziehungen mit anderen Studierenden hatten einen positiven Einfluss auf meine persönliche/ intellektuelle Entwicklung.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Es war schwer Studierende kennenzulernen und Freundschaften mit Personen zu schließen, die dieselben Werte haben wie ich.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Einige der Studierenden, die ich kenne, wären bereit mir zu zuhören und zu helfen, wenn ich ein persönliches Problem hätte.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Interaktionen mit Fakultätsmitarbeitern/-innen, außerhalb des Hörsaals, hatten einen positiven Einfluss auf meine persönliche und intellektuelle Entwicklung.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 5 Meine Interaktionen mit den Fakultätsmitarbeitern/-innen, außerhalb des Hörsaals, hatten einen positiven Einfluss auf meine Karriereziele. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 Ich bin zufrieden mit den Möglichkeiten, die Fakultätsmitarbeiter/-innen auch informell zu treffen und mit ihnen zu interagieren. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 Einige Fakultätsmitarbeiter/-innen sind bereit, private Zeit aufzubringen, um sich mit wichtigen Belangen der Studierenden zu beschäftigen. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 Die meisten Fakultätsmitarbeiter/-innen sind an der außerakademischen Entwicklung der Studierenden interessiert. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9 Ich bin zufrieden mit dem Ausmaß meiner intellektuellen Entwicklung seit der Einschreibung an dieser Hochschule. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10 Mein Ideenreichtum und intellektueller Horizont sind, seitdem ich an dieser Hochschule bin, angestiegen. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11 Ein Hochschulabschluss ist mir wichtig. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12 Ich bin davon überzeugt, dass es die richtige Entscheidung war diese Hochschule zu wählen. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13 Ich habe keine Ahnung, in welchem Fach ich mich spezialisieren möchte. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14 Das Erzielen guter Noten ist mir wichtig. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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Part F: Uns interessiert, was Sie über die untenstehenden Aussagen denken.

	1	2	3	4	5
	Stimme überhaupt nicht zu		Weiß nicht		Stimme sehr zu
1 Vorgesetzte sollten die meisten Entscheidungen ohne Beratung mit ihren unterstellten Mitarbeitern/-innen treffen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Vorgesetzte sollten nicht zu oft nach der Meinung ihrer unterstellten Mitarbeiter/-innen fragen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Vorgesetzte sollten soziale Bindungen mit ihren unterstellten Mitarbeitern/-innen vermeiden.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Unterstellte Mitarbeiter/-innen sollten den Entscheidungen ihrer Vorgesetzten nicht widersprechen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Vorgesetzte sollten wichtige Aufgaben nicht an ihre Mitarbeiter/-innen delegieren.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Es ist wichtig Anweisungen im Detail zu erklären, damit ich immer weiß, was von mir erwartet wird.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Es ist wichtig, sich genau an Anweisungen und Abläufe zu halten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Regeln und Vorschriften sind wichtig, da sie mir Auskunft darüber geben, was von mir erwartet wird.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 Standardisierte Arbeitsabläufe sind hilfreich.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Arbeitsanweisungen sind wichtig.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 Individuelle Interessen sollten gegenüber dem Gruppeninteresse zurückgestellt werden.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 Individuen sollten auch bei Schwierigkeiten immer zur Gruppe halten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 Das Wohl der Gruppe ist wichtiger als Anerkennung für den Einzelnen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 Gruppenerfolg ist immer wichtiger als Individualerfolg.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 Individuen sollten ihre persönlichen Ziele erst unter Berücksichtigung des Gemeinwohls der Gruppe verfolgen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 Gruppenloyalität sollte gefördert werden, auch wenn Individualziele darunter leiden.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 Es ist wichtiger für Männer eine berufliche Karriere zu verfolgen als für Frauen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 Männer lösen Probleme üblicherweise durch analytisches Vorgehen; Frauen lösen Probleme üblicherweise durch Intuition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 Das Lösen von schweren Problemen, erfordert üblicherweise eine aktive und energische Vorgehensweise, die typisch für Männer ist.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 Es gibt einige Tätigkeiten, die ein Mann immer besser ausüben kann als eine Frau.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 Sorgfältiger Umgang mit Geld ist mir wichtig.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22 Entschlossenes Vorgehen trotz Widerständen ist mir wichtig.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23 Langfristige Planung ist mir sehr wichtig.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24 Es ist mir wichtig, für zukünftigen Erfolg heute auf Spaß zu verzichten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25 Hartes Arbeiten für Erfolg in der Zukunft ist mir wichtig.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX

Part G: Zu guter Letzt möchten wir noch einige demografische Informationen abfragen.

(Wir weisen nochmals daraufhin, dass die Informationen streng vertraulich und anonymisiert analysiert werden.)

1. Demografisches

1a. Nationalität _____

1b. Ethnischer Hintergrund _____

1c. Alter _____

1d. Beziehungsstatus

Verheiratet In einer Beziehung Single Keine Angabe

1e. Haben Sie Kinder oder planen Sie irgendwann in der Zukunft Kinder zu haben?

Ja, ich habe Kinder. Nein, ich möchte keine Kinder in der Zukunft.
 Nein, aber ich möchte Kinder in der Zukunft. Ich weiß nicht, ob ich Kinder möchte.

1f. Wenn Sie Kinder haben/ planen: (*Multiple Antwortmöglichkeiten.*)

Werden Sie Ihre ursprüngliche Karriereplanung nicht ändern.
 Werden Sie einige arbeitsbezogene Änderungen vornehmen (z.B. Teilzeitarbeit, flexible Arbeitszeiten, etc.).
 Werden Sie Ihre Karriere unterbrechen und wahrscheinlich nach einigen Jahren zu demselben Job zurückkehren.
 Werden Sie wahrscheinlich für Ihre familiären Verpflichtungen den Beruf aufgeben.

1g. Haben Sie (teilweise) im Ausland studiert?

Ja Nein

2. Wirtschaftliche Aspekte

2a. Ihre Hochschulbildung (*Multiple Antwortmöglichkeiten.*)

ist kostenlos beinhaltet Studiengebühren beinhaltet andere Ausgaben (z.B. Miete, etc.)

2b. Ihre ungefähren jährlichen Studienausgaben (brutto und inkl. Miete, etc.) sind

< 6.000 € 6.000 - 8.999 € 9.000 - 11.999 €
 12.000 - 14.999 € 15.000 - 20.000 € > 20.000 €

2c. Wie finanzieren Sie Ihr Studium?

Selbstständigkeit Eltern Angestelltenverhältnis Ersparnisse
 Privates Stipendium Bankkredit Öffentliches Stipendium Sonstiges:

3. Wie hoch ist Ihr zu erwartendes monatliches Einkommen (brutto) bei einem Direkteinstieg nach Abschluss Ihres Hochschulstudiums.

< 1.999 € 2.000 - 2.499 € 2.500 - 2.999 €
 3.000 - 3.499 € 3.500 - 3.999 € 4.000 - 4.999 €
 4.500 - 4.999 € > 5000 €

4. Was ist Ihr angestrebtes Berufsfeld?

Lehrkörper Forschung und Entwicklung Beratung
 Unternehmertum Dienstleistungssektor Öffentlicher Dienst
 Privater Sektor Sonstiges:

5. Wen werden Sie mit Ihrem zukünftigen Einkommen primär unterstützen? (*Multiple Antwortmöglichkeiten.*)

Eltern/ Familie Partner und Kinder Sie selbst zur Befriedigung der eigenen Bedürfnisse

APPENDIX

6. Eltern: Bildungs- und Beschäftigungsstatus

Bitte nennen Sie den Beruf Ihres/-r ...	Höchster Bildungsgrad Ihres/-r		Überwiegender Beschäftigungsstatus während Ihrer Kindheit			
	Vater	Mutter	Vater	Mutter		
-Vaters:	<input type="checkbox"/>	Kein Abschluss	<input type="checkbox"/>	<input type="checkbox"/>	Gelegenheitsbeschäftigung	<input type="checkbox"/>
	<input type="checkbox"/>	Klasse 1-9	<input type="checkbox"/>	<input type="checkbox"/>	Teilzeit beschäftigt	<input type="checkbox"/>
	<input type="checkbox"/>	Realschulabschluss	<input type="checkbox"/>	<input type="checkbox"/>	Vollzeit beschäftigt	<input type="checkbox"/>
	<input type="checkbox"/>	Fachausbildung	<input type="checkbox"/>	<input type="checkbox"/>	Selbstständig	<input type="checkbox"/>
-Mutter:	<input type="checkbox"/>	Abitur	<input type="checkbox"/>	<input type="checkbox"/>	Ehrenamtlich tätig	<input type="checkbox"/>
	<input type="checkbox"/>	Hochschulabschluss	<input type="checkbox"/>	<input type="checkbox"/>	Keine, er/ sie war ein/-e Hausmann/-frau	<input type="checkbox"/>

Ihre Emailadresse (optional): _____

Kommentare: _____

Vielen Dank für Ihre Teilnahm

APPENDIX
