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Technological self-efficacy and occupational mobility intentions in the face of technological advancement: a moderated mediation model

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ABSTRACT

While research on the effects of technological advancement on job design has gained traction, we know little about how personal and contextual factors relate to work attitudes and mobility intentions in relation to technology-induced change in different occupational domains. Based on social cognitive career theory, we investigated the influence of technological self-efficacy beliefs (TSE) on occupational commitment and occupational mobility intentions and included automation potential and developmental support as contextual moderators. Based on a survey study with 512 employees and two data points, we found that TSE was negatively related to occupational mobility intentions, both directly and through the mediating role of occupational commitment. The relation between occupational commitment and mobility intention was stronger for individuals receiving more developmental support. Contrary to our hypotheses, the relation between TSE and mobility intention was stronger in occupations with low and medium automation potential. Our findings provide first evidence for the relevance of TSE for occupational mobility intentions and the impact of automation potential and perceived developmental support on this relationship. We discuss the relevance of our findings for better understanding potential effects of technological advancement on occupational mobility and provide practical implications for enabling employees to deal with changing work environments.

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Technological self-efficacy; automation potential; developmental support; social cognitive career theory; occupational mobility

Introduction

Technological advancements will dramatically change the world of work in the coming decades (Arntz et al., 2016). Therefore, they are considered highly important factors for shaping the nature of work and individual career development (Hirschi, 2018; Parker & Grote, 2020). In light of destabilized organizational affiliations and more boundaryless careers, occupations are expected to play a key role as stabilizing reference points in contemporary careers (Anteby et al., 2016; Currie et al., 2006; Dierdorff, 2019). Research suggests that technological advancements will not eliminate whole occupations but rather substitute or alter specific tasks (Arntz et al., 2016; Bessen, 2016), resulting in transformed work design within jobs and occupations (Parker & Grote, 2020). However, occupations call for specific skills and knowledge to successfully fulfil work role requirements (Dierdorff et al., 2009) which are acquired in vocational preparation. The specificity of these human capital investments is particularly evident in countries with educational systems that are based on vocational education and training (Eggenberger et al., 2018), like Switzerland or Germany (Fuller & Sigelman, 2017). Yet, as technological change is expected to transform established work design (Parker & Grote, 2020), it will challenge the fit between individuals and their work environments (Van Vianen, 2018a). If for instance someone who works in the field of medical assistance, an occupation that has dramatically changed due to advanced technology taking over manual and cognitive work, is not comfortable with using new

instruments to complete work tasks, it is likely that they will increasingly suffer in their occupation and therefore might consider an occupational change. Hence, if individuals want to stay employable within their occupations, they have to adapt to the altered work requirements (Van Vianen, 2018b).

Whether individuals are capable of coping and adaptively dealing with such changes at work critically depends on their level of self-efficacy (Savickas, 1997). Self-efficacy reflects an individual's belief in their ability to successfully perform a particular behaviour or course of action (Lent & Brown, 2013). Because the perception of competence in performing tasks is specific to the respective occupational context (Rigotti et al., 2008; Schyns & von Collani, 2002), self-efficacy also relates to core constructs of individual career development, like occupational commitment and occupational mobility intentions (Cooper-Hakim & Viswesvaran, 2005; Klassen & Chiu, 2011; Lee et al., 2000). Therefore, the more specific technological self-efficacy (TSE), defined as the belief to successfully perform a new, technologically sophisticated task (McDonald & Siegall, 1992), seems to be a promising personal factor for promoting occupational commitment and averting occupational mobility intentions when dealing with technology-induced change at work. Still, research on possible effects of the technological advancement and transformation of work on occupational mobility is scarce. Previous research found that the anticipated sustainability of one's job in the face

of technological advancement predicts perceived job insecurity (Nam, 2019), which in turn influences job satisfaction and organizational commitment, as well as turnover intentions (Staufenbiel & König, 2010). Yet, how technology-induced change and individuals' attitudes towards such changes influence commitment and mobility intentions at the occupational level, has to the best of our knowledge never been addressed.

Using the social cognitive career theory (SCCT, Lent & Brown, 2013; Lent et al., 1994), as a theoretical framework, the present study introduces TSE as a relevant personal factor that shapes successful career paths in view of technological advancement. In line with the basic assumptions of SCCT, TSE is expected to predict occupational mobility directly and through the mediating role of occupational commitment. More specifically, if individuals believe they have the necessary capabilities to perform technologically sophisticated tasks within their occupations, they are expected to thrive in the altered occupational context, which promotes their occupational commitment, and reduces occupational mobility intentions.

Within SCCT, objective and subjective supports and barriers from the environment (e.g., social, cultural, and economic context) are assumed to influence career development. Because the risk of being replaced by automation is tangible for many workers (Frey & Osborne, 2017), we propose that the automation potential of one's occupation and the support for further development are particularly important contextual factors for career development in light of technological advancement. First, heeding calls to examine more distal contextual factors for career development, we argue that the objective automation potential (AP) of occupations is an important macro-level contextual factor that impacts individual career development. The AP of an occupation reflects the degree to which the core tasks of an occupation can be substituted by technology already available today (Dengler & Matthes, 2018). Thus, if a computer can perform a specific task more efficiently and cheaply than a person, it is likely that the task is automated, and that technology replaces the worker. Second, because technological change also affects the applicability of established skills and knowledge within one's occupation (Hirschi, 2018), individuals need to invest in their further development throughout the whole career (Van der Heijden et al., 2016). Consequently, support for further development is considered an important, more proximal contextual factor for adaptive career self-management (Lent & Brown, 2013). In the present study, we address these two contextual factors by including the AP of occupations, and perceived developmental support by supervisors as key moderators for occupational mobility intentions.

By studying the interplay of personal and contextual factors for individuals' occupational mobility intentions, our study makes two important contributions. First, we introduce technological self-efficacy as a relevant person-specific factor for understanding career development in the face of technological advancement. Second, we show how automation potential and developmental support represent key contextual factors which moderate the relation between self-efficacy beliefs, occupational commitment, and occupational mobility intentions. Thereby, we provide new empirical insights on how technological advancement impacts occupational mobility intentions in contemporary careers.

Adaptive career management in the new world of work

Given the ubiquity of technology-induced change at the workplace (Frank et al., 2019), it will be highly relevant for individuals to proactively manage technology-related career opportunities and challenges (Hirschi, 2018). A prominent theory that addresses how individuals navigate their careers considering challenging career choices, is the SCCT (Lent & Brown, 2013; Lent et al., 2000). SCCT views individuals as reciprocally interacting with their social context and focuses on adaptive career behaviours across the life span, such as decision-making skills or role transitioning. The theory highlights the importance of individual agency for career development and emphasizes the role of self-efficacy for adaptive career behaviour. SCCT proposes that individuals develop interest in occupational fields where they hold high self-efficacy beliefs and expect beneficial outcomes from engaging in the activity or domain (i.e., outcome expectations). It further proposes that self-efficacy beliefs promote adaptive career behaviour both directly and indirectly through individuals' interests and chosen goals. Moreover, self-efficacy is not only linked to adaptive behaviour but also to the self-regulation of affective states (Bandura, 1977), such as work attitudes. And as high self-efficacy enables individuals to proactively shape their environment to their advantage, it is positively related to proactive behaviours, higher job and organizational commitment, and lower turnover intentions (Gruman et al., 2006; McNatt & Judge, 2008; Saks, 1995; Singh et al., 2013).

At the occupational level, self-efficacy beliefs impact how individuals respond to changes within their occupations and whether they remain interested in, and committed to their occupational career paths (e.g., Park & Jung, 2015). Occupational commitment is conceptualized as the "psychological link between a person and his or her occupation" (Lee et al., 2000, p. 800), that consists of the three dimensions affective commitment (i.e., the desire to remain in the occupation), normative commitment (i.e., the obligation to remain in the occupation), and continuance commitment (i.e., perceived costs when leaving the occupation, Meyer et al., 1993a). While past research has for the most part focussed on the affective dimension of occupational commitment (Meyer & Espinoza, 2016), Spurk et al. (2019) have recently argued that macro-events, such as a global economic crisis, may influence all three dimensions of occupational commitment, and future studies should thus include multidimensional measures. Considering the fundamental impact of technology-induced change on work experiences, we frame technological advancement as such a macro-event and, therefore, included all three dimensions in this study.

Following the basic assumptions of SCCT, occupational commitment is considered a highly relevant work attitude that is related to various positive (e.g., job satisfaction) and negative work experiences (e.g., stress) which has repeatedly proven to be a powerful predictor of occupational mobility intentions in previous work (Lee et al., 2000; Spurk et al., 2019; Yousaf et al., 2015). For instance, Klassen and Chiu (2011) found that occupational self-efficacy impacted occupational commitment, which in turn was negatively related to occupational mobility intentions in a sample of teachers. Moreover, occupational

commitment is an important resource for navigating the uncertainty and complexity inherent to contemporary careers (Akkermans et al., 2018; Hall et al., 2018), and is, therefore, considered to be a key variable for understanding individual career development (Cooper-Hakim & Viswesvaran, 2005).

The relevance of self-efficacy beliefs for dealing with technological advancement

Self-efficacy beliefs are malleable and are substantially influenced by changes in task requirements, personal experience, and the availability of specific resources to successfully perform a task (Gist & Mitchell, 1992). Following Bandura's (2018) recommendation to study specific self-efficacy beliefs tailored to the particular requirements of a situation, we examine the role of TSE. Due to the increasing influence of technological advancement on all occupations, we argue that in addition to the more general occupational self-efficacy, that is the belief to successfully fulfil a work-related task (Rigotti et al., 2008), individuals' specific self-efficacy beliefs regarding technology are highly relevant for occupational commitment and occupational mobility intentions. If individuals believe in their capability to successfully deal with technology (i.e., have high TSE), they are more likely to accept and use it (Celik & Yesilyurt, 2013; Venkatesh & Davis, 1996). Thus, high TSE individuals are expected to be more open to, and less frightened by the impact of technological advancement on their occupation, independent of the quality of the change, which may range from support for small tasks, such as having an electronic calendar, to augmenting or replacing human performance with advanced technology, such as leaning algorithms, increasing also task complexity (Parker & Grote, 2020; Walsh & Strano, 2018).

Prior research on TSE is limited to a rather narrow range of specific settings. So far, the influence of TSE has been explored for the use of technology in higher education and online classes (Huffman et al., 2013; Pan, 2020; Warden et al., 2020), and in healthcare (Rahman et al., 2016). Within the more general context of technology-induced change across all occupations, it is likely that technology-related self-efficacy beliefs are essential for understanding how occupational commitment and mobility are affected. Nevertheless, the relevance of TSE for occupational mobility has, to the best of our knowledge, never been addressed.

Based on the theoretical assumptions from SCCT, we argue that if technological advancement changes established occupational tasks in a way that individuals feel they are not willing or able to perform well any longer, they might lose their interest in the altered work environment, reduce their occupational commitment, and, consequently, develop withdrawal intentions. Because self-efficacy beliefs promote adaptive career behaviour both directly and indirectly (Lent & Brown, 2013), we assume that TSE acts as a cognitive person factor which impacts both occupational commitment and occupational mobility intentions. More precisely, as individuals with high TSE are more ready to adapt to technology-induced change, we assume that TSE is negatively related to occupational mobility intentions. Additionally, because self-efficacy affects how committed individuals are towards their goals (Bandura, 2015), we

assume that occupational commitment partly mediates the relation between TSE and occupational mobility intentions.

Hypothesis 1: TSE is negatively related to occupational mobility intentions.

Hypothesis 2: Occupational commitment mediates the relation between TSE and occupational mobility intentions.

Automation potential and developmental support as moderating variables

As outlined above, we propose that the AP of one's occupation, and perceived support for development are especially important factors for career self-management in the face of technological advancement (Hirschi, 2018).

Automation potential (AP). Automation refers to technology taking over human tasks (Raisch & Krakowski, 2021). Depending on the number of tasks which can be substituted by different technologies within a given occupation, the overall work design gets changed, rendering occupations more technologically embedded and requiring humans to interact with technology in different ways, e.g., as supervisory controllers of automated tasks (Sheridan, 1987). The measure for AP by Dengler and Matthes (2015, 2018), that we selected for our study, does not account for augmentation, where human tasks are supported by technology but not replaced (Raisch & Krakowski, 2021). Accordingly, we cannot capture all possible changes that technology might induce in work design, but a very important share of those changes with particularly high impact where tasks are fully reallocated to technology. Our choice of the objective measure of AP developed by Dengler and Matthes (2015, 2018) was also motivated by the fact that employees perceive technology-induced change in different ways and develop specific attitudes towards it (Schneider & Sting, 2020), making them not the best judges of their own risk of being replaced by technology (Brougham & Haar, 2017). The current study draws on the objective AP of occupations (Dengler & Matthes, 2015, 2018) to investigate under which conditions TSE leads to stronger occupational commitment, and lower withdrawal intentions. Because TSE also relates to individuals being more open and accepting towards technology (Celik & Yesilyurt, 2013), we assume that the AP of the occupation strengthens the relationship between TSE, occupational commitment, and occupational mobility intentions. This is because AP should render TSE more relevant for being successful in one's occupation and allows to express TSE more. Accordingly, if the occupational context offers a relevant level of technology-induced change, people with high TSE will thrive in the altered work environment and thus be more committed to their occupation. Consequently, we assume the positive relation between TSE and occupational commitment to be stronger for high AP occupations (Hypothesis 3a). Furthermore, staying in one's occupation is considered adaptive for individuals with high TSE if the occupational context offers many

technology-induced changes in job requirements (high AP occupation). Therefore, we assume that the direct relation between TSE and occupational mobility intentions is stronger for high AP occupations, as presented in Hypothesis 3b. Additionally, we also assume to find the same relationships for low AP occupations but less pronounced than for high AP occupations.

Hypothesis 3a: AP moderates the relation between TSE and occupational commitment, such that the positive relation between TSE and occupational commitment is stronger when AP is high.

Hypothesis 3b: AP moderates the relation between TSE and occupational mobility intention, such that the negative relation is stronger when AP is high.

Developmental support by supervisor. Considering technology-induced change and occupational mobility, updating one's professional skills through formal or informal further education is viewed as a critical career-related behaviour (Hirschi, 2018), and supervisor support for development is crucial for fostering such adaptive behaviour (Lent & Brown, 2013). Work environments that support employees in their career and skill development promote individuals' perceived employability (Wittekind et al., 2010), defined as "an individuals' chance of a job in the internal and/or external labour market" (Forrier & Sels, 2003, p. 106). Moreover, research shows that turnover intentions depend on the level of support for further development (Maertz et al., 2007). Within SCCT, the cognitive person variable of self-efficacy is expected to interact with contextual influences, that "have the capacity to enable or limit agency and to codetermine the outcomes of adaptive behaviours" (Lent & Brown, 2013, p. 562). We propose that the degree to which individuals are supported to promote their professional development is such a critical contextual moderator. More specifically, we assume that developmental support moderates the negative direct relation between occupational commitment and occupational mobility intention.

Hypothesis 4: Developmental support moderates the relation between occupational commitment and occupational mobility intention, such that the negative relation is stronger when developmental support is high.

In combination with the proposed mediation model, we finally propose a partially moderated mediation hypothesis, as presented in Hypothesis 5.

Hypothesis 5: The indirect relation of TSE to occupational mobility intentions through occupational commitment is conditional on the degree of AP and developmental support, in that AP strengthens the direct effect of TSE on occupational commitment (5a), and developmental support strengthens the direct effect of occupational commitment on occupational

mobility intention (5b). See Figure 1 for an overview of the proposed research model.

Method

Participants and procedure

As samples drawn from panel providers have recently been shown to be trustworthy in the field of applied psychology (Walter et al., 2019), we conducted an online survey using the services of a panel provider¹ to investigate the proposed relations. Participants obtained a small compensation for their participation. To increase validity, we included a validity item in the middle of the survey to make sure participants answered the questions carefully and conscientiously (i.e., "please choose not at all true"). Data from a total of 661 Swiss and German employees were collected at two data points in time (T1 and T2) with a time-lag of about four weeks, starting in November 2019. Both Switzerland and Germany are known for their apprenticeship based vocational education and training systems, providing occupation-specific vocational preparation (Fuller & Sigelman, 2017). Consequently, occupational change is considered an extreme process (Meyer et al., 1993b), characterized by occupation-specific human capital loss (Kambourov & Manovskii, 2009).

For the current study, we only included participants who completed both measurement waves, followed the instruction on the validity item, and provided information on their occupational mobility intention in T2 ($N = 512$), yielding a response rate of 77.6%. The final sample did not contain any missing values after excluding invalid responses. Participants had an average age of 46.7 years ($SD = 10.7$), 54.7% identified as female. 89.3% of participants worked 50% or more, most worked full-time (59.4%). The average occupational tenure was 16.4 years ($SD = 11.4$), the average organizational tenure was 10.6 years ($SD = 9.7$). For the assessment of attrition bias, we entered the measures from T1 and the control variables in a logistic regression analysis predicting the probability of being included in the sample (Goodman & Blum, 1996). Older respondents were more likely to belong to the sample ($B = 0.50$, $p < .001$, $OR = 1.05$), as did participants with higher technological self-efficacy ($B = 0.27$, $p = .013$, $OR = 1.31$).

Measures

Predictor and outcome variables

Technological self-efficacy was measured at T1 using the validated four-item scale by Neyer et al. (2012). The five-point Likert scale ranged from 1 = *not at all true* to 5 = *totally true*, a sample item is "It's hard to deal with new technology – I usually just don't know how to do it" (recoded item).

Occupational commitment was measured at T2 with 16 items (Felfe et al., 2014). The scale consists of three subdimensions measuring affective, costs, and normative commitment. Items were rated on a five-point Likert scale (1 = *not at all true* to 5 = *totally true*), a sample item is "I'm proud to work in this occupation".

Occupational mobility intention was measured at T2 with three items by Blau (2000), rated on a four-point Likert scale (1 = *strongly disagree* to 4 = *strongly agree*). A sample item is "I'm currently considering to change my occupation".

Moderators

AP was measured using the online tool developed by Dengler and Matthes (2018).² The tools' AP scores were developed by first defining occupational core tasks through an expert rating, and second, by examining whether existing technology can fully substitute individual tasks based on the assessment by three independent coders. Following this task-based approach, which indicates the potential to substitute occupational tasks by technologies that are already available today, the tool provides AP scores ranging from 0–100% for every occupation in the study context. In the survey, participants selected their occupational field from a drop-down menu (e.g., technical occupations and information sciences, or occupations of the construction industry), and additionally filled in their exact occupational title in an open text box. Unclear responses were discussed within the research team, and as both answers were mandatory in the survey, there were no missing answers. Informed by these two indicators, every participant was matched to an occupation in the tool by Dengler and Matthes (2018), and the respective AP was assigned to the participant. AP is evaluated as low if 30% or fewer of the tasks can be performed by technology, medium if 31–70% can be substituted, and high if more than 70% can be substituted (Dengler & Matthes, 2015; Frey & Osborne, 2013). We used these theoretical thresholds for the categorization of AP in our sample. Within our sample, 41.4% of participants worked in low (e.g., nurse), 43.6% in medium (e.g., office clerk), and 15% in high AP occupations (e.g., cashier), respectively. For the analysis, we used the full scale (0–100%).

Developmental support for development was measured with a three item-scale developed by Greenhaus et al. (1990) at T1. Items were rated on a five-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*), a sample item is "My supervisor supports my efforts to promote my career through training/further education."

Control variables

To identify the incremental validity of technological self-efficacy, we included occupational self-efficacy as a control variable. Occupational self-efficacy was measured at T1 with

a six-item scale (Rigotti et al., 2008). A sample item is "I attain the professional goals that I set for myself", items were rated on a five-point Likert scale (1 = *not true* to 5 = *completely true*). Additionally, because there is a reciprocal relationship between because occupational mobility intentions and organizational turnover intentions (Chang et al., 2007; Woo & Maertz, 2012), we controlled for organizational turnover intention measured at T2, using the three-itemscale by Leiter et al. (2011). Items were rated on a Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Finally, gender and chronological age are known to impact the link between occupational commitment and relevant outcome variables like occupational tenure (Spurk et al., 2019). In our sample, gender was significantly correlated with TSE and developmental support, while age was significantly correlated with developmental support and occupational self-efficacy. Therefore, we included both variables as controls.

Data analysis

All analyses were conducted in SPSS 26. To test for the proposed moderated mediation effects (Hayes, 2018), we used Model 22 of the PROCESS macro for SPSS (Hayes, 2013) and conducted 10'000 bootstrap samples. The advantage of this statistical approach is that all study variables and all hypothesized effects can be tested simultaneously.

Results

Means, standard deviations, correlations, and Cronbach's alpha statistics for all measures are reported in Table 1. TSE was negatively related to occupational commitment, occupational mobility intention, and positively related to developmental support and occupational self-efficacy. The results of the analysis testing the full model, including the direct effects and the conditional direct effects are summarized in Table 2.

As proposed in Hypothesis 1, we found a significant negative direct effect of TSE on occupational mobility intention. Likewise, supporting Hypothesis 2, we found that occupational commitment mediated the relationship between TSE and occupational mobility intentions. The results revealed a significant positive indirect effect of TSE on occupational mobility intention via occupational commitment, $ab = .05$, $SE = .02$, 95% CI [.02, .08].

Table 1. Descriptive statistics and intercorrelations.

		M (SD)	1	2	3	4	5	6	7	8
1	T1 Technological self-efficacy	4.03 (0.89)	(.89)							
2	T2 Occupational commitment	3.25 (0.80)	-.10*	(.92)						
3	T2 Occupational mobility intention	1.87 (0.89)	-.18***	-.53***	(.91)					
4	Automation potential ^a	40.63 (28.74)	.07	-.06	.09*					
5	T1 Developmental support	3.28 (1.10)	.10*	.37***	-.33***	-.01	(.89)			
6	T1 Occupational self-efficacy	3.87 (0.68)	.37***	.20***	-.24***	.00	.35***	(.88)		
7	T2 Turnover intention	2.26 (1.23)	-.14**	-.53***	.73***	.03	-.33***	-.17***	(.87)	
8	Age	46.71 (10.65)	-.01	.05	-.07	-.00	-.17***	.12**	-.04	
9	Gender ^b	0.55	-.16***	-.06	.04	.03	-.16***	-.08	.01	.12**

Note. N = 512. Cronbach's alpha reliabilities are reported along the diagonal in parentheses.

^a0–100% substitutable tasks within occupation

^b0 = male, 1 = female.

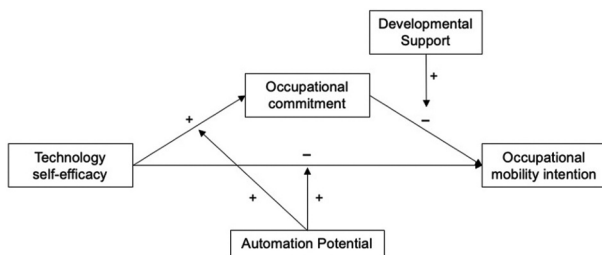
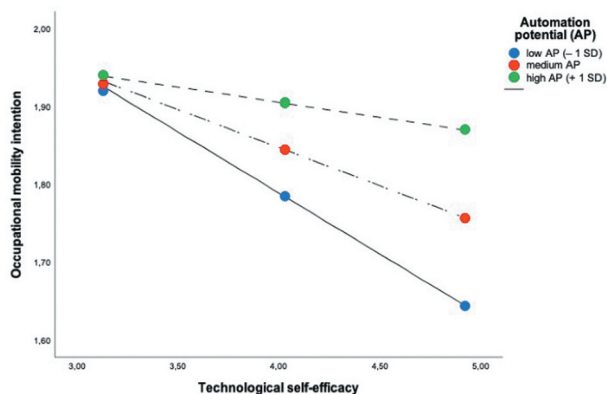
* $p < .05$ ** $p < .01$ *** $p < .000$.

Table 2. Results of moderated mediation analysis.

	Occupational commitment					Occupational mobility intention				
Predictor	Coeff.	SE	p	LLCI	ULCI	Coeff.	SE	p	LLCI	ULCI
T1 Technological self-efficacy	-.26	.06	.00	-.37	-.15 [†]	-.18	.05	.00	-.23	-.08 [†]
Automation potential	-.00	.00	.41	-.01	.00	-.01	.00	.14	-.01	.00
Technological self-efficacy x Automation potential	.00	.00	.47	-.00	.00	.00	.00	.04	.00	.00 [†]
Gender	-.13	.06	.03	-.24	-.01 [†]	-.02	.05	.67	-.13	.08
Age	.00	.00	.86	-.00	.01	-.00	.00	.24	-.01	.00
T1 Occupational self-efficacy	.23	.05	.00	.14	.32 [†]	-.06	.04	.16	-.15	.02
T2 Turnover intention	-.35	.02	.00	-.39	-.30 [†]	.42	.03	.00	.36	.47 [†]
T2 Occupational commitment						-.43	.10	.00	-.63	-.23 [†]
T1 Developmental support						-.23	.09	.01	-.40	-.05 [†]
Occupational commitment x Developmental support						.06	.03	.02	.01	.12 [†]
R ²			.35***					.60***		
Conditional direct effects on occupational mobility intention										
Moderator	Effect		Boot SE		p	Boot LLCI		Boot ULCI		
Automation potential										
low	-.16		.04		.00	-.24				-.08 [†]
medium	-.10		.03		.00	-.16				-.03 [†]
high	-.04		.05		.39	-.13				.05
Developmental support										
low	-.29		.05		.00	-.39				-.19 [†]
medium	-.22		.04		.00	-.30				-.15 [†]
high	-.15		.05		.00	-.25				-.10 [†]
Index of moderatedmediation										
Index	Boot SE		Boot LLCI		Boot ULCI					
.00	.00		-.00		.00					

Note: N = 512. LLCI = Lower level of the 95% confidence interval, ULCI = Upper level of the 95% confidence interval. Values of moderators in conditional tables are the mean and ± 1 SD. [†]95% CI does not include zero.

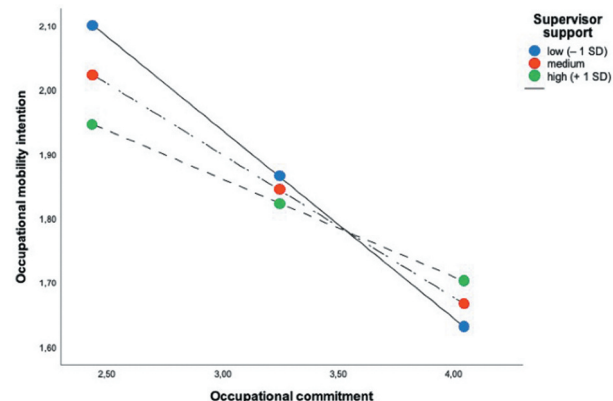
* $p < .05$ ** $p < .01$ *** $p < .000$.

**Figure 1.** Proposed model, based on SCCT assumptions.**Figure 2.** The moderating effect of automation potential on the relationship between technological self-efficacy and occupational mobility intention.

Hypothesis 3a assumed that the positive relation between TSE and occupational commitment would be stronger when AP is high. Contradicting H3a, we found a significant negative direct effect of TSE on occupational commitment, and AP did

not moderate this relation, as the interaction term was not significant. Hypothesis 3b assumed that AP moderated the direct relation between TSE and occupational mobility intention in that the negative relation would be stronger when AP is high. While we found a small (Cohen, 1992), yet meaningful moderating effect of AP, only the slopes for participants in low and medium AP occupations were significant, but not for participants in high AP occupations, as illustrated in Figure 2. Thus, while TSE predicted occupational mobility intention both directly (Hypothesis 1) and indirectly (Hypothesis 2), the negative direct relation was stronger for employees in occupations with low and medium levels of AP only, contradicting H3b. Therefore, Hypothesis 3 had to be rejected.

Supporting Hypothesis 4, we found that developmental support moderated the negative relation between occupational

**Figure 3.** The moderating effect of developmental support on the relationship between occupational commitment and occupational mobility intention.

commitment and occupational mobility intentions. Again, this moderation was relatively small (Cohen, 1992), but comparable to effect sizes of similar studies (Lingmont & Alexiou, 2020). As illustrated in Figure 3, the slope for participants with low supervisor support was steeper than the slope for participants with high supervisor support. High supervisor support thus weakened the negative relation between occupational commitment and occupational mobility intention. A post-hoc test revealed that particularly the continuance dimension of occupational commitment was responsible for this finding.

Finally, in Hypothesis 5, we proposed that occupational commitment partially mediates the relation between TSE and occupational mobility intention, in that AP strengthens the direct effect of TSE on occupational commitment (5a), and developmental support strengthens the direct effect of occupational commitment on occupational mobility intention (5b). As the index for the moderated mediation was not significant, Hypothesis 5 had to be rejected.

Discussion

Technological advancement will most likely not eliminate whole occupations but rather alter and substitute specific tasks and, as a consequence, jobs and occupations across all industries (Arntz et al., 2016; Frank et al., 2019). Therefore, a better understanding of individual and contextual success factors for sustainable careers in response to these changes has been called for (Hirschi, 2018). The first aim of this study was, thus, to investigate which technology-related personal and contextual factors support successful occupational paths. Based on SCCT assumptions, we explored if, and under which conditions TSE influenced occupational mobility intentions. Supporting our hypotheses, we found that TSE was negatively related to occupational mobility intentions, and that occupational commitment partially mediated the relationship between TSE and mobility intentions.

As proposed by SCCT, TSE directly predicted occupational mobility intentions, also after controlling for occupational self-efficacy, and turnover intentions. This result emphasizes the relevance of technology-related self-efficacy for sustained occupational stability, and reinforces the need to study self-efficacy beliefs that are tailored to the specific domain, rather than including “one-size-fits-all” measures (Bandura, 2018, p. 133). The current study thus adds to the limited existing research on TSE and highlight its functional importance for contemporary occupational career trajectories, over and above the more general measure of occupational self-efficacy.

Interestingly, we found that TSE was not positively, but negatively related to occupational commitment. This finding contradicts both basic SCCT assumptions and previous research that highlight the positive influence of self-efficacy beliefs on occupational commitment (e.g., Klassen & Chiu, 2011). Yet, since occupational commitment primarily focuses on current occupational features and tasks which are likely to change due to technology-induced change (Bessen, 2016), individuals with high TSE might not embrace such a work environment and, thus, reduce their commitment. Unlike most prior research (Meyer & Espinoza, 2016), we included not only effective, but also normative and continuance occupational commitment in

our analysis, which both were negatively related to TSE. This means that individuals with high TSE did not feel obligated to remain in their occupations and expected potential occupational mobility not to be costly. Although not central to the current analysis, which focussed on the impact of TSE on occupational mobility intentions, these findings lead to the assumption that TSE allows individuals to deal with technology-induced change within their occupations adaptively. However, because the occupation itself changes on a task level, the commitment to current occupational features might not be essential for adaptive occupational career trajectories.

The second aim of this study was to examine objective and subjective contextual influences of adaptive career management considering technological advancement. We found that both the objective task-based AP and developmental support were relevant for understanding occupational mobility intentions. Yet, while we assumed that the negative relation between TSE and occupational mobility intentions would be stronger for high AP occupations, we found the relation to be stronger for low and medium AP occupations. For high AP occupations, where more than 70% of work tasks could be automated, it seems that even high TSE does not help to confront the anticipated changes in one's occupation. Our finding thus emphasizes that staying in one's occupation is especially adaptive for individuals with high TSE in occupations that offer some technology-induced change, but not in occupations where most of the established tasks can be substituted by technology. We further found that AP did not moderate the relationship between TSE and occupational commitment. Thus, while AP had some influence on the relationship between TSE and occupational mobility intentions, it seems that other contextual factors might be more relevant for individuals' adaptive career management. Our finding also resonates with employees' overall low concern of being replaced by robots and automation (Brougham & Haar, 2018) and stresses the importance of studying subjective perceptions of technology-induced change in addition to objective measures of AP as used in our study (Schneider & Sting, 2020). While prior research demonstrated that uncertainty around job-related automation and the awareness thereof leads to organizational turnover intention (Lingmont & Alexiou, 2020; Priyadarshi & Premchandran, 2022), our study provides first insights into how the combination of individual and macro-level variables impact the turnover process (Direnzo & Greenhaus, 2011) at the occupational level.

With regards to more proximal contextual variable of developmental support, we found that such support weakened the negative relation between occupational commitment and occupational mobility intentions, highlighting the role of developmental opportunities for motivation. SCCT emphasizes the importance of environmental supports to set and implement goals for adaptive career behaviour and decision making (Lent & Brown, 2013). As updating one's professional skills is considered a critical career-related behaviour facing the challenges of technological advances (Hirschi, 2018), support for such adaptive career self-management is highly valued. Our finding also echoes research on employability and occupational expertise, which assumes that learning oriented work environments foster skill development (Van der Heijden et al., 2016). In the context of technological advancement, developmental

support appears to be especially important for individuals with low continuance occupational commitment, as the encouragement for learning and up- and reskilling demonstrates that investment in the current occupation is worth the effort, and additionally fosters employability and occupational stability.

Limitations and future research

The first limitation of this study concerns the use of an online panel with participants from Switzerland and Germany only, using a limited sample size. While the use of panel providers is widely accepted (Porter et al., 2019) and suitable for exploratory research questions (Walter et al., 2019), further studies are needed to examine whether our results generalize to other samples and different economic and social situations. Also, a bigger sample size would allow to compare groups concerning age, gender or occupational groups and thus allow to address the problem of heterogeneity thoroughly. Still, using online panels increased the external validity of our study, and thus generalizability (Cruz, 2021), as it allowed us to include data from a broad range of employees from different countries, industries, and positions that hold different educational degrees, too. Related to the first limitation, the current study does not account for additional employee characteristics which might have impacted the selection into their occupation, and may also impact how they react to and deal with changes in their work caused by technological advancement. Also, participants in the sample were more likely to be older and report higher levels of TSE than those who had missing data for the second measurement wave and were thus excluded from the sample. Future studies could address these limitations through conducting multiple moderate-*N* studies to successfully address the problem of heterogeneity (Kenny, 2019) and include more comprehensive employee characteristics.

The second limitation concerns the measurement of occupational mobility intentions as a proxy for actual mobility (e.g., Li et al., 2019). Although studying antecedents of actual occupational mobility has recently gained traction (e.g., Böckerman & Ilmakunnas, 2009; Medici et al., 2020), future studies should capture actual mobility in larger longitudinal research designs, taking the ongoing technological advancement and its differential impact on individuals' careers in different occupations into account.

One additional limitation concerns the introduction of the objective, task-based measure of AP as a moderator in our model, neglecting the subjective evaluation of technological progress for individual career development, and the individuals' awareness of the actual AP of their occupation. Recently, employees' assessment of automation as a threat has been linked to organizational commitment and turnover intentions (Brougham & Haar, 2018). We, therefore, encourage future studies to include both objective and subjective measures to account for individual differences in the perception of technology-induced change and their relevance for career-related outcomes. Still, as with all self-reported information (Conway & Lance, 2010; Gerpott et al., 2020), the subjective evaluation of technological advancement can also be biased (Spencer et al., 2021) and should thus be thoughtfully implemented in future studies.

Conclusions and practical implications

Because technology-induced change will impact virtually all occupations (Frank et al., 2019), occupational change cannot be considered an adaptive response to transformed work environments. Nonetheless, technological advancements will sooner or later force most individuals to react to altered occupational environments. To prevent needless occupational mobility, it is crucial to learn about personal and contextual factors which contribute to adaptive career management and support employees in building sustainable occupational career trajectories. This study set out to investigate the influence of TSE on adaptive career self-management in today's dynamic world of work. Using SCCT as a theoretical framework, we demonstrated the incremental validity of TSE over and above occupational self-efficacy for the prediction of occupational mobility intentions. Furthermore, we found that developmental support by supervisors and the objective, task-based AP of one's occupation influenced how TSE and occupational commitment relate to occupational mobility intentions.

Finally, the present study also offers implications for practice. First, as self-efficacy beliefs are formed through direct and indirect learning experiences (Sheu et al., 2018), TSE is malleable and can be actively addressed through the provision of adequate learning opportunities in vocational preparation, later employment, and in continued education. Second, our results suggest that developmental support is relevant for fostering occupational stability. Especially for employees with low TSE and limited occupational commitment, developmental support is important for employees' sustained occupational stability. Leaders should hence actively promote the development of employees' occupational expertise and employability and empower them to adaptively deal with changing work environments through expanding their human capital.

Notes

1. Talk Online Panel GmbH, Vienna, Austria.
2. <https://job-futuromat.iab.de/>.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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