# Should I Stay, or Should I Go?

## Job Satisfaction as a Moderating Factor between Outcome Expectations and Entrepreneurial Intention among Academics

# Abstract

Both psychological and entrepreneurship research emphasize the pivotal role of job satisfaction in the process of entrepreneurial career decisions. In fact, a co-relationship between entrepreneurial intention, job satisfaction, and organizational commitment was demonstrated recently. Prior research operationalized entrepreneurial careers as an escape from poor work environments; thus, there is a lack of understanding regarding how job-satisfaction and outcome expectations can motivate and trigger academic entrepreneurship within and related to the environment of universities (e.g., spin-off activities). In this study, drawing on Social Cognitive Career Theory delineated by Lent and colleagues and the concept of entrepreneurial intention, we addressed the role of job satisfaction as a moderating factor between outcome expectations and entrepreneurial intention. Furthermore, we examined to what extent (a) entrepreneurial intention and (b) spin-off intention are determined by certain outcome expectations and perceived behavioral control. This paper purports to study academic researchers in specialized and non-technical fields and builds on a survey of 593 academic researchers at Swiss Universities of Applied Science (UAS). Supporting our hypothesis, we showed that outcome expectations are a significant predictor for entrepreneurial intentions, in general, and spin-off intentions, in particular. Finally, a multi-group analysis corroborated that job dissatisfaction partly operates as a motivational factor in entrepreneurial transition and interactions with entrepreneurial outcome expectations. In conclusion, the concept of job satisfaction and the theoretical approach of Social Cognitive Career Theory seems to be relevant to study and to encourage academic entrepreneurship as career decisions of the academic researchers.

# Introduction

Are academic researchers with high job satisfaction more willing to participate in entrepreneurial forms of knowledge exploitation (e.g., spin-off activities)? Or, are they more likely, to leave the university setting for entrepreneurial projects because of job dissatisfaction?

Academic entrepreneurship is widely recognized for its contribution to economic, regional, and innovation development (Audretsch 2014; Block et al. 2017; Fini et al. 2018; Guerrero et al. 2015; Shane 2004; Stuetzer et al. 2018). To study academic entrepreneurship in the early stage, a significant part of the empirical research employs the concept of *entrepreneurial intention* (Goethner et al. 2012; Hossinger et al. 2020; Miranda et al. 2018; Obschonka et al. 2012; Obschonka et al. 2015). Today it is generally assumed that entrepreneurship represents an intended career decision based on outcome expectations (OE) and external causes (Douglas and Shepherd 2002; Tran and Korflesch 2016; Shane 2004). Academic researchers traditionally choose between the following career options: (a) remaining in research positions, (b) moving to industry or services, or (c) become a full or part-time entrepreneur (Murray 2004). Although the literature on academic entrepreneurship has focused primarily on exogenous factors affecting entrepreneurial intention (Feola et al. 2017; Huyghe and Knockaert 2015; Kirby et al. 2011; Miranda et al. 2017), empirical research identifying endogenous factors, such as motivational drivers (e.g., OE and job-satisfaction), for entrepreneurial career decisions are scant. In their review of the current literature, Singh and Onahring (2019) considered the interconnection between entrepreneurial intention, job satisfaction, and organizational commitment. The authors also called for further research into the relationship between job satisfaction and entrepreneurial intention (Singh and Onahring (2019).

Academic entrepreneurship, as a specific form of entrepreneurship[1], refers to the "commercial application of academic research" (Abreu and Grinevich 2017, p. 764). However, prior literature by Miller et al. 2018 stated that a wide range of activities among academics beyond the commercialization of research could be considered as entrepreneurial. Miller et al. (2018) went on to distinguish between 'entrepreneurial academics' and 'academic entrepreneurs.' Unlike 'academic entrepreneurs,' involved in the spin-off and research-commercialization activities, 'entrepreneurial academics' capture other, more informal ways to become entrepreneurs (Miller et al. 2018) or leave the university to work solely as funders (i.e., academic exodus) (O'Shea et al. 2008). Crucial to the entrepreneurial process is the first step - the individual career choice - which may lead to academic entrepreneurship (i.e., spin-offs) or other forms of entrepreneurship within or outside the context of universities.

However, it is not always clear why academic researchers choose to establish extramural businesses rather than commercialize their research in the form of spin-offs. Entrepreneurial decision-making among academics can be interpreted as a specific form of career choice, made in a unique organizational context, based on individual, socio-cognitive, and environmental characteristics (D'este and Perkmann 2011; Lam and Campos 2015; Lam 2015; Rizzo 2015). Prior research highlighted that socio-organizational conditions play an essential role in academics' entrepreneurial intention formation (for an

[1] In Contrast the Global Entrepreneurship Monitor defines entrepreneurship as "*any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business*" (Bosma et al. (2012, p. 9)

overview, see Miranda et al. 2018; Hossinger et al. 2020). Furthermore, entrepreneurship research demonstrated that through a low level of commitment, entrepreneurial behavior as a job-exit strategy becomes more attractive if employment conditions are perceived as dissatisfying (Guerra and Patuelli 2016; Lee et al. 2011; van Dick et al. 2004; Werner et al. 2014). Regarding spin-off creation, Shane (2004) and Lam (2015) noted that academic spin-offs, which are linked by definition to the commercial knowledge transfer of universities, are usually considered from a scientist's perspective as the continuation of their academic career, rather than a career exit. Academic entrepreneurship literature reflects a lack of systematic research that explicitly investigates the interaction between job satisfaction and entrepreneurial career goals in terms of varying entrepreneurial behaviors among academic researchers.

By focusing on commercial technology transfer, academic entrepreneurship research overlooked that there are various forms of entrepreneurial activities among academics, which are not necessarily geared towards knowledge transfer (e.g., social /cultural entrepreneurship, consulting, finance). It is, therefore, worth questioning whether all entrepreneurial-minded academics intend to participate in spin-off activities, rather than other forms on entrepreneurial behavior. This issue is also reflected in existing research with some authors evaluated academic entrepreneurship in the form of spin-off intention to commercialize research (Brettel et al. 2013; Goethner et al. 2009, 2012; Huyghe and Knockaert 2015; Obschonka et al. 2012; Obschonka et al. 2015). Others stepped back and simply examined entrepreneurial intention rather than solely referring to commercialization activities of research (Foo et al. 2016; Moog et al. 2015).

We argue that the different ways of operationalizing academic entrepreneurship make it challenging to compare results within the field. Since entrepreneurship in terms of knowledge transfer embodies unique OE and motivations (e.g., personal financial gain or career enrichment), which contrasts with extramural forms of entrepreneurship (Lam 2015; Houweling and Wolff 2019; Hossinger et al. 2020; Shane 2004), warrants its contribution in driving entrepreneurial intention. According to Miller et al. 2018, only a few studies explored the motivating factors driving academics to engage in knowledge transfer activities or other forms of academic entrepreneurship (e.g., Abreu and Grinevich 2013; Guerrero and Urbano 2014). Firstly, there is a lack of research examining the interaction between socio-environmental conditions, such as job satisfaction and OE, as motivational drivers contributing to the different forms of entrepreneurial intentions among academics. Secondly, there are knowledge gaps addressing the motivation differences between the commercialization of research and general entrepreneurial career preferences, as spin-offs may represent only a portion of the entrepreneurial activities by academics.

In this study, we sought to fill this void by focusing on entrepreneurial career choices by evaluating the following questions. Firstly, addressing the lack of knowledge concerning the role of job-satisfaction in driving motivations to pursue entrepreneurial and spin-off opportunities. Thus, we will investigate whether spin-off activities are more attractive to academics when job satisfaction is high; or if low job satisfaction drives rates of pursuing different forms of entrepreneurship in terms of an academic career exit. Secondly, there is a need for research that integrates OE as a relatively novel construct in entrepreneurship research. Building on Social Cognitive Career Theory (SCCT) (Lent et al. 2002, 1994), which is a valuable framework for assessing the influence of organizational variables on entrepreneurial career decisions (Kassean et al. 2015; Liguori et al. 2018; Segal et al. 2002; Tran and Korflesch 2016). This study provides empirical results on academic entrepreneurial intentions by combining the above research questions. Regarding methodology, the motivational mechanisms behind entrepreneurial decisions were investigated

by conducting a survey among Swiss academics from various disciplines at UASs. With a sample of 593 participants, we test the proposed research questions using structural equalization modeling.

In this paper, we contribute original data to the emerging research on academic entrepreneurship. First, by addressing the motivational role of job (dis-)satisfaction in the entrepreneurial process for academics. Second, by highlighting the role of OE and perceived behavioral control (PBC) in modulating the entrepreneurial career decisions of academics. Thus, the results offer a more in-depth insight into the interplay between job satisfaction and the scientists' OE and commitment to entrepreneurship. Third, by developing an empirical application of SCCT in academic entrepreneurship research, we showed empirical differences between academic entrepreneurship and entrepreneurial academics in terms of OE. Overall, this study contributes to understanding the dynamics that drive academics to participate in entrepreneurial activities. The remainder of the study is structured as follows. It begins with a small review of the contextual and motivational factors of academic entrepreneurship and the theory of social cognitive careers, while the next section focuses on defining the hypotheses. Section four outlines methodology, while section five presents the results, and section six contains conclusions and discussions.

# Literature review and theoretical framework

With the emergence of the knowledge economy, there is considerable interest in promoting and supporting the entrepreneurial careers of scientists (i.e., academic entrepreneurship). In this scenario, universities are seen as key actors in shaping and influencing favorable entrepreneurial ecosystems (Etzkowitz 2003, 2014, 2017; Huyghe and Knockaert 2015; Kirby et al. 2011; Meek and Wood 2016; Miller et al. 2018). The concept of the 'entrepreneurial university' that emerged at the end of the 1990s (Etzkowitz and Leydesdorff 1998) comprises services and tasks that go beyond research, teaching, and redefines the organizational outlook of universities as well as the interaction between research, education, and innovation. Accordingly, the promotion of spin-off activities is recognized as a central element of the so-called 'third mission' of universities (Etzkowitz 2003). The interaction between industry, government, and university in order to transfer knowledge and promote innovation from research and development (R&D) in industry and society is called the 'triple helix' (Etzkowitz 2003, 2017). In this framework, universities take the responsibility to develop policies and instruments, in particular, to encourage entrepreneurial careers of their academic researchers and support spin-offs to commercialize research (Feola et al. 2017). A recent review (Hossinger et al. 2020), identified various organizational conditions determining academic entrepreneurship decisions. Firstly, the so-called drivers, such as a university focus on applied research, previous organizational experience with industry cooperation, resources, and the reputation of the university, increase the propensity for academic entrepreneurship (Arvanitis et al. 2008; Fischer et al. 2018). Secondly, the entrepreneurial orientation of universities, such as culture and climate within universities and departments, promotes the entrepreneurial intentions of scientists (Huyghe and Knockaert 2015). Thirdly, support mechanisms such as university regulations, incubation services, infrastructure, technology transfer offices, financial support, and training for entrepreneurs are essential to foster academic entrepreneurship (Hossinger et al. 2020).

Entrepreneurial motivations are considered to be the a priori reasons of an individual to start a business (Shane et al. 2003). Prior research explicitly addressed motivational factors for spin-off activities (i.e., academic entrepreneurship) (Antonioli et al. 2016; Guerrero and Urbano 2014; Lam 2015; Houweling and Wolff 2019; Morales-Gualdrón et al. 2009; Shane et al. 2003) and posit that socio-organizational factors have a significant influence on the motivation of academics to become entrepreneurial (Feola et al. 2017; Miranda et al. 2017; Morales-Gualdrón et al. 2009). For example, in their empirical study of Spanish academic entrepreneurs, Morales-Gualdrón et al. (2009), identified the following factors to be significant drivers of entrepreneurial motivation: personal, entrepreneurial potential (i.e., entrepreneurial opportunity), scientific knowledge, and availability of resources, incubator organization and social environment (i.e., social norms and attitudes). In an in-depth interview-based study, Guerrero and Urbano (2014) used nascent academic entrepreneurs to analyze individual motivations and OE. Their findings showed that academic entrepreneurs define various outcomes, including technology diffusion, technology development, financial gain, public service, and peer motivation.

Additionally, Lam (2015) offers a conceptual framework for the motivation of researchers to participate in spin-off activities, which consists of three types of motivation 'Gold' (as for financial rewards), 'Ribbon' (as a reward for reputation/career) and 'Puzzle' (as intrinsic satisfaction). Lam (2015) also stresses that the majority of academic entrepreneurs are motivated by intrinsic and

reputation-related factors rather than financial expectations in order to participate in spin-off creation. The synthesis of the literature mentioned above would suggest that the motivation for spin-off activities is mainly related to improving current academic employment opportunities. In contrast to spin-off activities, there is a lack of systematic research about factors that explain extramural forms of entrepreneurship among 'entrepreneurial minded academics.'

Generally, personal factor such as self-efficacy (Chang and Edwards 2015; Huyghe and Knockaert 2015; Zhao et al. 2005), attitudes (Goethner et al. 2012; Miranda et al. 2017), entrepreneurial passion (Obschonka et al. 2015) and job (dis-)satisfaction have been named in the literature as a driver of entrepreneurship (Brockhaus 1982; Chang and Edwards 2015; Guerra and Patuelli 2016; Jeong and Choi 2017; Singh and Onahring 2019). In their review, Singh and Onahring, p. 2 (2019) defined job satisfaction as "the difference between the quantum of rewards received by employees and the amount they believe they should receive". In other words, job satisfaction can be seen as an expression of the fit between job expectations and current employment conditions. Based on previous research, the authors postulated a research model relying on a positive relationship between job satisfaction, organizational commitment and entrepreneurial intention. While job dissatisfaction acts as a push factor for entrepreneurial intentions (Brockhaus 1982; Guerra and Patuelli 2016; Jeong and Choi 2017), job satisfaction in contrast can strengthen individual's proactivity, intrapreneurship (Neessen et al. 2019) and organizational commitment (Tang et al. 2019), such as the implementation of an entrepreneurial mission.

Regarding entrepreneurial universities, if universities explicitly start to promote spin-off activities, a higher organizational commitment would be associated with an increase of spin-off activities. For example, Guerra and Patuelli (2016) examined the transition from wage to self-employment by relying on Swiss panel data. While a higher level of job satisfaction (with working conditions) was negatively related to job-change but positively related to moving to self-employment, job-dissatisfaction with income also acted as a push factor for moving to self-employment. Especially individuals with a higher level of education and more working hours showed an increased likelihood to move into self-employment. Although the authors have not been able to analyze the nature of self-employment, it is shown that job satisfaction and job dissatisfaction under certain circumstances promote entrepreneurship. While highlighting the role of job dissatisfaction, other research demonstrated a higher likelihood for entrepreneurial career decisions if dissatisfaction with current working conditions (Brockhaus 1982) or fear of unemployment was high (Hofstede et al. 2004). Similarly, Jeong and Choi (2017) observed a negative effect of job satisfaction on entrepreneurial intention and a mediating effect of job satisfaction between OE and entrepreneurial intention among a sample of artists. Against the background of the literature mentioned above, it can be concluded that job satisfaction is an important motivating factor for the transition to entrepreneurship.

## The Social Cognitive Career Theory (SCCT)

When studying entrepreneurial career decisions, scholars widely employed and acknowledged entrepreneurial intention to be the first step in a long entrepreneurial process and to be the 'best' predictor of entrepreneurial behavior (Bird 1988; Krueger et al. 2000; Liñán and Fayolle 2015). Entrepreneurial intention reflects a mental process that accompanies the planning and implementation of

entrepreneurial actions (Boy and Vozikis 1994; Tran and Korflesch 2016). To date, entrepreneurship researchers applied several theoretical models to study the intention formation, such as the Model of Entrepreneurial Events (SEE) (Shapero and Sokol 1982) and the Theory of Planned Behavior (TPB) (Ajzen 1991, 2011; Tornikoski and Maalaoui 2019). A theory to analyze career choices presented by Lent et al. (1994, 2002) is called the Social Cognitive Career Theory (SCCT). SCCT considers environmental (see Liguori et al. 2018; Tran and Korflesch 2016) and motivational influences, such as OE and self-efficacy beliefs to predict career decisions. In contrast to other theoretical approaches, the SCCT provides several advantages. For example, SCCT defines precise intention predictors that are not as abstract as represented by other intentional models (e.g., perceived desirability in SEE versus outcome expectations in SCCT) (Tran and Korflesch 2016). SCCT postulates that career goals (e.g., goal intention, see Kassean et al. 2015) are determined by the assessment of cognitive-individual factors (e.g., self-efficacy, 'I will be able to do this') and associated OE ('If I do this, then what will be the outcome?') (Lent et al. 1994, p. 83). By evaluating past behavior, individuals gain an understanding of social environmental factors, their cognitive capabilities (e.g., domain-specific self-efficacy), and shape future career goals. Researchers employed SCCT as a theoretical framework to explain career choices (Lent et al. 2008) based on individual cognitive factors (Lent et al., 2002) originating from Bandura's general socio-cognitive theory (1986). SCCT has been empirically applied in a variety of contexts (Chang and Edwards 2015; Lent et al. 2002; Lent et al. 2008; Rogers and Creed 2011). Liguori et al. (2018) recommend SCCT as a theoretical framework for investigating entrepreneurial career goals.

## Development of hypotheses

In line with the SCCT, present article focuses on entrepreneurial (in particular spin-off) intention as a career choice, by assuming OE and self-efficacy beliefs to influence entrepreneurial career goals.

Both self-efficacy and perceived behavioral control (PBC) refers to the individual's perception of whether or not an action would be difficult to perform (Ajzen 2002). In their literature review, Tran and Korflesch (2016) argue that the construct of self-efficacy in SCCT was conceptually similar to the constructs of PBC in TPB (Ajzen 1991) and perceived feasibility in SEE, "as they are all about perception of capability to start a social venture" (Tran and Korflesch 2016, p. 23). According to Bandura, self-efficacy refers to the individual's "judgment of their capabilities to organize and execute courses of actions required to attain designated types of performance" (Bandura 1986, p. 391) and thus to one's own perceived abilities. In the framework of SCCT, self-efficacy beliefs shall predict career goals, and influences OE, as people expect outcomes that are more desirable in activities where they consider themselves effective (Bandura 1986). Ajzen (2002) considered Bandura's (1986) concept of self-efficacy (dealing with ease or difficulties in task performance) as part of a superordinate construct of PBC. In the field of academic entrepreneurship, studies show that both PBC and self-efficacy are strong predictors of entrepreneurial intentions (Boy and Vozikis 1994; Goethner et al. 2012; Guerrero et al. 2008; Huyghe and Knockaert 2015; Obschonka et al. 2015; Obschonka et al. 2012). In line with prior research, we argue that PBC will positively predict entrepreneurial intention. Thus, the following hypotheses can be developed based SCCT and on the earlier findings:

(H1a): Among academics, PBC are positively related to entrepreneurial intention.
(H1b): Among academics, PBC are positively related to spin-off intention.

Outcome expectations (OE) are personal beliefs about possible and imaginary consequences of specific behavior, which are considered to be fulfilled as a result of a specific action (Lent et al. 1994). SCCT, therefore, assumes that individuals are more willing to act if they believe that the associated OE are achievable (Liguori et al. 2018). Based on SCCT and the expectation theory of Vroom (1964), OE is are a key factor in predicting career goals. Expectation theory states that people are motivated to participate in an activity if they believe that the goal is worth the effort and that there is a way to reach the goal. In terms of entrepreneurship, OE result from a global assessment of expected efforts and the resulting benefits (Douglas and Shepherd 2000). According to entrepreneurship literature, one will opt for an entrepreneurial career if the expected profits from entrepreneurship are higher than the sum of the expected future benefits from employment (Goethner et al. 2012, p. 630). As outlined above, entrepreneurship literature considers various motivations that may encourage academics to become entrepreneurial (Morales-Gualdrón et al. 2009; Lam 2015; Guerrero and Urbano 2014). In their review of literature, Hossinger et al. (2020) summarized that academics choose entrepreneurial activities in order to pursue an intrinsic source of rewards, such as independence, sense of achievement, inner saturation and self-realization or external rewards, and academic benefits from the creation of spin-off companies. Regarding spin-off activities, academics may consider spin-off activities as an opportunity to obtain academic reputation (Houweling and Wolff 2019) or to gather resources, such as access to financial funding or new infrastructure to support research (Hossinger et al. 2020).

We argue that OE, in terms of financial gains, satisfaction, autonomy, and quality of life, predict both entrepreneurial intentions (i.e., entrepreneurial academics) in general and spin-off activities in particular. Previous research on entrepreneurship has shown that certain expectations (e.g., autonomy, financial gains, satisfaction) explained entrepreneurial decisions (Guerrero and Urbano 2014; Miranda et al. 2017). For example, expected reputation and financial gains indirectly explained the spin-off intentions of the academic researcher (Goethner et al. 2012; Miranda et al. 2017; Houweling and Wolff 2019). Thus, the following hypotheses can be developed based on the earlier findings:

(H2a): Among academics, OE positively influence spin-off intention.
(H2b): Among academics, OE positively influence entrepreneurial intention.

## Job satisfaction as a two-way moderator

In 2019, Singh and Onahring reviewed various models of job satisfaction that provide a theoretical framework for the relationship between job satisfaction, organizational commitment, and entrepreneurial intention. For example, Vroom (1964) defined job satisfaction as an affective orientation of the individual towards his current employment conditions. Based on Singh and Onahring's (2019) assumption, job satisfaction is an indicator and measure of the fulfillment of work-related expectations and personal needs. Organizational literature noted that job satisfaction could be affected by various organizational conditions, such as perceived autonomy, job content, job flexibility, social benefits, career prospects, and interpersonal relationships (Agho et al. 1993; Shvets 2018). While employees who are satisfied with the conditions tend to be more committed towards their organizational norms (Tang et al. 2019), researchers showed that job dissatisfaction positively affects job quits and entrepreneurial careers (Chang and Edwards 2015; Guerra and Patuelli 2016; van Dick et al. 2004; Werner et al. 2014). It has been argued that, under certain circumstances, the transition to entrepreneurship is a kind of exit

strategy from current employment (Brockhaus 1982). For example, those employees who are dissatisfied with their employment conditions would expect improvements from a change to self-employment, accompanied by greater economic benefits than from remaining in current employment (Guerra and Patuelli 2016). In general, job satisfaction is an indicator and a driver for the evolution of new OE and career goals, as it creates a subjective framework for both interpretation and behavior.

Hence SCCT states that career goals are affected by personal, environmental, and situational factors (Lent et al. 1994; Tran and Korflesch 2016), including both objective and subjective environmental conditions such as job satisfaction. Subjective environmental conditions influence the individuals' interpretation regarding opportunities, resources, barriers, and financial benefits (Lent et al. 1994). According to prior research, satisfied employees show higher levels of organizational commitment, higher productivity, and more punctual as well as efficient behavior (Lumley et al. 2011; Tang et al. 2019). A higher level of organizational commitment is related to the desire to pursue a career within the organization (Feinstein and Vondrasek 2001; Meyer et al. 2002). We argue that entrepreneurial academics with a high level of job satisfaction show a greater propensity to commercialize their research by founding spin-offs in line with the aims of Entrepreneurial Universities (Etzkowitz 2017). Based on a psychological contract (Rousseau 1995), employees try to implement the organization's goals in a meaningful way and align their behavior accordingly. For example, Huyghe and Knockaert (2015) demonstrated that the entrepreneurial mission of the university has a positive effect on spin-off intentions. Obschonka et al. (2012) showed that academics who feel attached to their university are more likely to follow institutional norms in terms of entrepreneurial goals. As entrepreneurial universities create a specific environment to encourage spin-off activities and practices that promote the commercialization of R&D (Etzkowitz 2017; Kirby et al. 2011), entrepreneurial academics will feel committed to them in order to gain reputation within their organization (Lam and Campos 2015). Thus researchers with high job satisfaction will automatically weigh their entrepreneurial OE more positively than academics with low job satisfaction to pursue an entrepreneurial career within and promoted by the ecosystem of entrepreneurial universities. This study assumes in particular that a high level of job satisfaction has a positive moderating effect on the relationship between OE and spin-off intention of academics. Thus, the following hypothesis can be developed:

(H3a): Among academics, job satisfaction positively moderates the relationship between OE and spin-off intention.

Vice versa, scholars widely acknowledged that high job dissatisfaction – i.e., the experience of frustration over unfulfilled expectations, increases the rate of job quits (Jeong and Choi 2017; van Dick et al. 2004; Werner et al. 2014; Werner and Moog 2007) and decrease organizational commitment (Singh and Onahring 2019). Therefore, job dissatisfaction has become an important issue in entrepreneurship research, as the creation of businesses such as start-ups is perceived as an exit out of poor working conditions and thus as an alternative to the current employment (Brockhaus 1982; Lee et al. 2011; Singh and Onahring 2019). As associated with the construct of OE, individuals weigh up costs and benefits when choosing (an entrepreneurial) goals (Lent et al. 2002). Therefore job dissatisfaction as an indicator that describes the individual's perception of the perceived disadvantages of remaining in the current job, triggered by a low level of autonomy, financial resources or pay, lack of career options, and

opportunities for advancement within the organization or too much workload. Entrepreneurial activities are generally seen as an alternative career opportunity and thus as a way out of academic careers (Murray 2004). Morales-Gualdron et al. (2009) noted that there are some push factors at the organizational level, as some academic researchers have left universities to start their businesses due to concerns about the current workload, high bureaucracy, and low-risk orientation of the parent organization. Furthermore, Guerrero and Urbano (2014) observed that 'motivating peers' either came from outside the university or were perceived as rebels within the university, suggesting that universities have either so far not sufficiently supported academic entrepreneurship or that these individuals do not feel committed to their organizations and thus encouraged to commercialize their research.

Since there is empirical evidence for a positive relationship between dissatisfaction with current employment and individuals' intention to pursue an entrepreneurial career, both in entrepreneurship research (Werner et al. 2014; Guerra and Patuelli 2016; Jeong and Choi 2017) and in academic researchers in particular (Guerrero and Urbano 2014; Morales-Gualdrón et al. 2009), we argue that job dissatisfaction moderates the relationship between OE and entrepreneurial intention. Accordingly, we expect that entrepreneurial academics who are encouraged by the desire to leave university due to job dissatisfaction will pursue entrepreneurial behavior that is unrelated to their current employment. In particular, career opportunities for young scientists at universities are limited, as there are few places in top academic positions and university employments are often limited in time. Thus, the following hypothesis can be developed based on earlier findings:

(H3b): Among academics, job satisfaction negatively moderates the relationship between OE and entrepreneurial intention.

# Research methodology

## Data collection and sample

This contribution is based on cross-sectional data collected in a nationwide, online survey of academics at the seven public Swiss universities of applied sciences (UAS). Since 1995, the Swiss UAS expanded its activities in research and development, which is anchored in the legal performance contract (Bundesgesetz über die Fachhochschulen 1995). Intensive cooperation with non-institutional players in the context of practice- or business-oriented education and practice-oriented research has always been a central characteristic of the UAS profile. In recent years, thus, the promotion of science-based start-ups has become an integral part of the service spectrum of universities in Switzerland. Accordingly, many universities and UASs have introduced measures to promote the commercialization of research. Thus, the financial benefits of spin-offs, license rewards, and contract research have become an important source of income for Swiss universities. In addition, a large proportion of members of UASs have completed their academic education (doctorate, habilitation) at universities. Therefore, we assume that the results are transferable to other research institutions and universities.

In Questback, an online survey tool (Unipark 2013), participants could choose between three languages (German, English, and French). Before conducting our study, we tested and optimized the questionnaire and procedures on an independent sample of academics from a large Swiss university. In January 2019, more than 8,000 academics from various disciplines were randomly invited via e-mail to participate in the survey. After eliminating incomplete responses, the final sample consists of 593 participants. The mean age of these respondents was 43.1 years (SD = 10.0, range: 25–69), 63.7 % (n=378) of these participants were male. Fifty percent (n= 289) of the participants belonged to STEM disciplines, including mathematics, computer science, natural science, and technology, while the others belonged to the social sciences and business administration. Academics who stated that they gained entrepreneurial experience (5.7 %, n= 34) were included as controls. An overview of the demographic characteristics of the sample is printed in *Table 1.* The sample corresponds to the demographic distribution in terms of age, nationality, gender, and education of scientists at the Swiss UASs (Bundesamt für Statistik 2019).

---------- INSERT TABLE 1 DESCRIPTIVE STATISTICS OF THE SAMPLE (*n* = 593 ) --------

## Measures

### Dependent Variables

To test our hypothesis, this contribution relies on prior research in terms of capturing academics' (a) general entrepreneurial intention and (b) spin-off intention (Goethner et al. 2012; Huyghe and Knockaert 2015; Moog et al. 2015; Obschonka et al. 2012). In line with common practice in entrepreneurial research, principle component analysis (PCA) was used to investigate the underlying structure of the six measurement items. The first two principal components accounted for 80% of cumulative variance, showing a probable binary structure. In order to avoid possible inaccuracies in the measurement of spin-off intention, participants in the survey were offered a precise definition of spin-off activities. Spin-offs are based either on the intellectual property resulting from research or on skills and knowledge developed at a university. Intellectual property or skills are essential for the creation of the company (i.e., academic entrepreneurship).

*Entrepreneurial intention (EI).* Three items were used as a seven-point Likert scale (1 = "very unlikely" to 7 = "very likely") to measure EI, e.g., "You have the firm intention of becoming an entrepreneur one day," based on Liñán and Chen (2009). Scale reliability, measured by Cronbach's α = 0.88, was above the generally accepted criterion of 0.70, indicating high reliability (Cortina 1993).

*Spin-off intention (SPIN).* To measure SPIN, three items were used as a seven-point Likert scale (1 = "very unlikely" to 7 = "very likely"). It was asked e.g. "You will engage in the establishment of a company based upon an idea, on knowledge or specific competencies or technology developed at the university," based on Obschonka et al. (2015), with scale reliability measured by Cronbach's α = 0.85.

## Independent Variables

*Job satisfaction.* Four items were averaged and used as a seven-point Likert scale (1= "Absolutely incorrect" to 7 = "Absolutely correct") to measure job satisfaction. E.g., "Overall, I am very pleased with the types of activities that I do in my job," "Overall, I am very satisfied with my salary," and "Overall, I am very pleased with my career opportunities," adapted from Wanous et al. (1997) and Gagné et al. (2015). Scale reliability was acceptable, measured by Cronbach's α = 0.77.

*Outcome expectations (OE).* Based on Miranda et al. (2018), we employed four items to measure OE as a seven-point Likert scale (1 = "Absolutely disagree" to 7 = "Absolutely agree"): (1) *Autonomy*: "Being an entrepreneur would entail a very high degree of Autonomy," (2) *Profit*: "The financial return that I would get by becoming an entrepreneur would be high," (3) *Self-realization:* "The personal satisfaction from being an entrepreneur would be very high," and (4) *Quality of life:* "The quality of life that I would get from being an entrepreneur would be very high." The four items were averaged based on scale reliability measured by Cronbach's α = 0.82.

*Perceived behavioral control (PBC).* Three items were used as a seven-point Likert scale to measure PBC. The three items were (1) "I can control the creation process of a new company," (2) "I know how to develop an entrepreneurial project," and (3) "I know the necessary practical details to start a company" with scale reliability of Cronbach's α = 0.89 (Seven-point Likert scale; 1 = "Absolutely incorrect" to 7 = "Absolutely correct")

## Control variables

According to prior entrepreneurship literature multiple influences determine scientist's EI: *Gender* [women = 0, men = 1] was controlled for, as men are usually more entrepreneurially active (Zhao et al. 2005; Miranda et al. 2017; Abreu and Grinevich 2017). Additionally, Goel et al. (2015) demonstrated a lower EI among female academics. *Nationality* [foreign = 0, Swiss citizen =1] was controlled for, as individuals with foreign citizenship demonstrate higher entrepreneurial interests (Peroni et al. 2016). *Age* was controlled, as older academics may have gained more social capital (Goethner et al. 2012). Since there is a considerable body of research showing that social capital (in the sense of social networks) is associated with financial resources and market knowledge, and thus a greater propensity to spin-off creation (Fernández-Pérez et al. 2014), *academic status* (professor [no = 0, yes = 1] (Huyghe and Knockaert 2015; Goethner et al. 2012; Ucbasaran et al. 2008), *highest job qualification* (master's degree [no = 0, yes = 1], doctoral degree [no = 0, yes = 1] (Goethner et al. 2012; Huyghe and Knockaert 2015), postdoctoral qualification [no=0, yes=1]), and *discipline* (social science and humanities =0, STEM =1)

are controlled (Abreu and Grinevich 2014; Mosey and Wright 2007; Krabel and Mueller 2009). Additionally, the *level of employment* (in percent) and *temporary work contrac*t [no = 0, yes = 1] was controlled as a dummy variable, since limited work contract negatively predict job-satisfaction (Waaijer et al. 2017). Following Huyghe and Knockaert (2015), we controlled for the *spin-off mission* of the universities, measured as a seven-point Likert-Scale. Bercovitz and Feldman (2008) emphasized that the individual behavior of academics is strongly affected by the social norms of the departments.

## Data analysis

To test the hypotheses, the technique of structural equation +modeling (SEM) using {lavaan} R package v. 0.6-5 (Rosseel 2012) in R (R Core Team 2013) was employed. This procedure uses fit indices to examine whether, and how well, the hypothesis-based model fits the data. Based on previous recommendations in social sciences (Kline 2005), this study focuses on the overall fit indices (Chi-Square Statistics, Root mean square of approximation RMSEA) and the incremental fit indices (Tucker Lewis Index =TLI, Comparative Fit Index = CFI). A non-significant $X^2$ indicates a good fit, but using $X^2$ alone as a fit statistic is problematic because it is influenced by the sample size and the extent of the correlations in the model. Generally, a CFI and a TLI of greater value than 0.90 indicate a reasonably good fit. In terms of the RMSEA, values $\leq 0.05$ indicate a close approximation, and values between 0.05 and 0.08 indicate a reasonable approximation error (Kline 2005).

## Convergent, discriminant validity and common method variance

Before testing the hypotheses, confirmatory factor analysis was carried out to verify the distinctiveness of our measurements (discriminatory validity) and to estimate the effects of commonly measured variances. The criterion of Fornell and Larcker (1981) has commonly been used to assess the degree of shared variance between latent variables of the model, and it was used to test convergent validity. On the basis of a confirmatory factor analysis ($X^2[94.0] = 219.7$ $p < 0.001$, RMSEA= 0.05, CFI = 0.97, TLI = 0.97), convergent validity can be investigated by calculating the Average Variance Extracted (AVE) using a cut-off point of 0.50 (Hair et al. 2017). The inspection of the AVE values *(Table 2)* for all factors suggests an acceptable convergent validity (AVE > 0.50, is considered as acceptable, AVE > 0.70 as very good).

Discriminant validity was evaluated in two ways. First, it was evaluated by comparing the constructs' values of the squared root of the AVE ($\sqrt{AVE}$) with the correlation of the other constructs (Fornell and Larcker 1981) (*see Table 2)*. A value of √AVE that is higher than the coefficient of the correlation between factors provides evidence of discriminant validity. As shown in *Table 2*, all factors met the criterion and demonstrated discriminant validity. Second, discriminant validity was evaluated by using a more recent technique, the heterotrait-monotrait ratio of the correlation (HTMT) (Henseler et al. 2015). HTMT is the average of the heterotrait-heteromethod correlation relative to the average of the monotrait-heteromethod correlation. If HTMT is below 0.90, a discriminatory validity between two reflective constructs can be assumed. Results show that the HTMT values between the respective constructs appeared to be below 0.90 (highest value of HTMT = 0.82 for the link between entrepreneurial and SPIN, lowest HTMT = 0.04 for PBC and satisfaction). The results provide evidence for convergent and discriminant validity.

---------- INSERT TABLE 2 HERE ----------

Common method variance (CMV) arises if a method bias influences all measures equally (Podsakoff et al. 2012) and can occur when respondents systematically distort their responses to surveys, e.g., according to social desirability. To examine the potential of CMV, all study variables were loaded onto one factor to examine the fit of the CFA model. If the one-factor CFA model fits the data, the common method variance is considered largely responsible for the relationship among the variables (Mossholder et al., 1998). The one-factor CFA model did not represent the data very well ($\chi^2$ (119) = 2563.8, $p < 0.001$, CFI = 0.55, RMSEA = 0.19), demonstrating that the study variables were not just different aspects of an underlying construct (CMV).

# Results

## Zero-order correlations

*Table 3* presents the zero-order correlations with Bonferroni Correction between all variables used to investigate the prediction model for explanation of EI and SPIN. In line with the theoretical expectations, EI and SPIN are correlated with PBC ($r_{Ent/PBC} = 0.43$, $p < 0.001$ and $r_{Spin/PBC} = 0.35$, $p < 0.001$). EI and SPIN intention are positively correlated with OE ($r_{Ent/OE} = 0.55$, $p < 0.001$ and $r_{Spin/OE} = 0.43$, $p < 0.001$). No statistically significant correlation emerged between job satisfaction and the SPIN (H3a). Whereas, as expected in hypothesis (H3b), a negative correlation between the EI and satisfaction was observed ($r_{Ent/Sat} = -0.9$, $p < 0.05$). A high correlation between SPIN and EI ($r_{Spin/Ent} = 0.70$, $p < 0.001$) is apparent in the data.

---------- INSERT TABLE 3 HERE----------

## Testing the Path Model

The hypothetical model (H1) and (H2) was tested with PBC and OE as predictors of EI and SPIN (all constructs were measured as latent variables in the model), including the control variables. Due to missing data (less than 3%), the full information maximum likelihood (FIML) estimation was used (Enders and Bandalos 2001). The model fit was acceptable ($X^2$ [168] = 407.7, $p < 0.001$, RMSEA = 0.05, CFI = 0.95, TLI = 0.94), indicating that the measurement of the latent variables was sound.
The model explained 55% of the variance of entrepreneurial and 44 % of the variance of SPIN. PBC had a significant effect of $\beta = 0.21$ ($p < 0.001$) on EI and a significant effect of $\beta = 0.14$ ($p < 0.001$) on SPIN, indicating support for (H1a) and (H1b). Also, in line with hypotheses (H2a) and (H2b), the results show that OE have a direct effect on both the EI ($\beta = 0.52, p < 0.001$) and SPIN ($\beta = 0.36, p < 0.001$). Among the control variables, gender, entrepreneurial experience, and university spin-off mission positively affected both EI and SPINs. STEM-Discipline showed a positive effect on SPIN. The effects of the control variables on EI and SPIN are shown in *Table 4.*

---------- INSERT TABLE 4 HERE----------

## Testing the Moderation

In order to test the moderating effect of job satisfaction, a multi-group analysis in {lavaan} R

package v. 0.6-5 (Rosseel 2012) was conducted. By applying a median split of the aggregated items of job satisfaction (Mean = 5.1, SD = 1.12, Median = 5.2), two groups were created (high job satisfaction; n = 261 and low job satisfaction; n = 332. For this analysis, the items of the OE scale were aggregated. This procedure was applied previously in other entrepreneurship studies (e.g., Obschonka et al. 2012).

Subsequently, a number of mean difference tests of the manifest variables of each scale (e.g., mean value of the EI) were performed. The two groups did not differ in terms of the dependent variables *EI* (t[550.4] = 0.96, $p = 0.35$), *SPIN* (t[549.3] = 0.37, $p = 0.71$), *gender* ($X^2[1] = 0.43, p = 0.51$), and *discipline* ($X^2[1] = 0.30\ p = 0.58$). The dissatisfied academics did not have statistically significant higher values in OE (Mean = 4.05, SD = 1.17) than the highly satisfied academics (Mean = 3.9, SD = 1.28; t[518.1] = 1.50, $p = 0.13$). The results of the multi-group model are shown in *Table 4.* OE showed a significant effect of $\beta_{LowSatisfation} = 0.55$ ($p < 0.001$) on EI among academics with low job satisfaction and an effect of $\beta_{HighSatisfaction} = 0.47$ ($p < 0.001$) on EI among academics with high job satisfaction, indicating a negative moderating effect of job satisfaction. The effects of OE on SPIN did not essentially differ within the low job satisfaction group ($\beta_{LowSatisfation} = 0.37$, $p < 0.001$) compared to the group with high job satisfaction ($\beta_{HighSatisfaction} = 0.36$, $p < 0.001$).

The group of low job satisfaction demonstrated a lower correlation between EI and SPIN ($r_{LowSatisfaction} = 0.65$, $p < 0.001$) compared to the group with high job satisfaction ($r_{HighSatisfaction} = 0.76$, $p < 0.001$) suggesting that the perception of differences between the two constructs increases with higher levels of job dissatisfaction.

In terms of variance elucidation, dependent and control variables explained more variance in EI ($R^2_{LowSatisfaction} = 0.60$, $R^2_{HighSatisfaction} = 0.54$) compared to the explained variance in SPIN ($R^2_{HighSatisfaction} = 0.47$, $R^2_{LowSatisfaction} = 0.42$)

----------INSERT FIGURE 1 HERE----------

In the next step, it was examined whether the differences between the two groups of job satisfaction were statistically significant. A Chi-square difference test revealed that the unconstrained and constrained (factor-loadings, measurement intercepts) did not differ in their fit ($\Delta X^2\ [16] = 22.0, p = 0.15$), indicating measurement invariance across both groups. The next step was to test the unconstrained model against models, where one of the paths was always set equal across both groups *(see Figure 1)*. Evidence arose of a significant moderating effect in the case of the link between OE and EI, but not in the case of OE and SPIN (as indicated by the significant $\Delta X^2$). While hypothesis (H3a) was not confirmed, the moderation analysis (as shown in *Table 5*), provided evidence for hypothesis (H3b). Accordingly, there is a negative moderation effect of job satisfaction on the relationship between OE and EI.

----------INSERT TABLE 5 HERE----------

Exploratory analysis of outcome expectation on the spin-off and entrepreneurial intention

In a second step, this study tested exploratory, which of the OE dimensions showed the greatest influence on the entrepreneurial and SPIN *(see Figure 1).* The items of the OE items for autonomy, profit, satisfaction, and quality of life were individually inserted into the model as independent variables

(additionally, the control variables and PBC). The model showed a good fit of $X^2$ [157] = 365 $p < 0.001$, RMSEA= 0.05, CFI = 0.96, TLI = 0.94. Regarding EI, the empirical model indicated a direct effect of OE self-realization ($\beta = 0.31, p < 0.001$) and outcome expectation quality of life ($\beta = 0.27, \mathrm{p} < 0.001$) on entrepreneurial intention. In contrast, no effect of OE autonomy ($\beta = -0.06, p = 0.11$) and OE financial profit ($\beta = 0.04, p = 0.92$) was found on EI. Regarding SPIN, besides OE self-realization ($\beta = 0.16, p < 0.01$) and OE quality of life ($\beta = 0.18, p < 0.001$), no effect of OE profit ($\beta$ = 0.07, p = 0.13) or OE autonomy ($\beta$ = - 0.04, $p$ = 0.34) was statistically significant. These results suggest that both entrepreneurial and spin-off intentions are driven by the expectation of an improvement in the quality of life and self-realization.

# Discussion

Our study examined the motivation and subjective perception of the environment in which an academic researcher considers their potential career as an entrepreneur. To investigate the research question, we analyzed a unique sample of 593 academics from Swiss UASs, obtained from an online survey conducted in Spring 2019. The study's results contribute to understanding the relationship between job-satisfaction and entrepreneurial intention among university researchers. While employing the SCCT (Lent et al. 1994, 2002) in the context of academic entrepreneurship, a distinction was made between entrepreneurial intention and spin-off intention (i.e., academic entrepreneurship). Academic spin-offs (based on intellectual property or knowledge and skills) are considered to be a specific form of academic entrepreneurship. They are an essential part of the commercial knowledge transfer, a vital task of entrepreneurial universities (Etzkowitz 2017; Meek and Wood 2016) and thus a considerable extension of an academic career.

To date, little is known about the motivational factor driving entrepreneurial career decisions among university researchers. This is particularly true when it comes to the differences in academic entrepreneurship (i.e., spin-offs) and extramural forms of entrepreneurial activities among academic researchers. The results of our study are mixed. On the one hand, our study supports prior findings in entrepreneurship literature that job dissatisfaction significantly interacts as a moderator for *entrepreneurial careers*. Conversely, our results did not show a positive relationship between job satisfaction as a moderator of outcome expectations and *spin-off careers*. Moreover, we found outcome expectation (OE) and perceived behavioral control (PBC) both to be significant predictors of entrepreneurial and spin-off career decisions.

First, on the effects of workplace characteristics, we found mixed findings regarding the moderating relationship between OE and entrepreneurial decisions. Generally, academic researchers in our sample showed a high level of job satisfaction. A multi-group analysis revealed no statistically significant moderating effects of job satisfaction on the relationship between outcome expectation and spin-off intention. However, a negative moderating effect between outcome expectation and entrepreneurial intention became apparent. This finding firstly suggests that participants perceived entrepreneurial careers and spin-off careers as slightly different from each other. Secondly, that different psychosocial micro-processes may be involved when studying academic entrepreneurship in the form of spin-offs (e.g., commercialization of research) compared to general entrepreneurial decisions among academic researchers.

In terms of entrepreneurial goals, spin-off intention is a specific case of entrepreneurial intention, but entrepreneurial intention may also include extramural forms of entrepreneurship. Our results show that entrepreneurial-minded researchers are more likely to engage in entrepreneurial activities, rather than spin-off activities if they are dissatisfied with their current employment. This means that previous findings from the entrepreneurship literature, which have shown that job-dissatisfaction increases the probability of the transition to self-employment (Chang and Edwards 2015; Guerra and Patuelli 2016; van Dick et al. 2004; Werner et al. 2014), can also be applied to academic researchers. As such, Singh and Onahring (2019), postulated a relationship exists between job satisfaction, organizational commitment, and entrepreneurial activities.

However, our results do not support the assumed effect that entrepreneurial researchers with high job satisfaction develop a more substantial interest in spin-off activities. It could be argued that scientists

who are satisfied with their current position may want to maintain the status quo and not pursue additional commercialization activities (i.e., spin-off activities). Qualitative research has shown that academics are developing a second identity as entrepreneurs within the entrepreneurial university, alongside their traditional academic identity (Boffo, S., & Cocorullo, A. 2019). The two forms of identity converge when traditional scientific identity also benefits from the entrepreneurial role's successes. Only thirty-six percent of respondents in the current study stated that their universities would significantly or partially support spin-offs activities of researchers (e.g., university spin-off-mission) (Huyghe and Knockaert 2015). We, therefore, assume that spin-off activities do not yet have a high priority at all higher education institutions, compared to an entrepreneurially-minded university, and that success in spin-off activities may not yet lead to a strengthening of academic careers within the organization.

Additionally, we argue that perceived feasibility in the form of PBC does matter when deciding to move into entrepreneurship. Per our results, entrepreneurial intention, as well as spin-off intention, were positively influenced by PBC. Our results demonstrated that academics with a higher level of PBC showed a higher likelihood to develop entrepreneurial as well as spin-off intentions when controlling for prior entrepreneurial experience and other personal control variables (e.g., age, discipline, and gender). This finding is consistent with prior entrepreneurship literature (Brettel et al. 2013; Díaz-García and Jiménez-Moreno 2010; Krabel and Mueller 2009; Moog et al. 2015; Obschonka et al. 2010; Obschonka et al. 2012; Obschonka et al. 2015). While SCCT posits self-efficacy to predict career intentions, our study supports PBC as an interesting construct to study beliefs of dealing with ease or difficulties in entrepreneurial task performance. Ajzen (2002) considered the concept of self-efficacy as part of a superordinate construct of PBC. While mostly measured as a one-dimensional construct, self-efficacy was also shown to be a significant predictor of entrepreneurial intention in prior academic entrepreneurship research (Díaz-García and Jiménez-Moreno 2010; Guerrero et al. 2008; Huyghe and Knockaert 2015).

Our results revealed that PBC has a slightly more substantial influence on predicting entrepreneurial intentions than predicting spin-off intentions. Spin-offs are more likely to be founded among research teams as it reduces individual pressures to manage every step to become a successful founder. Also, universities, technology transfer offices, science parks, and incubators offer opportunities, such as coaching and training to acquire skills needed to create spin-off activities, suggesting less responsibility for the individual. Previous research has shown that these offers have a positive effect on perceived behavioral control (Miranda et al. 2017). We argue that individuals do not have to rely exclusively on their skills when selecting a spin-off career. Therefore, feasibility plays a less crucial role in spin-off decisions than in other forms of self-employment.

Third, regarding personal motivation, we hypothesized in line with the SCCT, that outcome expectation would be a predictor for entrepreneurial intention. We noted a positive effect on the level of outcome expectation on both entrepreneurial intention and spin-off-intention, which suggested that higher outcome expectations encourage a transition into entrepreneurship. However, the effect of outcome expectation was more important for predicting entrepreneurial intention than for spin-off intention. Additional analyses determined that expected profit and autonomy were not significant motivations for spin-off or entrepreneurial intent. Furthermore, Self-realization and expected improvements in quality of life explained entrepreneurial intention more reliably than for spin-off intention. We also considered other motivations such as reputation and extrinsic rewards, which were stronger predictors of spin-off decisions

than self-realization and quality of life (e.g., Houweling and Wolff 2019). This finding is consistent with the assumptions of SCCT and the expectation stated in the literature review that motivations in the form of specific outcome expectation explain entrepreneurial career decisions (Antonioli et al. 2016; Goethner et al. 2012; Guerrero and Urbano 2014; Houweling and Wolff 2019; Lam 2015; Miranda et al. 2017; Morales-Gualdrón et al. 2009). However, our results show that entrepreneurial career decisions do not necessarily have to be linked to expected financial gains as a primary goal. Other scholars referred to pecuniary advantages such as compensation for their time and efforts spent on entrepreneurial activities driving intentions rather than pure motivation (Hossinger et al. 2020; Morales-Gualdrón et al. 2009).

Regarding our control variables, the probability of a spin-off intention was positively influenced by previous entrepreneurial experience, gender (e,g., women show a lower level of spin-off intention), fixed-term employment contracts, employment in the STEM disciplines, and a perceived spin-off mission by the university (e.g., Huyghe and Knockaert (2015). In contrast, age, academic status, level of employment (in percent), nationality, and highest degree obtained did not significantly account for spin-off intention. These findings support the results of prior academic entrepreneurship research (e.g., Miranda et al. 2018; Hossinger et al. (2020). Entrepreneurial intention is positively influenced by prior entrepreneurial experience and an explicit spin-off mission of the university, suggesting that the promotion of an entrepreneurial mission within universities contributes significantly to spin-offs and less to other entrepreneurial activities (e.g., Huyghe and Knockaert 2015; Foo et al. (2016).

This paper contributes to the existing literature on the determinants of entrepreneurial activity among academics in three specific areas. First, this study demonstrates that job-dissatisfaction fosters the re-evaluation of OE to set entrepreneurial career goals. Individuals choose between employment and self-employment to maximize the benefits of career choice when considering expected outcomes (Douglas and Shepherd 2000). Second, the results emphasize that entrepreneurial activities are associated with specific expectations, including improvements in self-realization and quality of life. Third, this paper contributes to the existing literature by empirically applying the framework of SCCT, as recommended by Liguori et al. (2018) and Tran and Korflesch (2016), to investigate academic entrepreneurship. This contribution also addresses the recommendations of Singh and Onahring (2019) to examine the relationship between job satisfaction and entrepreneurial intention. Our results emphasized that several motives are driving the entrepreneurial goals among academics that warrant further research. This study underlines the importance of individual OE and PBC, which merits greater attention by practitioners and knowledge-transfer agencies. In conclusion, financial motivation is not the primary motive for a scientist to become entrepreneurial. Instead, personal fulfillment of one's ideas in combination with job-dissatisfaction proved to be a more compelling motivator.

## Limitations and Further Research

Analysis of academic entrepreneurship and job satisfaction is prone to several limitations, which also provide possible avenues for future research. One limitation concerning our data is that our sample refers only to the context of Swiss UAS in 2019. In Switzerland, salaries and job satisfaction are comparatively high, and researchers have opportunities to switch into industry, which must be considered when interpreting results regarding OE and entrepreneurial intention. Additionally, the field of entrepreneurship research is rapidly evolving in Switzerland (Moog et al. 2015; Houweling and Wolff 2019).

Secondly, the results are particularly valid for UASs because of their strong ties to industry, which has long enabled entrepreneurial activities on the margins of academic employment. Future studies should examine other countries with lower opportunity costs for entrepreneurial activities and higher unemployment rates to study the relationship between job-satisfaction and entrepreneurial activities among academics. In this study, a distinction was made between entrepreneurial intentions and spin-off intentions by assuming that spin-off intentions were a specific case of entrepreneurial intentions. Future studies distinguishing between spin-off intentions and extramural forms of entrepreneurship would likely yield more contrasting results.

Furthermore, the results are based on cross-sectional data. Future studies should use longitudinal data to assess the impact of possible interactions between organizational conditions and academic entrepreneurial behavior. In particular, longitudinal studies could elicit the extent to which spin-offs and start-ups can arise from long-term job dissatisfaction. Additionally, future studies are urged to follow a multi-level approach and test the extent to which different academic positions and team-related factors influence entrepreneurial behavior. A methodological limitation of this study is the lack of validated measurement scales, which led to variables with few items being used. In particular, a re-validation of the job satisfaction scales within academia is required for future studies. Additionally, a mixed-methods approach could be used to investigate the extent to which spin-off careers are seen as alternative career paths and whether they could be developed by training and a stronger presence of role models.

| | | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 378 | 63.7 |
| | Female | 215 | 36.3 |
| Age | Mean (SD) | 43.1 (10.0) | |
| | Median [Min, Max] | 42.0 [25.0, 69.0] | |
| Discipline | Social Sciences | 304 | 51.3 |
| | Natural Sciences (STEM) | 289 | 49.7 |
| Academic status | Professor with leadership responsibility | 180 | 30.4 |
| | Professor without leadership responsibility | 141 | 23.8 |
| | Research assistant | 272 | 45.9 |
| Employment level | Mean (SD) | 80.1 (22.9) | |
| Temp. work contract | | 222 | 37.4 |
| Highest educational qualification | Master (UAS, university) | 296 | 49.9 |
| | Doctorate or post-doctoral degree | 297 | 50.1 |

*Table 1* Descriptive statistics of the sample ($n$ = 593 )

*Average variance extracted (AVE), $\sqrt{AVE}$, Means (M), standard deviations (SD), and correlations with confidence intervals*

| Variable | *M* | *SD* | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|---|---|
| (1) Ent. Intention (EI) | 2.39 | 1.46 | **0.84** | | | | |
| (2) Spin. Intention (SPIN) | 2.58 | 1.57 | .70** | **0.90** | | | |
| (3) PBC | 3.34 | 1.41 | .43** | .35** | **0.83** | | |
| (4) Job-Satisfaction | 4.72 | 1.15 | -.09* | -.02 | -.02 | **0.74** | |
| (5) Outcome Expectation | 3.65 | 1.24 | .55** | .43** | .37** | -.07 | **0.73** |

*Table 2* M and SD are used to represent mean and standard deviation, respectively. The values shown in bold are the square root of AVE. * indicates p < .05. ** indicates p < .01.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Ent. Intention (EI) | 1 | | | | | | | | | | | | | | | | |
| (2) Spin. Intention (SPIN) | 0.70** | 1 | | | | | | | | | | | | | | | |
| (3) PBC | 0.43** | 0.35** | 1 | | | | | | | | | | | | | | |
| (4) Job-Satisfaction | -0.09* | -0.02 | -0.02 | 1 | | | | | | | | | | | | | |
| (5) Outcome Expectation | 0.55** | 0.43** | 0.37** | -0.07 | 1 | | | | | | | | | | | | |
| (6) Uni. Spin-Mission | 0.29** | 0.38** | 0.13** | 0.08* | 0.14** | 1 | | | | | | | | | | | |
| (7) STEM-Discipline | 0.21** | 0.28** | 0.10* | -0.01 | 0.14** | 0.25** | 1 | | | | | | | | | | |
| (8) (Post-)Doctoral degree | -0.10* | -0.09* | -0.03 | 0.00 | -0.07 | -0.02 | -0.08 | 1 | | | | | | | | | |
| (9) Professor with leadership responsibility | -0.02 | 0.06 | 0.11** | 0.09* | 0.03 | 0.09* | 0.03 | 0.08 | 1 | | | | | | | | |
| (10) Professor without leadership responsibility | -0.08 | -0.09* | 0.03 | -0.05 | -0.09* | -0.02 | -0.16** | 0.11** | -0.36** | 1 | | | | | | | |
| (11) Research assistant | 0.09* | 0.02 | -0.13** | -0.05 | 0.04 | -0.06 | 0.11* | -0.17** | -0.62** | -0.51** | 1 | | | | | | |
| (12) Temp. work contract | 0.15** | 0.12** | -0.08 | -0.04 | 0.07 | 0.07 | 0.05 | -0.10* | -0.37** | -0.21** | 0.52** | 1 | | | | | |
| (13) Employment level | 0.02 | 0.10* | -0.04 | 0.02 | 0.01 | 0.05 | 0.26** | 0.04 | 0.29** | -0.13** | -0.16** | -0.22** | 1 | | | | |
| (14) Gender (men/woman) | -0.09* | -0.20** | -0.10* | -0.09* | -0.03 | -0.11** | -0.26** | -0.05 | -0.14** | -0.08 | 0.19** | 0.10* | -0.25** | 1 | | | |
| (15) Age | -0.15** | -0.09* | 0.13** | -0.04 | -0.12** | -0.01 | -0.11** | 0.15** | 0.41** | 0.29** | -0.63** | -0.45** | 0.06 | -0.12** | 1 | | |
| (16) Swiss citizens | -0.08 | -0.07 | 0.02 | 0.01 | -0.02 | -0.04 | -0.08* | -0.03 | -0.02 | 0.01 | 0.01 | -0.02 | -0.10* | 0.05 | 0.05 | 1 | |
| (17) Ent. experience | 0.36** | 0.33** | 0.31** | -0.12** | 0.20** | 0.08 | 0.08* | -0.04 | 0.10* | 0.02 | -0.11** | 0.04 | -0.07 | -0.08 | 0.09* | 0.00 | 1 |

*Table 3* Computed correlation used Pearson-method with pairwise-deletion and Bonferroni Correction. * indicates $p < .05$. ** indicates $p < .01$.

| | | | Research Model *Overall (n=593 )* | | Low Job-Satisfaction *($n_{Low}$=332)* | | High Job-Satisfaction *($n_{High}$=261)* | |
|---|---|---|---|---|---|---|---|---|
| Path | | | St. path coefficient | *p* | St. path coefficient | *p* | St. path coefficient | *p* |
| OE | ---> | EI | 0.52 | < 0.001 | 0.55 | < 0.001 | 0.47 | < 0.001 |
| PBC | ---> | EI | 0.21 | < 0.001 | 0.23 | < 0.001 | 0.17 | < 0.001 |
| Job-Satisfaction | ---> | EI | - 0.02 | 0.59 | | | | |
| Uni. Spin-Mission | ---> | EI | 0.20 | < 0.001 | 0.16 | < 0.001 | 0.28 | < 0.001 |
| Gender women | ---> | EI | - 0.04 | 0.22 | - 0.08 | 0.09 | 0.01 | 0.93 |
| Age | ---> | EI | - 0.09 | 0.05 | - 0.09 | 0.14 | - 0.09 | 0.18 |
| Professor | ---> | EI | 0.04 | 0.29 | 0.06 | 0.24 | 0.03 | 0.61 |
| Entrep. exp. | ---> | EI | 0.23 | < 0.001 | 0.27 | < 0.001 | 0.20 | < 0.001 |
| Employment level | ---> | EI | 0.04 | 0.33 | 0.02 | < 0.05 | - 0.06 | 0.31 |
| Nationality | ---> | EI | - 0.03 | 0.33 | 0.02 | 0.68 | 0.09 | 0.08 |
| Temp. work contract | ---> | EI | 0.08 | 0.05 | 0.08 | 0.16 | 0.11 | 0.09 |
| (Post-)Doctoral degree | ---> | EI | 0.10 | 0.05 | 0.04 | 0.78 | 0.16 | 0.30 |
| STEM-Discipline | ---> | EI | 0.40 | 0.28 | 0.07 | 0.17 | 0.03 | 0.60 |
| $R^2$ | | EI | 0.55 | | 0.62 | | 0.54 | |
| OE | ---> | SPIN | 0.36 | < 0.001 | 0.37 | < 0.001 | 0.36 | < 0.001 |
| PBC | ---> | SPIN | 0.14 | < 0.001 | 0.14 | < 0.01 | 0.12 | 0.08 |
| Job-Satisfaction | ---> | SPIN | - 0.05 | 0.24 | | | | |
| Uni. Spin-Mission | ---> | SPIN | 0.30 | < 0.001 | 0.30 | < 0.001 | 0.34 | < 0.001 |
| Gender women | ---> | SPIN | - 0.10 | < 0.05 | - 0.15 | < 0.05 | - 0.05 | 0.39 |
| Age | ---> | SPIN | - 0.08 | 0.09 | - 0.18 | < 0.05 | 0.03 | 0.70 |
| Professor | ---> | SPIN | 0.04 | 0.51 | - 0.03 | 0.61 | 0.02 | 0.77 |
| Entrep. exp. | ---> | SPIN | 0.24 | < 0.001 | 0.31 | < 0.001 | 0.13 | < 0.05 |
| Employment level | ---> | SPIN | 0.04 | 0.33 | 0.11 | < 0.05 | 0.01 | 0.83 |
| Nationality | ---> | SPIN | - 0.03 | 0.47 | - 0.02 | 0.65 | - 0.02 | 0.65 |
| Temp. work contract | ---> | SPIN | 0.10 | < 0.05 | 0.08 | 0.15 | 0.11 | 0.09 |
| (Post-)Doctoral degree | ---> | SPIN | 0.10 | 0.35 | 0.08 | 0.35 | 0.13 | 0.42 |
| STEM-Discipline | ---> | SPIN | 0.10 | < 0.05 | 0.06 | 0.23 | 0.13 | < 0.05 |
| $R^2$ | | SPIN | 0.44 | | 0.48 | | 0.42 | |
| *Model Fit* | | | | | | | | |
| $X^2$ | = | 407.7 | df=186 | < 0.001 | 608.9 | df=336 | < 0.001 | |
| RMSEA | = | 0.046 | | | 0.053 | | | |
| CFI | = | 0.941 | | | 0.942 | | | |
| TLI | = | 0.923 | | | 0.928 | | | |

*Table 4* Structural model path coefficients, $R^2$, and fit statistics for the models

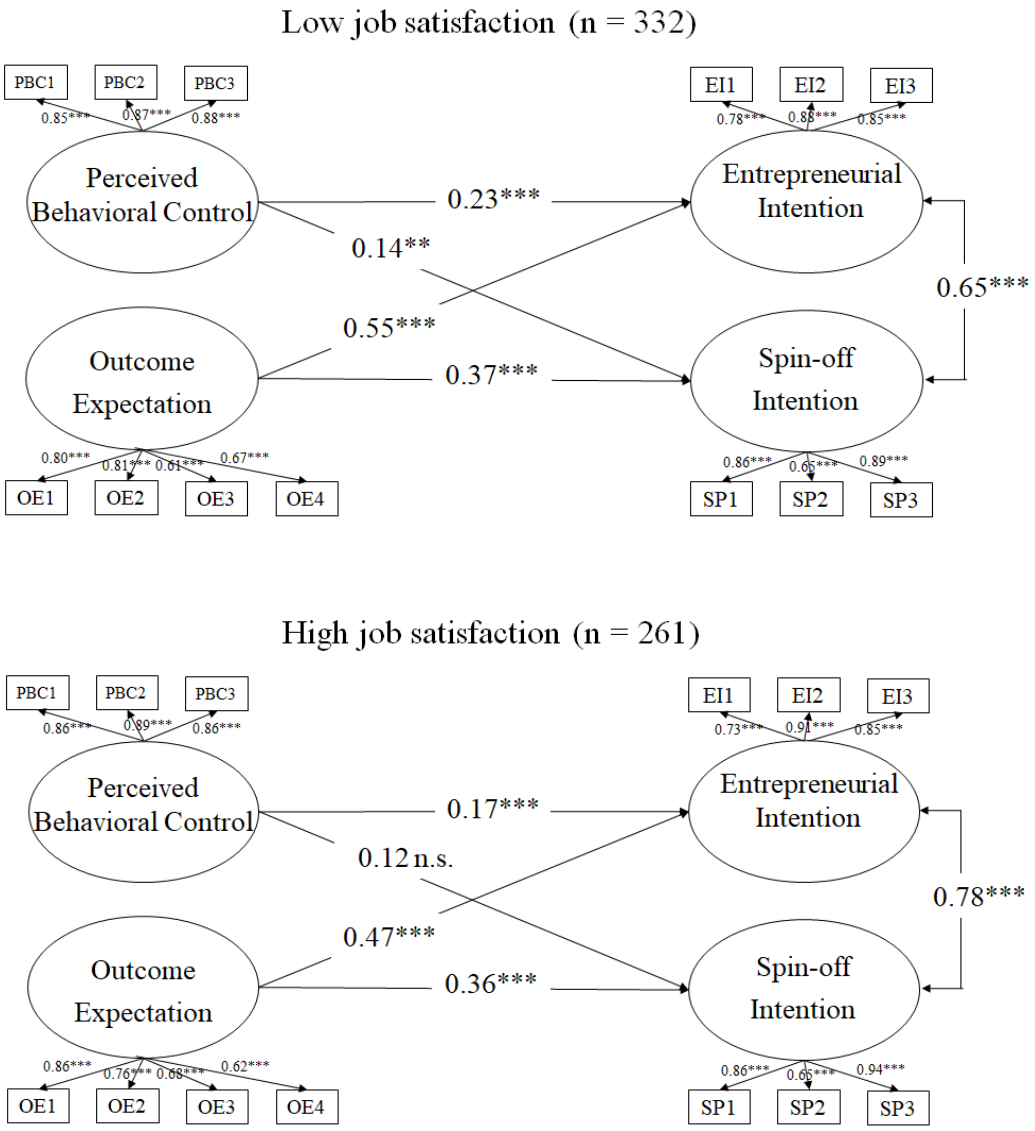


*Figure 1* Multi-group analysis (Moderator: Job Satisfaction). Note: Standardized coefficients are given. All effects are controlled for gender, field, nationality, venture already founded, academic status, qualifications and contract of employment. **p< .05, **p < .01, ***p<.001*

| Models – Moderation | $X^2$ | $df$ | CFI | RMSEA | $\Delta X^2$ | $\Delta df$ |
|---|---|---|---|---|---|---|
| Unconstrained model I | 609*** | 336 | 0.94 | 0.053 | | |
| PBC➔ EI set equal across groups | 610*** | 337 | 0.94 | 0.052 | 1.31 | 1 |
| PBC➔ SPIN set equal across groups | 609*** | 337 | 0.94 | 0.053 | 0.22 | 1 |
| OE➔ EI set equal across groups | 615*** | 337 | 0.94 | 0.053 | 5.5* | 1 |
| OE➔ SPIN set equal across groups | 610*** | 337 | 0.94 | 0.053 | 0.51 | 1 |

*Table 5 Fit* indices and $X^2$ difference test for moderation effect of job satisfaction.
Note *p < .05, **p < .01, ***p< .001

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