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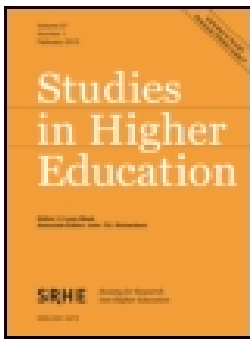


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# How training and development practices contribute to research productivity: a moderated mediation model

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## ABSTRACT



The use of corporate management practices in higher education has led to spread of result-oriented practices to improve research productivity, including publication rewards and requirements. In this paper we stress the importance of input and process based approaches by examining the mediating role of research self-efficacy on the relationship between training & development practices and research productivity, and the moderating role of knowledge sharing climate. This empirical work provides a more complete understanding of how training & development practices may build research self-efficacy which in turn promotes faculty members' research productivity. Finally, we contribute to the emerging literature on the moderating effects of knowledge sharing climate.

## KEYWORDS

Training and development; research productivity; knowledge sharing climate; research self-efficacy; strategic human resource management

## Introduction

The global higher education sector has changed significantly in the past two decades. Some of these changes were induced by national governments to improve efficiency and effectiveness in various fields, including policies to enhance research productivity (Billot 2010; Brew, Boud, and Malfroy 2017). According to Lucas and Murry (2011) research productivity became a requirement for research institutions, as well as for faculty members in all types of institutions. This attracted scholarly attention to understanding individual-level research productivity and factors that lead to its increase (Hemmings and Kay 2016; Nygaard 2017). In this study we focus our attention on HR practises, particularly research training and development (T&D) practices. Governments and higher education institutions (HEIs) in many developing countries devote significant resources to research T&D, including research methodology workshops and 'how to publish' seminars. Previous studies have identified different organizational factors that may predict faculty members' research performance (Hedjazi and Behravan 2011; Wester et al. 2019). Bland (1992) revealed twelve factors from Productive Research Environments (PRE), based on meta-analysis including research emphasis, group climate, governance mechanisms, availability of resources, and HR practices. A related concept, Research Training Environments (RTE) was studied as a predictor of research productivity among doctoral students (Brown et al. 1996; Mallinckrodt and Gelso 2002). On the post-doctoral level, there are a limited number of empirical studies which show the effectiveness of intervention in the form of research training programs in improving the research performance (Anandarajah et al. 2016; Konstantakos et al. 2010; Kurahara et al. 2012; Rothberg et al. 2014).

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In addition to the gap in the literature related to post-doctoral level research training, the recent meta-analysis of the relevant studies indicates that the direct relationship between research environment and research productivity might be mediated or moderated by different organizational and individual-level factors (Ajjawi, Crampton, and Rees 2018). This finding and our survey of the literature suggest that there is a lack of empirical research regarding the potential role mediators and moderators play between T&D and research productivity. Particularly, there is a need to examine individual-level variables (e.g. research self-efficacy) as a mediator between T&D practices and research productivity (Holtttum and Goble 2006) and the boundary conditions of these relationships (Overall, Deane, and Peterson 2011). The possibility of establishing boundary conditions can be explained by the research evidence that the relationship between research self-efficacy (RSE) and its antecedents is not linear (Ajjawi, Crampton, and Rees 2018).

To address this research gap, we investigate whether T&D practices can affect research productivity of faculty members, using the moderated mediation model. More specifically, we investigate the potential mediating role of RSE and of a knowledge sharing (KS) climate, relying on social exchange theory (SET) and social capital theory (SCT). The aim of the study is to analyze how T&D practices and KS Climate interact together to predict both RSE and individuals' research productivity. This study attempts to add to the literature in several ways. First, the RSE construct is evaluated as a mediator in the link between T&D practices and research productivity. Although the RSE construct is becoming popular in educational and behavioral research, there is lack of studies that view it as a mediator. The second contribution of our work is that it adds to the understanding of SET and SCT interaction. To the best of our knowledge there is a lack of research that includes T&D practices, KS Climate, and RSE within the models of reciprocal organizational relationships. Third, this paper will widen our knowledge of social exchange relationships between individuals and organizations by treating KS Climate as a moderating factor. Our findings provide credible support for the notion that social capital theory might complement social exchange theory in explaining faculty members' research productivity. This suggests that several theories should be taken into account as a framework in predicting faculty members' research productivity.

## Literature review and hypotheses development

Previous research works have revealed that human resource management (HRM) practices play a unique role in facilitating research productivity of faculty members (Beerkens 2013). Studies have shown that work autonomy (Edgar and Geare 2013), organizational counseling, a reward system (Hedjazi and Behravan 2011), and other organizational practices may effectively promote research performance. The major responsibility of HRD professionals is creating opportunities for learning and development to help employees realize their potential (Peterson and Provo 1998; Swanson and Holton 2008).

In our research, we follow this line of research by introducing training and development practices as a mechanism for promoting research productivity. T&D refers to a bundle of activities or practices, designed by an organization, to enhance employees' skills, competencies, and knowledge (Kraiger 2003). We narrowed down this broad definition to research-related T&D practices that are intended to equip employees with skills and competencies that enable them to become more productive in their academic work. These practices include research workshops, master-classes, seminars, and short courses for early career and senior researchers. As discussed before, SET is appropriate to explain the impact of T&D practices on faculty members' research productivity. Based on this theoretical framework, when employees feel that an organization cares about them by investing in T&D, they are more likely to respond to such investment with desirable work outcomes (Blau 1968). In other words, employees tend to reciprocate the favorable treatment they receive (Cropanzano and Mitchell 2005). Other studies have also found that different kinds of T&D activities, formal and informal, play a crucial role in enhancing research productivity of academic staff (Phillips and Russell 1994; Wood et al. 2018). Hence, the following hypothesis is posed:

Hypothesis 1: T&D practices have a positive impact on research productivity

### ***T&D practices and research self-efficacy***

In efforts to improve their research performance, higher education institutions invest in enhancing the research skills and RSE of their faculty members. T&D practises increase research self-efficacy in several ways. First, these practices make faculty members feel more confident in their abilities to do research, leading to greater levels of RSE. Second, T&D practices can create collaboration between faculty members, so that they can accumulate successful experience, which may further enhance their self-efficacy in research. Third, T&D practices help individuals to gain a sense of control over their career paths, due to organizational help and support for relearning old skills and learning new ones (Lee and Bruvold 2003). This leads to the improvement of psychological states such as self-efficacy and self-esteem. Fourth, T&D practices facilitate an organizational climate in which feelings of trust, cooperation, and optimism occur (Kuvaas and Dysvik 2009). All of these may further strengthen faculty members' self-efficacy in doing their academic work. Overall, the literature suggests that the training environment had a positive effect on RSE (Phillips and Russell 1994). Previous studies have also reported that PhD students who had better training opportunities were more likely to have higher RSE and interest in research (Lambie and Vaccaro 2011). Based on these arguments, the following hypothesis was formulated:

Hypothesis 2: T&D practices have an impact on research self-efficacy

### ***Research self-efficacy and research productivity***

Past research on encouraging research productivity has emphasized organizational and individual level factors (Teodorescu 2000). Recent empirical works on individual-level factors have revealed that psychological factors are significant in explaining this variable (Hemmings and Kay 2016). Therefore, it is vital to consider RSE as a potential predictor of research productivity.

In our study, it is assumed that faculty members with higher levels of RSE are more likely to be productive in their research, for the following reasons. First, ones' self-efficacy is most affected by past experience in performing similar activities (Pajares 2002). The successful accomplishment of a particular job enhances self-efficacy (Bandura 1982). When people repeat their success in completing a certain task, they have higher confidence in their ability to accomplish this task again. For instance, faculty members who have successfully published their work may have high research self-efficacy, compared to those without such a track record. Second, a person highly confident of her/his abilities is more likely to select challenging activities and complete them successfully (Bandura 1977). Hence, research achievements of faculty members depend largely on each member's psychological state. Overall, past studies have viewed self-efficacy through the prism of social cognition theory (Bandura 1982), and found it to be a significant predictor of individual outcomes (Bandura, 2001). In a university context, RSE plays a major role in faculty members' engagement in research activity (Hemmings et al. 2012). In light of the above evidence, the following hypothesis is posed:

Hypothesis 3: Research self-efficacy positively affects research productivity

### ***The mediating effect of research self-efficacy***

One of the key contributions of our paper is the examination of the indirect effect of T&D practices on research productivity via RSE. Building on our earlier arguments, we propose that RSE mediates the association between T&D practices and research productivity.

Support for our hypothesis can be found in the job characteristics model of work motivation input-process-outcomes (Hackman and Morris 1975). This framework provides insight into how T&D practices may affect employee-related outcomes via the mediation of psychological constructs (e.g. RSE).

In the first stage (input), an organization implements T&D practices that are expected to improve psychological states (e.g. RSE) of faculty members (process) in the second stage. Outcomes are achieved in the third stage, in terms of enhanced research productivity. Hence, we expect that T&D practices (input) positively affect RSE (process), which in turn facilitates research productivity (outcome).

Additional theoretical support for our assumption is derived from SET, which views the employment relationship as an exchange process between employer and employee (Blau 1968). Employees reciprocate organizational investment (e.g. T&D) with positive outcomes (e.g. RSE and research productivity). In addition to the reciprocity, the sense of belonging can also explain the indirect relation between T&D practices and research productivity. Investment in staff T&D might be perceived by employees as a message that their employer cares about their development and professional growth. It may have a positive impact on individuals' sense of being an important part of the organization, which enhances their research self-efficacy. Enhanced RSE leads to active engagement in research and increases productivity. Finally, a sense of belonging also can be used to explain the proposed indirect relationship between T&D practices and research productivity. Namely, T&D practices might be perceived as a message to academic staff that their HEIs value them and that the organization cares about their professional development. Hence, it has a positive effect on individuals' sense of belonging to the organization, which in turn may increase faculty members' research confidence and RSE. Further, these positive capacities may help individuals become more productive in their academic activities. It can be concluded that T&D practices generate positive conditions required for RSE and research productivity to flourish. These arguments enable us to formulate the following hypothesis:

Hypothesis 4: Research self-efficacy mediates the link between T&D practices and research productivity

### ***The moderating effect of a knowledge-sharing climate***

The term KS refers to donating or collecting knowledge to assist others and to cooperate with others to generate new ideas (Wang and Noe 2010). According to Connelly and Kevin Kelloway (2003), KS Climate is related to the organizational environment in which employees see KS as a natural activity in their daily work. KS climate is supported by personal belief and organizational structures that are conducive to the free flow of information and knowledge sharing among employees (Bock et al. 2005). The effectiveness of research-related T&D practices can significantly increase if the skills and knowledge obtained by trainees is shared with other colleagues within their organization.

In this paper, we are arguing that KS Climate plays a moderating role by strengthening the effect of T&D practices on RSE, for the following reasons. First, when organizations provide employees with T&D opportunities, alongside creating a work climate where knowledge and experience can be easily shared, faculty members are more likely to have higher levels of self-efficacy in doing research. Employees often acquire knowledge through KS activities and those with a greater level of knowledge are more confident in their abilities to conduct research (Hu and Zhao 2016; Richter et al. 2012). By contrast, an organization is unlikely to gain from T&D programs when people hoard their knowledge and are reluctant to share it (Connelly et al. 2012).

The next reason is based on the fact that knowledge is a type of solid reasoning for data and information which may improve employees' learning and decision-making capabilities (Beckman 1999). Hence, in an organizational climate where knowledge can flow freely, T&D practices have a much stronger effect on faculty members' RSE.

Third, in a KS Climate where employees can fearlessly share their knowledge and learn from others, such positive group dynamics as closeness, cohesiveness, and brotherhood are more likely to exist (Weinstein and Ryan 2010). In other words, this climate provides a framework for the development of close social relationships among co-workers. Hence some organizational members will see KS as opportunity to satisfy their needs for esteem, which may further

improve their self-efficacy. Therefore, KS Climate has the potential to strengthen the influence of T&D practices on RSE.

Fourth, when knowledge is shared between co-workers, it becomes a public good and generates new knowledge (van den Hooff and de Ridder 2004). This new knowledge may be beneficial by improving the research skills and competencies of faculty members, and thereby further enhancing their self-efficacy beliefs. Finally, we assume that KS Climate can strengthen T&D practices, because jointly they send a positive message to employees that the employer cares about them and the workplace environment, which may lead to improved RSE.

In sum, we hypothesize that the impact of T&D practices on RSE is conditional upon contextual factors such as KS climate. Namely, we expect the moderating effect to occur between T&D practices and KS Climate on RSE. Combining these arguments, we propose the following:

Hypothesis 5: The KS Climate moderates the relationship between T&D practices and research self-efficacy

### **Moderated mediation**

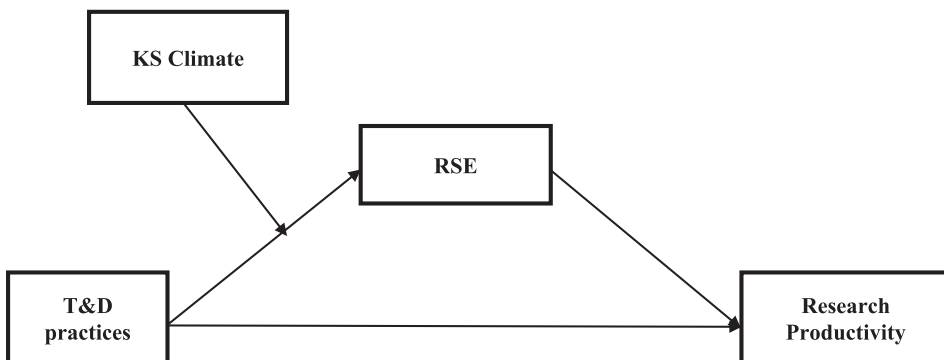
In addition to the assumption that T&D practices are likely to promote research productivity through RSE, it is expected that KS Climate may play a significant role in the relationship between T&D and research productivity. On the basis of the arguments mentioned above, we suggest the moderated mediation model which integrates the mediating role of RSE and the moderating role of KS Climate in the link between T&D practices and research productivity (see Figure 1). In particular, the strength of the mediated effect increased along with the level of KS climate. This led us to the following hypotheses:

Hypothesis 6: KS Climate moderates the indirect relationship between T&D practices and research self-efficacy.

## **Methodology**

### **Data and sample**

A total of 600 questionnaires were randomly distributed among science, technology, engineering, and mathematics (STEM) faculty members across eight leading public and private universities in Astana and Almaty. These two cities are the main research and educational hubs of Kazakhstan. A total of 165 questionnaires were returned to us, out of these, 140 responses were used for data analysis; the remaining responses were excluded due to incomplete data or invalid responses, thus the actual response rate was 23%. Among the faculty members, 43% were male and 57% female. Age of respondents: 3% were 20–24 years old, 28% were 25–29 years old, 25% were 30–39 years old,



**Figure 1.** Research framework.

32% were 40–49 years old, and 12% were over 50. In terms of educational level, almost all of the respondents had a PhD degree (95%). The majority of the respondents (78%) held non-managerial positions. The working experience of respondents varied from less than one year to more than fifteen years.

### **Measures**

Measures for each construct were derived from previously validated instruments. These items were rated on a Likert scale ranging from strongly disagree to strongly agree.

#### ***T&D practices***

The five-item scale of T&D practices was adopted from the research of Meyer, Allen, and Smith (1993), which refers to the degree to which an organization enables employees to further develop their skills and competencies. The questions in the original survey were slightly modified to refer to research training. An example survey item is the following: 'There are lots of (research) training opportunities provided for me in this university/organization.' The Cronbach's  $\alpha$  for these items was 0.89.

#### ***Research self-efficacy***

In this paper, the RSE of faculty members was measured using a nine-item scale developed by Holden and his colleagues (1999). It measures their confidence in their ability to complete specific research activities. Each item begins with the phrase 'How confident are you that you can ...?' The Cronbach's  $\alpha$  was 0.87. The sample item included: 'effectively present your study and its implications?'

#### ***Knowledge-sharing climate***

This construct was measured by five items, which were all derived from Connelly and Kevin Kelloway (2003). The sample item included: 'People with expert knowledge are willing to help others in this organization.' Cronbach's  $\alpha$  coefficient for this scale in the present research was 0.73.

#### ***Research productivity***

Operationalizing research productivity is a subject of debate among scholars, as the scientific output has both a tangible (e.g. publications, conferences, patents) and an intangible (e.g. consulting activity, tacit knowledge) nature (Abramo and D'Angelo 2014). Due to possible time lag problems, we avoided using the number of publications in WoS or Scopus databases, a common practice of ranking agencies, to assess research productivity in this cross-sectional study. The indicators used to measure other variables presented in this paper assess the current state of the respondents and their environments. For consistency among the measures, we used the nine-item scale from Kahn and Scott (1997) to measure research productivity. This scale covers a broad range of research activities (publications, conference participation, involvement in data collection and analysis) instead of focusing only on the number of publications or citations. Example items are 'How many unpublished empirical manuscripts have you authored?' and 'How many local, regional, or national research conventions have you attended?' The value of Cronbach's  $\alpha$  for the scale was 0.76.

### **Data analysis**

To analyze our research model, Partial Least Squares (PLS) path modeling was employed. The arguments for using this approach are: (1) this study focuses on maximizing the variance explained in the dependent variable rather than theory confirmation; (2) the proposed research model is complex, and considers mediation and moderation (Hair et al. 2016). The SmartPLS 3.0 software was utilized to perform our analysis. Additionally, the PROCESS macro was used to test the conditional indirect effect. This macro used bootstrapping technique for testing mediated moderation hypotheses,

using a resampling procedure of 5000 bootstrap samples (Preacher, Rucker, and Hayes 2007). The point estimate was considered significant when the confidence interval did not contain zero.

## Results

### Measurement model

#### Reliability and validity

Since all data were obtained from a single source, the potential impact of common method variance (CMV) was addressed using the following steps. Two different post-hoc tests were utilized to assess the impact of CMV. To minimize the risk of common method variance, Harman's ex post one-factor test was performed (Podsakoff and Organ 1986), by including all of the items used in the research into un-rotated factor analysis. The outcomes revealed that no single factor appears to dominate, and the biggest factor explained 24% of the variance, thus further confirming that CMV was not pervasive in this research. Moreover, to reduce test anxiety, participants were assured that there were no right or wrong answers. Moreover, the dependent variable was measured on a different scale to deal with similar measurement issues. In sum, measurement bias was minimized by using these approaches.

To assess the measurement model, the reliability, convergent, and discriminate validities were examined. As a measurement of reliability, Cronbach's coefficient alpha was calculated for each construct. The value of all constructs varied from 0.73 to 0.89, which is higher than the minimum threshold of 0.7 (Nunnally and Bernstein 1967). Furthermore, composite reliability (CR) was used to analyze the reliability of variables. All values were between 0.79 and 0.90, exceeding the threshold of 0.7 (see Table 1). Similarly, convergent validity was assessed using the method outlined by Fornell and Larcker (1981). Namely, average variance extracted (AVE) should exceed 0.50 to establish convergent validity. All values of AVE (see Table 2) are above the advised threshold. In accordance with Fornell and Larcker (1981), to ensure discriminant validity the square root of AVE should be more than the correlation between study variables. Our outcomes indicate that discriminant validity is achieved (see Table 2).

## Results

### Structural model

After validating the measurement model, SmartPLS 3.0 was used to test our hypotheses. A bootstrapping technique (with 5000 resamples) was applied to examine the significance of the path coefficients (Chin 1998). In accordance with Preacher, Rucker, and Hayes (2007), bootstrap tests are non-parametric simulations and are an efficient and reliable approach to evaluate indirect effects for mediation and moderation models. This method is a better option than the Sobel test, because in an indirect effect test the standard error estimate often does not follow a normal distribution and yields a biased  $p$ -value (MacKinnon et al. 2002). Figure 2 shows the path coefficients, and significance level of the endogenous variable. The outcomes point out that T&D practices have a significant

**Table 1.** Latent variable correlation matrix, internal consistency, and average variance extracted.

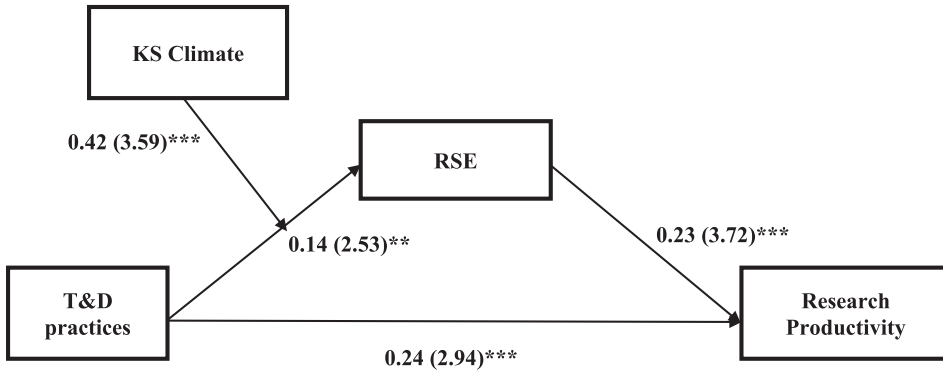
	Mean	Standard Deviation	KS Climate	Research self-efficacy	Research productivity	T&D practices	Composite reliability	Cronbach's coefficient	AVE	AVE (square root)
KS Climate			–				0.84	0.73	0.64	0.8
Research self-efficacy			0.27**	–			0.80	0.87	0.65	0.8
Research Productivity			0.17**	0.27**	–		0.79	0.76	0.57	0.75
T&D Practices			0.11*	0.21**	0.32**	–	0.90	0.89	0.86	0.92

Note:  $t$ -values > 1.65\* ( $p < 0.1$ );  $t$ -values > 1.96\*\* ( $p < 0.05$ );  $t$ -values > 2.57\*\*\* ( $p < 0.001$ ).

**Table 2.** Testing mediation.

Paths	Standardized coefficients (t-values)		
	Total effects	Direct effects	Indirect effects
Training -> Research productivity	0.25 (2.63***)	0.27 (2.80***)	0.10 (2.04**)
Training ->Research self-efficacy		0.14 (2.77***)	
Research self-efficacy -> Research productivity		0.17 (4.34***)	

Note: t-values > 1.65\* ( $p < 0.1$ ); t-values > 1.96\*\* ( $p < 0.05$ ); t-values > 2.57\*\*\* ( $p < 0.001$ ).



**Figure 2.** Research model.

Note: t-values > 1.65\* ( $p < 0.1$ ); t-values > 1.96\*\* ( $p < 0.05$ ); t-values > 2.57\*\*\* ( $p < 0.001$ ).

impact on research productivity (Hypothesis 1: path coefficient = 2.94,  $t = 0.24$ ). Also, the findings revealed that T&D practices have a direct and positive effect on RSE (Hypothesis 2: path coefficient = 2.53,  $t = 0.14$ ), and RSE (Hypothesis 3: path coefficient = 0.15,  $t = 3.72$ ) has positive impact on research productivity.

**Mediating role of RSE**

As is shown in Table 2, the total effect is significant ( $\beta = 0.25$ ;  $t = 2.63$ ). The findings suggest the existence of both a direct and an indirect effect (mediation) ( $\beta = 0.10$ ;  $t = 2.04$ ), since the direct effect of T&D practices on research productivity after introducing RSE is significant ( $\beta = 0.27$ ;  $t = 2.80$ ). In sum, RSE is found to have a partial mediation effect on the association between T&D practices and research productivity.

**Moderating role of KS climate**

In our analysis, the moderating variable (KS climate) was entered into the model, and the moderating impact was added to the mediating variable (RSE). Then, bootstrapping was employed to examine the statistical significance of the moderating effect. The outcomes of the moderation analysis are presented in Table 3. In line with our expectations, KS Climate increases the impact of training on RSE. Therefore, Hypothesis 5 is fully supported.

**Table 3.** KS Climate as a moderator.

Hypothesis	Relationship	Interaction term ( $\beta$ )	Interaction term (T- statistics)
H5	Trainings -> research self-efficacy	0.42	3.89***

Note: t-values > 1.65\* ( $p < 0.1$ ); t-values > 1.96\*\* ( $p < 0.05$ ); t-values > 2.57\*\*\* ( $p < 0.001$ ).

**Table 4.** Conditional indirect effects results.

Outcome	Indirect effect	Index	SE (Boot)	95% CI Lower limit	95% CI Upper limit
Research productivity	0.40	0.84	0.17	0.14	0.90

Note: Bootstrapping based on  $n = 5000$  subsamples.

### *Moderated mediation*

In order to examine moderated mediation, we have followed the suggestion of Hayes (2013). Consistent with our expectations, KS Climate significantly moderates the link between T&D practices and RSE (see Table 3). Next, Model 7 of the PROCESS macro was used to assess the conditional indirect effect of T&D practices on research productivity when RSE is the mediator and KS Climate is the moderator. PROCESS uses a bias-corrected 95% bootstrap confidence interval (CI) for the indirect effect based on 5000 bootstrapped samples. If the confidence interval does not overlap zero, it means that the indirect effect is significant. Consistent with our assumptions, the results support Hypothesis 6, due to a significant indirect effect of 0.15 (Table 4).

### **Discussion and conclusion**

This study followed the suggestion in the recent meta-analysis of literature in education research of the necessity for further research on the interplay between mechanisms and context in fostering research productivity (Ajjawi 2018). We added to the literature on the Research Training Environment (Brown et al. 1996; Mallinckrodt and Gelso 2002) by bringing in insights from HRM literature with a focus on research-related T&D practices provided for academic staff at the post-doctoral level. Based on the social exchange and social capital theories, a moderated mediation model was specified to better understand the mediating and moderating mechanisms through which T&D practices affect faculty members' research productivity. Firstly, it was revealed that research-related T&D practices are positively associated with research productivity. These findings support the literature which states that T&D practices create the necessary conditions for enhancement of individuals' research productivity (Anandarajah et al. 2016; Konstantakos et al., 2010; Kurahara et al., 2012; Rothberg et al. 2014). Secondly, it was found that RSE plays a crucial role in bridging organizational interventions and research productivity. In other words, T&D practices may enhance faculty members' research productivity through promoting RSE, which adds to the literature by indicating that RSE mediates this relationship (Lambie and Vaccaro 2011; Lee and Bruvold 2003). Hence, it can be argued that to facilitate research productivity, HEIs first need to utilize T&D practices to build individuals' RSE. At the same time, to get a more complete picture of factors that contribute to faculty members' research productivity, KS Climate was considered as a moderating construct. In line with our expectations, it was revealed that KS Climate moderates the path between T&D practices and RSE. Further, a moderated mediation effect was confirmed using a bootstrapping technique.

There are some plausible explanations for these outcomes. While T&D practices are more formal ways of transferring knowledge, informal and spontaneous ways of sharing knowledge are also important (Hu and Zhao 2016). Therefore, an organizational climate in which individuals feel free to share their knowledge and ideas with others multiplies the effect of T&D practices on RSE and research productivity. It is particularly important for the post-Soviet Kazakhstani context, where such counterproductive phenomenon as 'knowledge sharing hostility' is apparent (Kozhakhmet and Nazri 2017).

### *Theoretical implications*

This manuscript makes several contributions to the educational literature on HRM. First, this paper reinforces theoretical and empirical foundations for promoting faculty members' research

productivity from a human resource development perspective. Our results are consistent with past research which reveals that certain HRM practices are effective tools for improving employee outcomes (Beerens 2013). More specifically, we found that T&D practices provide academic staff with opportunities to improve their current skills or acquire new ones, making it possible to enhance their research performance (Phillips and Russell 1994; Wood et al. 2018). The second contribution is related to confirming the mediating role of RSE between T&D practices and research productivity. It adds to the literature about the mechanism behind the impact of HRM practices on various individual outcomes (Boxall, Hutchison, and Wassenaar 2015), and also broadens the empirical basis of research on RSE. Finally, we add to the educational literature on the Research Environment (Bland 1992; Ajjawi, Crampton, and Rees 2018) and Research Training Environment (Brown et al. 1996; Mallinckrodt and Gelso 2002) by integrating concepts from HRM and organizational theory. The study broadens the literature on productive research environments by exploration of the role of the KS Climate in influencing individuals' RSE, and by examining the moderating effect of KS Climate on the links between T&D practices–RSE–research productivity. As hypothesized, we confirm moderation and moderated mediation effects of the KS climate.

### ***Practical implications***

The corporate approach to university management has emphasized top-down approaches such as minimum publication requirements and the monetary incentives of publishing, often at the expense of investing in KS Climate and T&D of academic staff. This research has several practical implications that argue for alternative HRM strategies in place of currently dominant 'publish or perish' managerial practices. Our results suggest that T&D practices play a significant role in improving RSE and the research productivity of academic staff. Particularly in non-anglophone and developing countries such as Kazakhstan, scholars may need additional training and re-learning of research skills in order to fully join the global scientific community. Alongside investing in T&D, HRM practitioners and executives in higher education should consider that the returns on these investments depend on the psychological state (e.g. RSE) of their faculty members. The RSE levels can be monitored and conditions for improvement should be created. KS Climate is found to be an important condition that moderates the link between T&D practices and RSE. Thus, HRM practices that enhance the KS Climate should be emphasized to improve research productivity.

### ***Limitations and future research***

Several limitations and directions for future studies should be considered. The scope of this study is limited to the Kazakhstani context. It would be interesting to replicate our findings in other settings. Next, all surveys were based on single respondent and self-reported data, which may cause common method bias. Despite the fact that we took required steps to address this issue, further studies should collect data from multiple sources. In this paper, we have used cross-sectional data which provide no evidence of causality or directionality. Hence, future research with longitudinal data is required to address this limitation. Finally, the general scope of this article was to examine the effect of T&D practices and RSE on research productivity. As an extension, our study analyzes the effect of T&D practices, RSE, and KS Climate on research productivity only. In the future, scholars may also examine other outcomes of research productivity to further clarify the proposed framework.

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