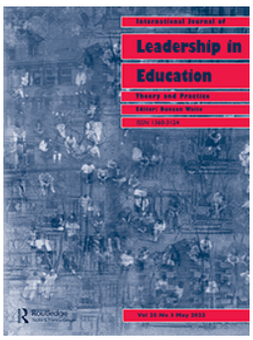

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RESEARCH

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Transformational leadership for researcher's innovativeness in the context of tacit knowledge and change adaptability

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ABSTRACT

This study explores how a learning culture supported by transformational leadership influences tacit knowledge sharing and change adaptability in higher education and how these relations impact this sector's internal and external innovativeness. The empirical model was tested on a sample of 368 Polish scientific staff using the structural equation modeling (SEM) method. Then results were expanded by applying OLS regression using SPSS PROCESS macro. Findings revealed that tacit knowledge sharing and change adaptability driven by learning culture are vital links connecting transformational leadership with innovativeness. Moreover, change adaptability was revealed to be a critical factor mediating between tacit knowledge sharing and innovativeness (external and internal). Tacit knowledge sharing and transformational leadership are seen as fully mediated by the mistake acceptance factor in learning culture. Besides, this study provided empirical evidence that higher education institutions must adapt to change constantly and evaluate their internal processes to deliver a higher level of innovative work visible externally. It also shows that leaders supporting a smooth flow of tacit knowledge sharing are central to scientific development because they foster adaptability and innovativeness (external and internal). Furthermore, the influence of the mistakes acceptance component on tacit knowledge sharing is revealed to be moderated by gender.

KEYWORDS

Learning culture; transformational leadership; innovations; tacit knowledge sharing; higher education; gender studies

Introduction

The relationship between leaders' mastery of tacit knowledge management skills and the achievement of competitive advantage at universities is an emerging topic (Aldosari, 2021; Mitchell et al., 2021). As a source of competitive advantage, innovativeness is the focus of all learning organizations today, including higher education institutions (HE) that, with constant improvement, can perform better internally and externally. Owusu-Agyeman (2019) exposed the significant role of transformational leaders' influence on innovativeness in higher education administration. The interest of this study is how transformational leaders influence innovativeness in the research area. Specifically, this study concerns the role of

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transformational leaders in the creation of a learning culture that enables knowledge sharing and changes the internal way of educational, scientific, and administrative processes, thus leading to the innovativeness of the entire institution visible externally. It is known that the smooth flow of knowledge processes supported by transformational leaders improves the development of intellectual capital and innovativeness in higher education (Kucharska, 2021a). But the role of the factor of change adaptability in this process has not been explored yet. Change adaptability seems to be a focal factor influencing innovativeness, according to Kucharska and Bedford (2020). They claim that change adaptability is a proxy of intelligence and prove that it is influenced by learning culture. Also, Hamzah et al. (2021) raise the issue of the need for career adaptability, whose importance has been increasingly recognized recently. It might be that academic staff compliance observed recently in the changes (Anderson et al., 2002) is indeed a result of all change adaptability skills represented by them. It might be that the level of this skill is also associated with the innovative performance of academic staff. This requires verification. Besides, all these studies in the context of scientific activity in the higher education sector provoked several additional questions. Namely, whether knowledge sharing is vital for innovativeness in higher education and whether all knowledge is rooted in tacit knowledge (Polanyi, 1966) that is a source of innovations (Ganguly et al., 2019); and, bearing in mind that the essence of science is the creation of new understanding, the question arises: how does tacit knowledge sharing support the overall innovativeness in the (internal and external) innovativeness of HE? Another question is, how does tacit knowledge influence change adaptability that is focal for the implementation of innovations (internal and external)? Internal innovativeness determines, e.g. organizational processes development (scientific, educational, and administrative), whereas external innovations determine, e.g. the qualified graduates', the desired novelty of the research and scholarly output. Also, if tacit knowledge sharing is so vital for innovativeness, how can leaders support its dissemination among staff?

Considering all the above, the research problem tackled in this study concerns the identified gap of knowledge of the influence of transformational leadership on (internal and external) innovativeness in scientific institutions, including such factors vital for innovativeness as organizational learning culture (Berraies et al., 2020), tacit knowledge sharing (Pérez-Luño et al., 2019) and change adaptability (Martin et al., 2013)—essential for the implementation of innovations. An in-depth understanding of the mechanisms of influence between the structure of all the above factors is needed to develop scientific institutions that are undoubtedly intensely interested in improving their innovative performance. This study aims to fill this gap.

Finally, it is also vital to introduce the presented research context. Specifically, this study is conducted based on the Polish higher educational institutions' sector financed predominately by public funds. The recently introduced performance-based national evaluation system, including bibliometric indicators, determines these funds' distribution. So, the competitive ethos among traditionally egalitarian higher education institutions puts intense pressure on higher education leaders to create favorable conditions for performance achievements, including publishing that to be successful must be innovative. Therefore, this study merit concerns exactly the transformational leadership role in creating a learning culture that enables knowledge sharing and changes the internal way of educational, scientific, and administrative processes, thus leading to the innovativeness of the entire institution visible externally.

But even though this study is conducted in a specific national context. It still brings value to the international audience because evaluation systems based on competitiveness are popular (Pinheiro et al., 2019).

Theoretical framework

The 'publish or perish' pressure is still common practice used for motivating academics to improve their research performance at universities (Aprile et al., 2021). It is not as much the quantity as the quality of publishing that matters for appraisal results (Heron et al., 2020). Therefore, only innovative studies have a chance to be published in the best journals. Novelty is the essence of scientific research. All this puts strong pressure not only on young scientists (Acker & Webber, 2017) but also on those much more experienced (Evans et al., 2020). So, today, leadership in higher education institutions faces increased pressure on researchers' effectiveness linked with their innovativeness because the best journals publish only innovative studies. Innovativeness depends on intellectual capital (Buenechea-Elberdin et al., 2018; Cabrilo et al., 2018; Campanella et al., 2014), and it is strongly supported by company culture (Kucharska, 2021b). Scientific institutions then should support their intellectual capital through culture, primarily through the dynamic culture of learning that promotes experimentation, questioning the existing status quo, and seeking new, deep understanding. It is in line with Senge (2006) idea that learning organizations have a shared vision of organizational aims and that open-mindedness accommodates diverse viewpoints, experimenting, questioning existing assumptions, and shared beliefs to promote continuous innovation – internal and external. Internal innovativeness determines, e.g. organizational processes development (scientific and administrative), whereas external innovations determine, e.g. the desired novelty of research output enabling their publication and, what is even more vital, innovative research can contribute to the entire humanity. The scientific contribution to society is generally seen as the higher-level mission of science.

Therefore, the empirical evidence that puts some light on the meaning of transformational leadership, learning culture, knowledge sharing, and, indeed, change adaptability for innovativeness among scientists matters for understanding the key factors of academia's internal and external innovativeness.

Transformational leadership shapes organizational culture

Organizational culture is the essence of the organizational mind-set. It is defined as the combination of the values, beliefs, and attitudes that are emphasized by a particular organization (Cho et al., 2013). Sometimes, leaders focus too much on changing organizational policies rather than changing the organizational mind-set and, therefore, often fail to improve performance (Schwartz, 2018). Therefore, this study focuses on transformational leadership that actively shapes organizational culture to ensure good innovation through intellectual capital and knowledge processes development.

Transformational leaders are a prominent group because they are true agents of change (Bakari et al., 2017). They make brave organizational ideas and visions a reality, create strong bonds with employees, motivate employees, and are supportive and inspirational (Busari et al., 2019). Executives who can transform their organizations and adapt them to

change, rather than cope with it, perform smoothly and deliver outstanding results (Kantor et al., 2008). Such leaders are able to effect changes through developing organizational culture (Brandt et al., 2019). Transformational leadership supports knowledge sharing (Coun et al., 2019; Dong et al., 2017). Furthermore, transformational leadership creates an organizational culture (Lee et al., 2018) that is potent enough to promote knowledge, learning, and innovativeness (Kucharska, 2021b). Since company culture may influence change adaptability, and transformational leaders have the power to shape it, then this relation should be included in the study to gain a full picture of the explored structure.

Summing up, the spontaneous flow and exchange of tacit knowledge requires strong leadership to create favorable conditions for such sharing (Mabey & Nicholds, 2015). Furthermore, to support knowledge sharing, organizations need to develop a culture in which employees can learn, unlearn, and relearn in a safe climate (Nold, 2012). Moreover, leadership positively influences the climate of psychological safety in organizations, and this climate mediates the relationship between leadership and tacit knowledge sharing (Shao et al., 2017). Considering that learning culture comprises not only the component of a climate that promotes learning but also the component of acceptance of mistakes (Kucharska & Bedford, 2020), the following hypotheses are proposed:

H1a: Transformational leadership positively influences the climate component of learning culture.

H1b: Transformational leadership positively influences the mistakes acceptance component of learning culture.

Employees with learning mind-sets are ready to be wrong (Senge, 2006) – that is, they accept that mistakes happen, and they learn from them. Zappa and Robins (2016) stressed that the essence of organizational learning is to identify and modify errors. Thus, as demonstrated by Kucharska and Bedford (2020), the learning climate component of learning culture supports mistake acceptance in the learning process. Therefore, a hypothesis as below is added:

H1c: The climate component of the learning culture supports the component of mistake acceptance.

Learning culture and tacit knowledge sharing

Polanyi (1966) said that all knowledge is rooted in tacit knowledge. Crane and Bontis (2014, p. 1136) defined tacit knowledge as knowledge that is 'acquired unconsciously and automatically, but capable of influencing action.' A culture that enables the creation of a channel of knowledge flow greatly supports tacit knowledge sharing (Mabey, 2013). In contrast to the explicit form of knowledge, which is expressed in words, data and codified into many forms that are easy to share (e.g. books, reports, documents, and databases), tacit knowledge is context-specific, personal, and it is stored in the human mind, and its sharing undoubtedly cannot be formalized. The creation and sharing of tacit knowledge not only cannot be formalized or structured, but it fully depends on the free will of the

knowledge owner, and it is personal motives that support this production and sharing (Park et al., 2017). Therefore, all tacit knowledge processes happen inside of the human mind, and the majority of them are unconscious, except for the moment of the revelation that precedes the decision about sharing (Olaisen & Revang, 2018). As a result, what matters are the workplace conditions supporting the socialization, experimentation, externalization, and combination of tacit knowledge (Cherqui et al., 2020; Philipson & Kjellström, 2020). Besides, studies by Bock et al. (2005) and Shao et al. (2012) revealed that tacit knowledge-sharing behaviors are not only supported by psychological motivations but are also facilitated by contextual factors such as organizational culture and climate. Yoon et al. (2009) noted that learning culture supports knowledge creation. Therefore, the following hypotheses are proposed:

H2a: The climate component of learning culture positively influences tacit knowledge sharing.

H2b: The mistake acceptance component of learning culture positively influences tacit knowledge sharing.

Tacit knowledge sharing, innovativeness, and change adaptability

Tacit knowledge fosters innovations (Berraies et al., 2020). Innovation can be perceived in several ways, but the distinction between product innovation and process innovation is common (Eidizadeh et al., 2017). The product or service innovation concept is well-established by many researchers, including Sheng (2019) and Ganguly et al. (2019). Product innovation relates to changes in an existing product or service aimed at its development or the introduction of a new product or service. For clarity, this study refers to market-oriented external innovation, understood as product or service innovation, and internal innovation, understood as innovative methods of working. Process innovation, as the name suggests, develops operational management processes. What is more, innovative working methods may also inspire the external innovations of the product or service. Still, to do so, scientific organizations must also develop internally. External and, at the same time, internal innovativeness is therefore expected. Taking all the above into consideration, the following hypotheses have been proposed:

H3a: Tacit knowledge sharing positively influences external innovations.

H3b: Tacit knowledge sharing positively influences internal innovations.

Besides, tacit knowledge, similarly to new knowledge, may naturally influence perceptions of things, causing a change in thinking or acting and fostering the overall adaptability to a changing environment. Thus, tacit knowledge, if shared, may positively influence change adaptability of the organization owing to a new perception of things. Therefore, a hypothesis is formulated as below:

H4: Tacit knowledge sharing positively influences change adaptability.

Change adaptability and innovativeness

Organizational adaptability reflects how an organization responds to change by managing stress and uncertainty, exposing flexibility or resilience, and supporting those who tackle problems to face the change (Reupert, 2020). Martin et al. (2013, p. 1) defined adaptability as 'appropriate cognitive, behavioral and/or emotional adjustment in the face of uncertainty and novelty.' Change is a characteristic of today's economy that places companies in a permanent learning and development mode, related to adjusting and gaining market advantage and creating value through constant innovativeness. Therefore, terms such as 'learning organization' and 'knowledge economy' have gained popularity in the last two decades. Garvin (1993) stated that being a learning organization means being open to change when needed. In today's aggressive and complex business conditions, organizations must continuously evolve and agilely adapt to change (Goswami, 2019). Regarding the higher education sector, Zembylas (2021) and Kang et al. (2020) identified change implementation at universities as an emerging and very problematic topic for exploration. Furthermore, Bystydzienski et al. (2017) stated that the successful implementation of change in a higher education institution strongly depends on having the right people on the board, including effective leaders. Moreover, this situation calls for internally and externally oriented organizational innovativeness. Regarding the higher education sector, also studies by Al-Husseini and Elbeltagi (2016) revealed that innovations should be considered separately for processes (methods of work) and products (effects of work). Based on all the above, hypotheses have been put forward as follows:

H5a: Change adaptability positively influences external innovations (effects of scientific work).

H5b: Change adaptability positively influences internal innovations (methods of scientific work).

Furthermore, Hagedoorn and Wang (2012) stressed that complementarity exists between internal and external innovativeness, while Wong and Chin (2007) and Jiménez-jiménez et al. (2008) noted that internal process innovations might increase overall innovativeness. Therefore, it is assumed that internal innovations may significantly support external innovations. Thus, the following hypothesis was proposed:

H6: Internal innovations positively influence external innovations.

Control variables

A control variable is an additional factor (additional variable) that may affect the relationship between an independent and a dependent variable and may act as a confounder, a moderator, or a suppressor (Spector & Brannick, 2011). The methodology of a control variable's imputation enables such an extraneous variable to be included in a model and remain theoretically important, even when the

variable is not the focal point of the study (Nielsen & Raswant, 2018). Such variable imputation to the model should be justified as with any other hypothesis (Becker et al., 2016). For this study, gender is such a theoretically important variable. Furthermore, the gender factor has been noted before to be significant in higher education studies (Burke, 2017; Sheerin et al., 2020). Therefore, it is expected that differences will be identified in relations between tacit knowledge and other variables when moderated by gender. Therefore, hypotheses have been proposed as below:

Hcv1a: Gender moderates the relation between transformational leadership and constant learning culture – climate component.

Hcv1b: Gender moderates the relation between transformational leadership and learning culture – mistake acceptance component.

Hcv1c: Gender moderates the relation between learning culture – climate component – and tacit knowledge sharing.

Hcv1d: Gender moderates the relation between learning culture – mistake acceptance component – and tacit knowledge sharing.

Mediation is a causal effect observed between two variables where the third variable mediates between the focal two and, as a result, the intervention of the third variable significantly supports the causal effect (Hayes, 2018). In this study, there are several variables whose mediating function is intentionally predicted and expected. They are learning culture, tacit knowledge sharing, and change adaptability. Figure 1 below visualizes all the proposed framework.

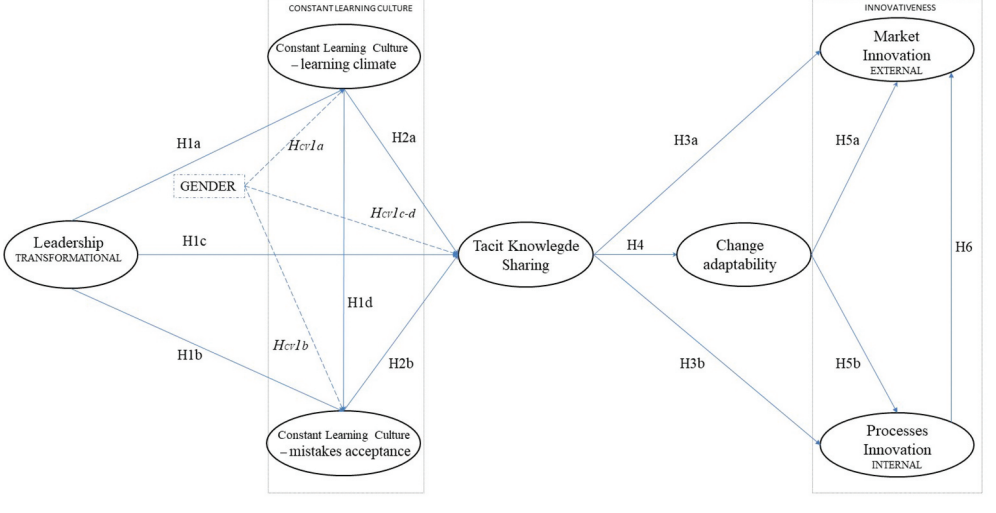

Figure 1. Theoretical framework.

Methodology

Sample

The sampling process focused on recruiting staff that usually shares scientific and teaching duties in higher education institutions in Poland. Employees included in the sample represent the positions of Rector, pro-rectors, and deans; employees holding a Ph.D. degree (adjuncts); and employees who are Ph.D. candidates. The sample size amounted to n = 368; the structure was designed according to statistics about Poland's labor market (Statistics Poland, 2017). Details of the sample structure are presented in Table 1.

Data were collected in January and February 2020. Anonymity, confidentiality, and informed consent were secured. The survey began with questions about the workers' qualifications to ensure the inclusion of respondents who had been employed for a minimum of one year at the same university. Respondents were provided with a brief explanation of the study purpose and a definition of tacit knowledge. Tacit knowledge was introduced as personal, informal knowledge often misled with intuition in the early stages of its existence. For better clarification, it was compared to the situation when one realizes something new, for example, a better way of performing tasks, or to the 'I have an idea!' revelation moment. Then the subjects were asked to respond to focal statements measuring all the involved constructs using a seven-point Likert scale to assess their attitudes to these statements. All respondents were asked about their opinions about the 'situation at the place of work' - they did not report their own behaviors but the organization's behavior. Appendix 1 presents details of the statements. Only fully completed questionnaires with SD > 0.4 were accepted for further analysis to secure the quality of the model.

The total variance of the sample was extracted at 77%, and a Kaiser–Meyer–Olkin (KMO) test of sample adequacy at the level of 0.936 exceeded 0.6 (Cerny & Kaiser, 1977; Hair et al., 2010). Further, a Harman single-factor test (Podsakoff et al., 2012) was run,

Table 1. Sample structure.

Characteristic	HE n= 368
Rectors & Pro-rectors	3%
Deans & Teams leaders	7%
Employees after Ph.D	23%
Employees before Ph.D	67%
Company size Large (>250 employees)	100%
Sector	
public	79%
private	21%
Age 18-24	0%
25-34	35%
35-44	23%
45-54	17%
55-64	15%
65 and over	10%
Gender	
Female	50%
Male	50%
Other	0
KMO	.936
Harman single factor test	38%
Total Variance Explained	77%
CMV	19%

and none of the results exceeded 38%, thereby confirming the accepted level of quality of the dataset. Common method variance was detected at 19%, confirming the accepted level of bias and justifying further analysis and presentation of the measures (Podsakoff et al., 2012).

Measures

All the included constructs represented by latent variables were measured using attitude scales. Respondents answered in their original language: in Polish. Therefore, statements from the existing scales presented in the literature in English were translated, and statements were optimized before final data gathering based on pilot study results. Appendix 1 presents details of the measurement scales for the constructs along with the sources of these scales and obtained reliabilities. The measured constructs had (standardized) indicator loadings above the reference level of >.6 (Fornell & Larcker, 1981; Hair et al., 2010). Internal consistency of the constructs was assessed using Cronbach's alpha and a critical level of >.7 (Francis, 2001). The average variance extracted (AVE) was assessed with a test statistic of >.5 and composite reliability of >.7 (Byrne, 2016; Hair et al., 2010), with all establishing scale validity. Discriminant validity was assessed by comparing the AVE square root against correlations with other constructs (deVellis, 2017; Fornell & Larcker, 1981). All AVEs were appropriately larger than the reference value. Table 2 presents the results from the IBM Statistical Package for the Social Sciences (SPSS) AMOS software.

Procedure

The analysis procedure began with the construction and assessment of the structural model. The control variable 'gender' (nominal scale) was input to the model, and after the assessment of control variable thresholds results Hcv1a-c, β = ns/.12**/-.10*, the not significant thresholds were excluded (Becker et al., 2016), and separate regression models were created applying composite variables to visualize these effects (Hayes, 2018). All the obtained results are presented in the Results section.

Table 2. Descriptive statistics, correlations, and AVE's root square in diagonal.

	AVE	CR	Cronbach alpha	GENDER	L	LCA	LCM	TKS	CHA	II	EI
L	.73	.82	.88	0.004	**0.856**						
LCA	.69	.90	.90	0.003	0.694	**0.828**					
LCM	.62	.87	.84	0.12	0.698	0.718	**0.788**				
TKS	.62	.87	.83	−0.041	0.495	0.58	0.63	**0.788**			
CHA	.76	.90	.89	−0.01	0.123	0.144	0.156	0.248	**0.872**		
II	.60	.85	.91	−0.022	0.271	0.318	0.345	0.548	0.374	**0.772**	
EI	.62	.86	.92	−0.02	0.238	0.279	0.303	0.481	0.356	0.605	**0.785**

n = 368; *L*- leadership; *LCA*- learning culture (atmosphere/climate); *LCM*- learning culture (mistake acceptance); *TKS*- tacit knowledge sharing; *CHA* – change adaptability; *II*- internal innovation (processes); *EI*- external innovation (product or service.

Results

The majority of formulated hypotheses were supported. Specifically, the direct influence of transformational leadership (H1a) on the learning climate component (β=.69***) and (H1b) the mistake acceptance component (β=.38***) were confirmed. Moreover, the support of the expected learning component for the mistake acceptance component (H1d) was also noted as positive and significant (β=.45***), and thus the relation between transformational leadership and mistake acceptance was additionally strengthened by the mediated effect of the learning climate. On the contrary, the direct influence of transformational leadership on tacit knowledge sharing (H1c) was not confirmed, but the indirect, mediated effect of learning culture was noted as 'full mediation'. It means that transformational leadership supports tacit knowledge sharing through a learning culture. Moreover, the hypotheses about the positive, direct influence of tacit knowledge sharing on external (H3a) and internal (H3b) innovations and on change adaptability (H4) were sustained (β=.21***/.49**/.25***, respectively). Similarly, the direct influence of change adaptability on external (H5a) and internal (H5b) innovations were also verified positively (β=.14**/.25***, respectively). Finally, the positive influence of internal innovativeness on external innovativeness was noted as positive and significant (β=.44***), therefore, H6 was sustained. Details of hypotheses verification are presented in Table 3 and visualized in Figure 2.

Mediations

Next to direct relations, indirect relations were also identified. The identified mediations are vital for the study because they significantly support the focal mediators for the analyzed relations between transformational leadership and tacit knowledge sharing (TKS) and, next, between tacit knowledge sharing and innovativeness (internal and external). So, learning culture is the focal mediator for both the component of transformational leadership and tacit knowledge sharing because learning climate mediates between leadership and mistake acceptance (MA), and the mistake acceptance factor mediates between climate factor and TKS, as well as between leadership and TKS. Since the direct relation between transformational leadership and TKS is not significant, the detection of the indirect effect between them is important. Therefore, it can be summarized that all revealed mediations clearly revealed how vital is learning culture as a TKS stimuli tool for transformational leaders. Furthermore, change adaptability has been identified as a strong mediator between TKS and innovativeness (external and internal). Moreover, internal innovations mediate between change adaptability and external innovativeness. It means that without changing scientific institutions internally, external innovativeness might be more problematic or simply impossible. This study clearly proves that the more intensive the innovativeness of internal processes (methods of scientific works), the better the performance of external innovativeness (effects of work).

Control variables

The above results (Figure 2, Table 3) also revealed that the gender factor controls positively the mistake acceptance component of learning culture and that it negatively controls tacit knowledge sharing. That is, after a more in-depth analysis of these relations using OLS regression applying PROCESS (Hayes, 2018), it was revealed that the higher the level of

Table 3. Hypotheses verification.

Model		
industry	HIGHER EDUCATION	
n	368	
R^2	41%	
gender->LCA	ns	
gender->LCM	.12**	
gender->TKS	−.10*	
χ2	745(306)	
CMIN/df	2.43	
RMSEA	.063(.057−.068)	
CFI	.931	
TLI	.920	
Hypotheses verification		
H1a	.69***	sustained
H1b	.38***	sustained
H1c	ns	rejected
H1d	.45***	sustained
H2a	.22**	sustained
H2b	.43***	sustained
H3a	.21***	sustained
H3b	.49***	sustained
H4	.25***	sustained
H5a	.14**	sustained
H5b	.25***	sustained
H6	.44***	sustained
Mediations		
mediation expected	direct	indirect	mediation observed
L-> LCA->LCM	.38(***)	.31(***)	complementary
LCA->LCM-> TKS	.45(***)	.21(***)	complementary
L->LCM->TKS	ns	.49 (***)	full
TKS->CHA->EI	.20(*)	.27(***)	complementary
TKS->CHA->II	.48(***)	.06(***)	complementary
CHA->II->EI	.14(*)	.11(***)	complementary

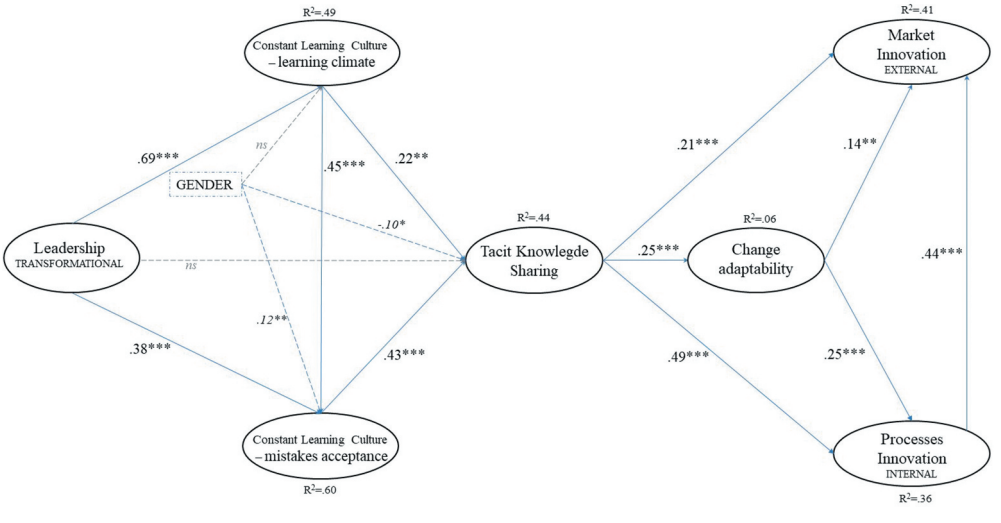

Figure 2. Structural model. Note: ML: standardized results; ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. $n = 368$; $\chi^2 = 745(306)$; CMIN/df = 2.43; RMSEA =.063; CFI =.931; TLI =.920

Figure 3. Mistakes acceptance & gender:

transformational leadership, the higher the level of the mistake acceptance component of learning culture (Figure 3), and this observed effect as reported by women is stronger than as reported by men. Consequently, women asked about the mistake acceptance component of learning culture at their universities perceived this level as much higher than men did. But considering the influence of mistake acceptance on the voluntary act of tacit knowledge sharing perceived through a gender lens, surprisingly, the higher the level of mistake acceptance perceived by women, the less perceived is the voluntary act of tacit knowledge sharing (moderation, Figure 4). This negative effect is stronger if the leadership factor is analyzed as a key driver (moderated mediation, Figure 5). It is a perception opposite to that

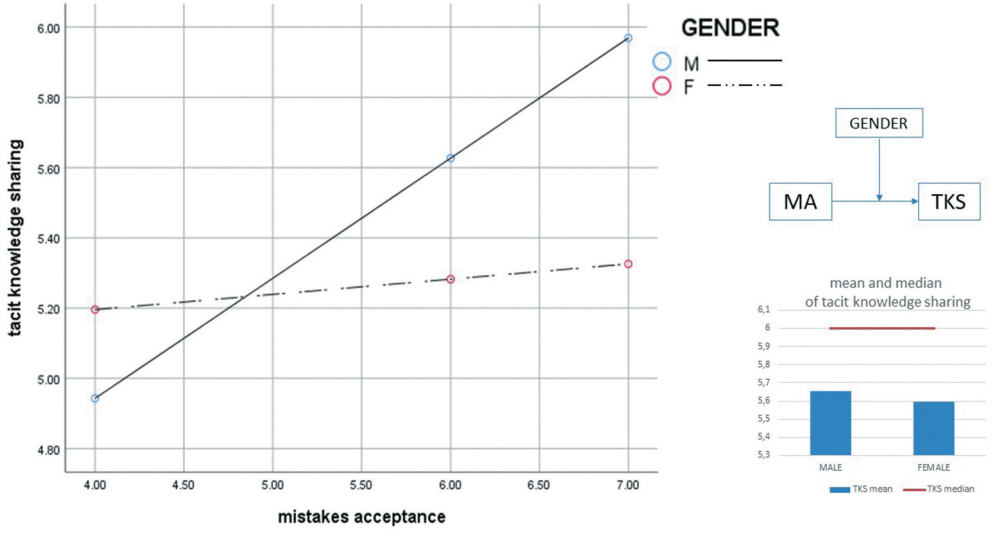

Figure 4. Tacit knowledge sharing & gender. (a) Mistakes acceptance and tacit knowledge sharing moderation by gender.

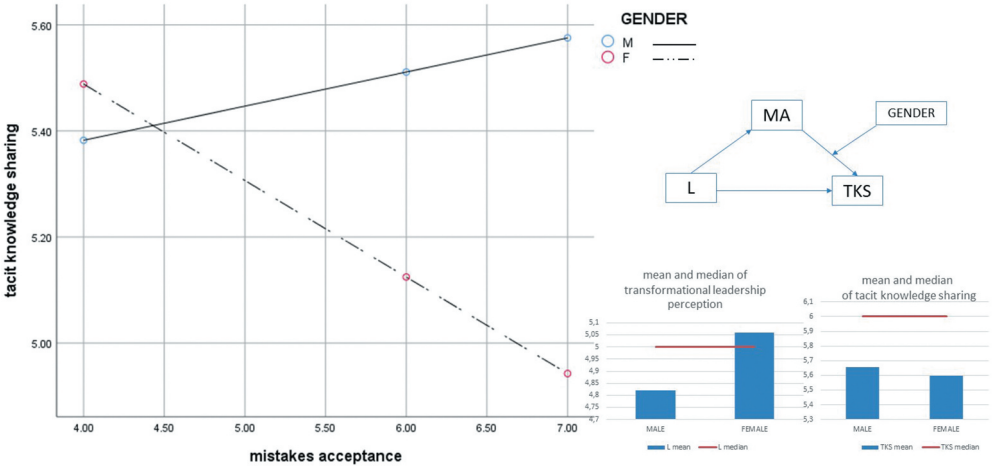

Figure 5. Moderated by gender mediated by mistakes acceptance relation between leadership and tacit knowledge sharing.

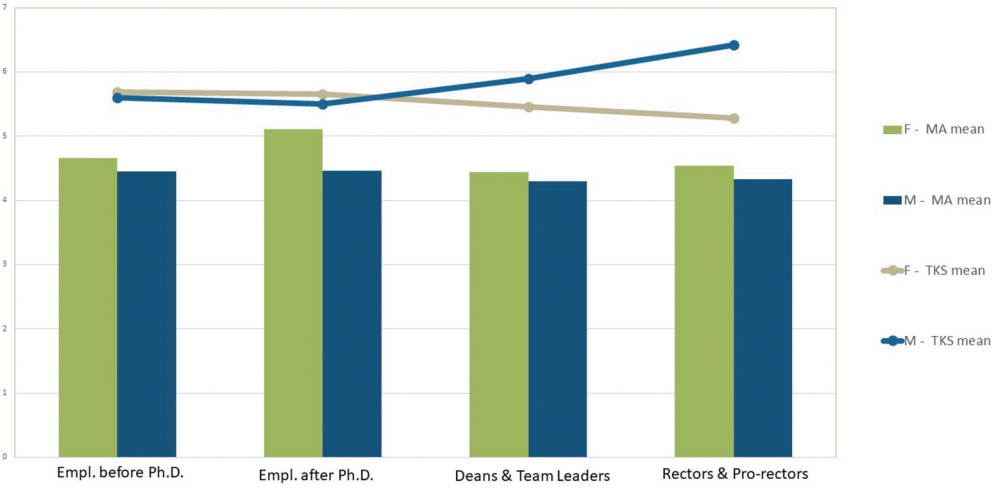

Figure 6. Tacit knowledge sharing, gender & position.

reported by men. They, however, perceive the mistake component of learning culture at a lower level than women do, but at the same time, their perception of tacit knowledge sharing at work is much higher. Figure 6 clarifies that the presented effect is related to a position held. Namely, women in managerial positions in science institutions report a lower observed level of TKS than men in corresponding positions. Such discrepancy is not observed for strictly scientific positions. For scientific positions, levels of TKS reported by men and women are equal. For clarification, it is worth repeating that all respondents were asked about their opinions about the 'situation at their place of work' - they did not report their own behaviors but behaviors observed within their organization.

Discussion, implications, future research and limitations

The most interesting and at the same time the most contributing findings of this study are the mediations revealed. Namely, the demonstrated mediating power of change adaptability for tacit knowledge sharing and internal and external innovativeness proves how vital the change adaptability skill is. This finding is even more important when it is observed that change implementation in the higher education system is usually problematic (Zembylas, 2021). Therefore, increasing change adaptability may increase innovativeness. One of the particularly important effects of change adaptability is the internal innovativeness of processes (methods of work) that complementarily mediates between change adaptability and external innovativeness. The exposition to both of these mediators provides strong evidence that a smooth flow of tacit knowledge sharing in higher education institutions is a focal process that influences innovativeness very strongly supported by change adaptability. Mitchell et al. (2021) suggested the immense power of tacit knowledge flow for innovativeness in higher education, but this study provides empirical evidence for it – therefore, it is of considerable value. Furthermore, the mediating power of change adaptability clearly revealed that higher education organizations must evaluate internally to be able to deliver a higher level of innovation performance in their scientific work externally. In other words, the more intensive the innovativeness of internal processes (methods of scientific works), the better the performance of external innovativeness (effects of work). That finally means – that the more innovative education and research, the higher chance for HE's a meaningful contribution to society and the entire humanity.

In addition, it is worth emphasizing that any HE institution's educational and research processes are accompanied by numerous ancillary processes that determine the functioning of a given entity, e.g. internal administrative processes. Since all internal processes determine a HE institution's scientific and educational innovative effectiveness, they should also be adapted to dynamic environmental changes and constantly improved. Summing up, the culture of learning and constant improvement should concern the entire organization to support its performance effectively, not only scientific or teaching staff and their scientific or teaching processes but also administrative staff and administrative processes. Simplifying, a transformation from traditional to the higher-level innovative performing institution can be totally impossible in the organizations that internally remain unchanged. Traditional universities usually act precisely like typical bureaucracies and focus too much on keeping hierarchy, rules, processes, and procedures instead of supporting the creation of innovative organizational solutions and new laws to adapt better to new aims and needs. In other words, it is impossible to achieve new organizational aims with old methods of working -– 'the typical corporate bureaucracy cannot respond well to rapid changes,' as Steiber (2018, p. 7) said. There is a considerable bias observed between new organizational aims and old working methods in traditional universities – between detailed controlling and desired freedom enabling the free flow of tacit knowledge vital for innovativeness (Kucharska, 2021a-b). So, the identified systemic and cultural bias is worth considering as a trigger for change at universities to create new organizational solutions that secure diligence, scientific rigor, and intellectual agility beyond hierarchies.

Regarding the influence of transformational leadership on tacit knowledge sharing, Aldosari (2021, p. 1) noted, based on Saudi universities, that 'leaders with tacit knowledge management skills and enacting a clear law to protect intellectual capital from strict restrictions by toxic, dictatorial, or bureaucratic leaderships and from the misuse of rigid systems of accountability or traditional control are needed.' The findings of this study are in line with this by revealing the mediating power of a learning culture composed of a learning climate and mistakes acceptance for leadership and tacit knowledge sharing relations. But components of transformational leadership that actually influence learning culture remain not explored, and it is an exciting direction for further studies. The knowledge from such studies will be a very precious source of clear guidelines for leadership practice. Furthermore, the influence of the mistake acceptance component on tacit knowledge sharing is revealed to be moderated by gender. Specifically, whereas the mistake acceptance level is much lower in men than in women, at the same time, tacit knowledge gained from mistakes is much more often reported by males than females. This might be caused by the lower level of self-esteem represented by females (Lundberg, 2020), but it is a post-hoc hypothesis and should be verified by further studies. Another issue that requires further research is: why do women in managerial positions perceive the level of tacit knowledge sharing as much lower than men do? Is it an effect of a low self-esteem lens, or does it have other causes? It is worth to be investigated. The positions held by women in higher education are a constantly discussed issue (Amano-Patino et al., 2020). Therefore, the level of mistake acceptance that was noted to be higher than in males, resulting in lower tacit knowledge sharing, might be an interesting contribution to gender-related productivity studies of the higher education system. This study is based on a single country sample. It would be of interest to compare the obtained results with other countries, especially in compliance with the national level of performance in the best, more prestigious global rankings through the prism of the methodology of these rankings. It would also be interesting to compare results obtained in public and private education institutions.

Conclusion

This study aimed to explore how learning culture supported by transformational leadership influences tacit knowledge sharing and change adaptability in higher education in Poland and how these relations impact internal and external innovativeness. The findings revealed that tacit knowledge sharing and change adaptability are driven by learning culture. Furthermore, both – tacit knowledge sharing and change adaptability are vital links connecting transformational leadership with innovativeness via culture of learning. Besides, change adaptability was revealed to be a significant factor mediating between tacit knowledge sharing and innovativeness (external and internal). Tacit knowledge sharing and transformational leadership are fully mediated by the mistake acceptance factor of learning culture.

Summing up, this study provided empirical evidence that higher education institutions must adapt to environmental changes better and evolve their internal processes more dynamically (scientific and administrative) to deliver a higher level of innovative performance visible externally. Moreover, it also revealed that a smooth flow tacit knowledge sharing is central for HE institutions development because it fosters change adaptability and innovativeness (external and internal). Finally, the

influence of the mistake's acceptance component of learning culture on tacit knowledge sharing is revealed to be moderated by gender. So, next to the need to identify components of transformational leadership's specific influence on learning culture, gender issues of learning from mistakes open another interesting direction for further studies.

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Appendix 1. Measurement scales applied

Construct	Items (Authors' compilation based on sources noted)
TKS: Tacit knowledge sharing Kucharska (2021a)	• I share knowledge learned from my own experience. • I have the opportunity to learn from others' experiences. • Colleagues share new ideas with me. • Colleagues include me in discussions about best practices.
EI: External innovations Kucharska (2021a)	• we provide competitively superior innovations to our clients • our innovations are perceived positively by our clients • we are better than competitors at introducing innovations • I am proud of our innovations
II: Internal innovations Kucharska (2021a)	• we constantly improve the way we work • we are good at managing changes • we are highly disposed to introduce new methods and procedures • we are highly disposed to accept new rules
LCA: climate Kucharska and Bedford (2020)	• All staff demonstrate a high learning disposition. • We are encouraged to engage in personal development. • We are encouraged to implement new ideas every day. • We are encouraged to engage in new solutions seeking.
LCM: mistakes acceptance Kucharska and Bedford (2020)	• People know that mistakes are a learning consequence and tolerate it up to a certain limit. • Most people freely declare mistakes. • We discuss problems openly without blaming. • Mistakes are tolerated and treated as learning opportunities.
CHA: Kucharska and Bedford (2020)	• I am flexible to changes • I can adjust myself to changes • I adopt to changes easily • I am used to changes
Transformational leadership Yi et al. (2019)	• The firm's management is always looking for new opportunities for the organization. • The firm's management has a clear view of its final aims. • The firm's management succeeds in motivating the rest of the company. • The firm's management always acts as the organization's leading force. • The organization has leaders who are capable of motivating and guiding their colleagues on the job.