Received: 25 September 2022 | Revised: 27 March 2023 | Accepted: 12 April 2023

DOI: 10.1111/hequ.12437

RESEARCH ARTICLE

Higher Education Quarterly WILEY

Effects of performance management systems–strategy alignment on lecturers' engagement with knowledge transfer: A perspective from Spain

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Abstract

Growing competition among higher education institutions (HEIs) explains their increasing interest in reinforcing strategies by incorporating knowledge transfer (KT) objectives into their strategic plans. However, this strategic formulation must be aligned with the implementation of performance management systems (PMSs) to properly achieve KT objectives. Thus, the aim of this paper is to examine whether aligning PMSs with KT strategic objectives improves KT performance while misalignment worsens it. To that end, PMSs are measured with respect to planning; cybernetic control; policies and procedures and reward and compensation elements. KT is specified as R&D contracts, extended patents, patents and licences. With a sample of 3812 Spanish university lecturers, we test the theoretical positive and negative effects of PMS–KT strategy alignment and misalignment on KT performance respectively. The results show not only that this alignment is effective for KT strategy implementation but also that misalignment has unintended effects on the achievement of long-term KT objectives. Therefore, lecturers' behaviour is influenced by how closely KT strategy and PMSs are aligned. The findings are useful for managers and academics to develop PMSs that effectively contribute to the achievement of universities' strategic goals.

1 | INTRODUCTION

Knowledge transfer (KT) from higher education institutions (HEIs) to society has an enormous impact on socio-economic growth (Xue et al., 2020) and is a key component of sustainable development in HEIs' strategic plans acknowledged by the European Union (EU, 2000) and the United Nations (UNESCO, 2011). HEIs have different ways of establishing collaborations with society, e.g., contracts, patents, licences, etc., but the literature on lecturers' KT engagement in these activities remains scarce (Berbegal-Mirabent, 2018), and further research must be conducted to shed light on how HEIs can act to actively involve lecturers in HEIs' strategic objectives.

Recently, most HEIs have reformulated their strategic plans to position KT as one of their priorities (Miller et al., 2018), but this fact does not mean that HEIs are implementing these plans adequately. Indeed, it seems that there is an imbalance between KT strategic objectives and KT strategic implementation (Chau et al., 2017). Thus, although recent strategic plan formulation should have prompted significant advances in lecturers' KT engagement, no effective accomplishments have been observed.

To explain this imbalance, it is essential to recognize the important role that lecturers play in the university system since they perform the core functions of their organizations. Studies have suggested that KT engagement conflicts with existing institutional management mechanisms (Etomaru et al., 2022), strongly affecting how lecturers perform their work (Nichols & Hayes Tang, 2022). In this research, we assume that this conflict is caused by misalignment between performance management systems (PMSs) and planned KT strategic goals so that aligning universities' PMSs with their strategic plans could be critical to achieve lecturers' engagement. In this context, PMSs act as powerful supporting factors for lecturers' success in their ambitions while HEIs achieve their key goals.

The management control literature has suggested that aligning different elements of PMS – planning, cybernetic control, policies and procedures and reward and compensation – with strategic priorities fosters individuals' engagement and consequently ensures effective strategy implementation (Chenhall, 2005; Ittner et al., 2003; Kaplan & Norton, 2001). This fact implies that KT strategy, first developed through a formal and rational process, should subsequently dictate the design of the university's PMSs (Anthony et al., 2007). This PMS–strategy alignment is supposed to drive lecturers' behaviour towards KT objectives. Moreover, PMSs can be designed in the context of different decision-making centres. Considering the university setting, PMSs can be implemented by the top management of the university and simultaneously by subsequent decision-making units, for example, faculties or schools, departments, research groups and/or research institutes.

Overall, our knowledge of the relationship between PMSs and KT performance in HEIs remains limited (Wilbon, 2012). Improving our understanding of PMS alignment with KT strategy in HEIs and how this alignment might be achieved is crucial to encourage lecturers' KT engagement. Hence, this paper aims to contribute to the growing interest in literature on university–business collaboration (Bastos et al., 2021) by testing the positive (negative) effect of alignment (misalignment) between KT strategy and PMSs on lecturers' KT engagement.

This study was conducted by using a sample of 3812 Spanish university lecturers who were surveyed regarding different elements of PMS that have been widely implemented in HEIs. The statistical results of a logit analysis revealed, as expected, that lecturers' KT engagement is affected by *PMS-KT strategy alignment (misalignment)*.

This study offers three contributions. First, this research provides empirical evidence concerning the theoretical positive (negative) impact of the alignment (misalignment) between PMSs and strategy for the particular case of lecturers' KT engagement. Moreover, the effect of PMSs on lecturers' KT engagement remains disaggregated, and a systemic approach is required (Secundo, De Beer, et al., 2019). Thus, the second contribution of this paper consists of providing a holistic analysis of PMSs that does not merely consider a specific tool (e.g. reward systems) (Friedman & Silberman, 2003) or a single decision-making unit (e.g. universities) (Chau et al., 2017). This paper includes all tools that pertain to university and research groups whenever possible. Finally, most studies focusing on management mechanisms to foster performance in HEIs have been case studies and/or have adopted the perspective of managers (deans or other managerial staff) (Bourne et al., 2013; Heinicke & Guenther, 2020; Sutton &

Brown, 2016), neglecting the lecturer's level of analysis (Smith et al., 2014). To address these research issues, this study is based on lecturers' perceptions of a full country–university system.

2 | LITERATURE REVIEW

2.1 | Barriers to lecturers' knowledge transfer engagement

Since the behaviour of lecturers is to a large extent shaped by institutional management mechanisms, it is important to pay attention to what rules, regulations, funding, assessment procedures, accountability standards and incentive schemes HEIs use to engage lecturers in KT activities.

Specifically, Friedman and Silberman (2003), Markman et al. (2004) and Lach and Schankerman (2008) analysed the internal reward structure of universities and addressed the role of incentive rewards in managing lecturers' unresponsiveness to engagement with society. Criteria for assessing lecturers' performance still largely incorporate traditional academic criteria, and lecturers' chances of obtaining a salary increase or a promotion mostly depend on his or her research production and not on collaborations with non-academic communities. This "publish or perish" culture is present in most universities and determines employment, salary and promotion opportunities.

Other scholars have attributed the lack of lecturers' KT engagement to an institutional orientation with little focus on entrepreneurship (Centobelli et al., 2019; Guerrero & Urbano, 2012; Siegel et al., 2003; Siegel & Wright, 2007; Thursby & Thursby, 2004). The importance of institutional orientation was also highlighted by Huang and Chen (2017), who found that it moderates the relationship between other formal mechanisms applied to manage KT and lecturer performance.

Furthermore, the way in which financial resources are allocated to the various strategic objectives of HEIs largely determines the options and choices of alternatives to academic activities. Actually, the funding parameters that determine the university budget often do not include support for KT engagement or industry interaction (Centobelli et al., 2019; Guerrero & Urbano, 2012; Huang & Chen, 2017; O'Shea et al., 2008).

Finally, Siegel et al.'s (2003) study of university–industry technology transfer found that lecturers sometimes have a poor understanding of the technology process and consequently pay little attention to interactions with private companies. Moreover, academic researchers are unaware of the commercial potential of their research findings or lack the required business attitude to develop their concepts and ideas further into products or prototypes. In this sense, Guerrero and Urbano (2012) concluded that it is important to introduce better methods of quality education and training based on creativity and entrepreneurial experiences.

In summary, the literature has identified significant barriers imposed by current procedures, regulations, resource allocation and reward systems to lecturers' engagement in KT. Moreover, as previous arguments have shown, the literature has traditionally adopted a narrow and fragmented perspective, limited to a specific tool, when explaining the management mechanisms that influence lecturers' engagement. To fill this gap, this study considers a broad set of PMSs.

2.2 | Performance management system–KT strategy alignment. Hypotheses development

PMSs can be understood as a package of rules, practices, values and other management activities applied by organizations to guide the behaviour and business decisions of subordinates and thus achieve objectives established by organizational strategies (Chenhall, 2005; Malmi & Brown, 2008). PMSs might also be the most essential management mechanisms for enhancing KT performance (Gonzalez-Sanchez et al., 2021; Huang & Chen, 2017),

and when adequately designed, their alignment with strategy means that managers can direct employees' behaviour towards strategic objectives and plans (Chenhall, 2005; Ittner et al., 2003; Kaplan & Norton, 2001).

PMS–KT strategy alignment leads to a focus on important KT concerns, promotes and rewards behaviours that are appropriate to achieving KT aims, provides mechanisms for KT accountability and control and creates the means to learn to engage in KT activities. Thus, making KT performance more 'visible' both inside and outside the organization and getting lecturers to be progressively more interested in KT activities will increase their KT performance.

Adapting Malmi and Brown's (2008) model, which conceives of PMSs as an un-insulated package of interrelated management mechanisms, this work assesses *PMS–KT strategy alignment* by considering the following elements: planning, cybernetic, policies and procedures and reward and compensation controls.

Aligning the planning element, which includes goals that reflect stakeholders' expectations and defines performance and evaluation in the context of KT strategy, allows an entrepreneurial environment to spread throughout the organization and discloses KT capabilities and outcomes to both industry partners and top-down organizations (Merchant & Otley, 2006), making it clear to lecturers what behaviours are expected. For this reason, the following hypothesis is proposed:

> **Hypothesis 1.** Planning-KT strategy alignment (misalignment) is positively (negatively) associated with lecturers' KT engagement.

The alignment of the cybernetic control element (e.g. budgeting, evaluation and monitoring of outputs), which includes metrics used to operationalize performance, helps to properly budget input/output relationships and to measure the progress and consequences of outcomes. These are traditional accounting control techniques that provide an expectation to achieve present targets and allow for budget revisions and a reallocation of resources when circumstances require an innovative response (Frow et al., 2010; Marginson et al., 2014). This approach makes it easier for individuals to develop their activities and allows them to know that their results are being monitored and are consequently important. Based on the previous justification, the second hypothesis is proposed:

> **Hypothesis 2.** Cybernetic control-KT strategy alignment (misalignment) is positively (negatively) associated with lecturers' KT engagement.

The alignment of policies and procedures (e.g. regular meetings, training workshops or other opportunities for learning and development) with KT strategy facilitates a market orientation, connects lecturers with clients' needs and enables learning regarding which specific KT activity should be developed (Franco-Santos et al., 2017; Sutton & Brown, 2016). Therefore, the third hypothesis is proposed:

> **Hypothesis 3.** Policies and procedures-KT strategy alignment (misalignment) is positively (negatively) associated with lecturers' KT engagement.

Finally, the alignment of reward and compensation systems – which incorporates recognition and incentive schemes and which can be extrinsic, such as bonuses, or intrinsic, such as a sense of achievement – with KT strategy promotes an environment that supports engagement with businesses, facilitates learning how to develop KT activities, motivates employees to undertake KT activities and rewards KT performance through incentive schemes, thus stimulating lecturers' KT engagement (Bonner & Sprinkle, 2002; Ittner & Larcker, 2001). Therefore, the fourth hypothesis is proposed:

> **Hypothesis 4.** Reward and compensation-KT strategy alignment (misalignment) is positively (negatively) associated with lecturers' KT engagement.

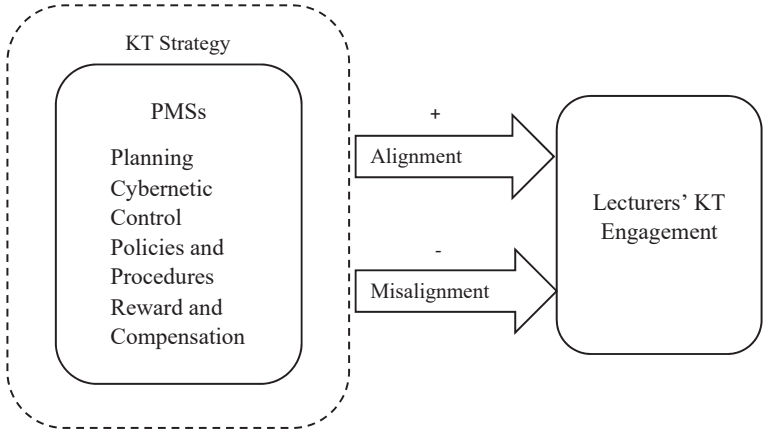

FIGURE 1 Research model.

Overall, the alignment of PMSs with KT strategy can help to break barriers to lecturers' KT engagement observed in previous literature. The research model employed in our study is depicted in Figure 1.

3 | MATERIALS AND METHODS

Data were collected using a questionnaire, and the selected population included all Spanish university lecturers during the 2015–2016 academic year, which marked the end of the reporting period.

Table 1 displays the main sample characteristics as control variables included in the model to avoid bias in the results. These variables refer to lecturers' features (demographics, academic field, research performance and membership in a research group). The sample consisted of 3812 respondents from 31 HEIs, with respondents representing 10.3% of all faculty members from the selected HEIs (see Appendix A). The response rate varied considerably among HEIs (from 5% to 25%), so their weight is adjusted to give each university the same weight that it has in the pool of HEIs under analysis.[1]

3.1 | Measurement variables

3.1.1 | Lecturer's knowledge transfer engagement

This paper uses outcomes in KT activities as a proxy for lecturers' KT engagement. Following previous research (Berbegal-Mirabent, 2018; Secundo et al., 2019b), the six KT categories examined are the same as those considered by the Observatory of Spanish University Research Activity (IUNE, 2018)[2] when collecting data from the full national university system. These six categories include R&D contracts, patents, extended patents, licences, spin-offs and consulting services. The dichotomous dependent variable was addressed in the questionnaire as a yes/no question: 'Have you participated in any of these KT activities over the period 2011-2016?'

3.1.2 | PMS–KT strategy alignment

Since lecturers' behaviour is a key factor in explaining KT performance, the real effect of *PMS–KT strategy alignment* on lecturers' KT engagement depends on lecturers' perception about their existence (or the lack thereof).

TABLE 1 Lecturers' characteristics ($N = 3812$).

	Percentage	Frequency
Gender		
Male	56.40	2151
Female	43.60	1661
Age		
Younger than 26	4.04	154
26–35	9.31	355
36–45	23.30	888
46–55	39.72	1514
56–65	23.63	901
Older than 65	–	0
Academic field		
Sciences and Health Sciences	32.61	1243
Arts and Humanities	12.04	459
Social Sciences	29.77	1135
Engineering and Architecture	25.58	975
Research performance (6-year period of research until Dec. 2016)		
None	40.06	1527
One or more period	59.94	2285
Research group membership and size of research group		
Yes, 10 or more members	44.50	1695
Yes, fewer than 10 members	45.20	1724
No	10.30	393

Thus, it is measured based on lecturers' perception of each PMSs' element considered. Table 2 shows the items used to measure each element of *PMS–KT alignment*.

PMS–KT alignment was identified at both the university and research group levels. Research groups were also considered in this research because they may influence engagement in KT (Olmos-Peñuela et al., 2014) and can shape their own internal performance management practices. Consequently, such groups can make decisions regarding the allocation of resources, the provision of means and the impact of previous performance on subsequent budgets and can organize meetings concerning joint discussions with non-academic institutions, while planning and reward systems are only applied at the university level.

The item formulation was inspired by previous academic references (Chapman & Kihn, 2009; Franco-Santos et al., 2012). Respondents were asked to indicate the extent to which they agreed with each item on a 5-point Likert scale ranging from 1 'not at all' to 5 'a lot'. For our analyses, two groups were created for each item. The first group included responses that were scored 4 or 5, indicating perception of the item's existence and thus alignment between KT strategy and PMSs. The second group included responses that were scored 1 or 2, representing a lack of perception of the item's existence and thus misalignment between KT strategy and PMSs. Responses that were scored 3 were not included in any group. The total number of responses was 3812.

Regarding university level, as shown in Table 3, the percentage of lecturers who did not perceive the existence of alignment between elements of PMS and KT strategy was higher than that of lecturers who did perceive their existence. Thus, most elements of PMS were not generally aligned with KT strategy; the exception was KT as a long-term objective (PLAN1). The largest differences were seen in the items reflecting individual resource

TABLE 2 *PMS–KT strategy alignment* elements and items.

PMS elements	Items	Description
Planning	PLAN1	KT was an important strategic (long-term) goal at my university.
	PLAN2	My University made KT results visible to university community members
	PLAN3	My university made its KT capacities visible to society and firms
Cybernetic control	CYBECO1	Financial resource allocation (funding) at my university/research group made it clear that KT was a priority
	CYBECO2	My university/research group provided appropriate means to undertake KT activities
	CYBECO3	Prior KT made a difference in lecturers' budget allocation at my university
	CYBECO4	My university/research group kept specific record of KT activities
Policies and procedures	POLPRO1	My university/research group organized meetings with lecturers to make suggestions and propose joint collaborative activities and applied research with companies and other institutions
	POLPRO2	My university fostered activities in which I have learned how to exploit my KT capabilities
Reward and compensation	REWCOMP1	Support was readily available throughout the development and exploitation of results whenever a KT activity was undertaken
	REWCOMP2	My university encouraged entrepreneurial culture supporting the exploitation and marketing of knowledge
	REWCOMP3	My university recognized and evaluated KT in the contexts of teaching, academic posts and other areas

assignment (CYBECO3) and/or promotion and incentive schemes (REWCOMP3), for which misalignment was considerably high.

However, the results of the research groups (Table 4) indicated that the percentage of lecturers who perceived *PMS–KT strategy alignment* was higher than the percentage found at the university level, while *PMS–KT strategy misalignment* perception was lower.

3.1.3 | Empirical model and estimation method

To examine whether PMSs and the KT strategy are aligned, a logit model is estimated. Thus, the dependent variable, y_i, takes a value of 1 if the respondent has produced a type of KT and 0 otherwise.

$$\left(y_i = \{ \begin{array}{ll} 1 & \text{Lecturer has produced a type of KT with probability } p \\ 0 & \text{Otherwise, with probability } p-1 \end{array} \right)$$

To estimate the probability (p) that KT was produced, we assume a functional form. The most common such form is a probit model that assumes a normal distribution and a logit model that assumes a logistic distribution.

TABLE 3 Descriptive statistics of *PMS–KT strategy alignment* and *misalignment* (university level).

		Perception of alignment		Perception of misalignment			
PMS elements	**Items**	**Mean**	**SD**	**Mean**	**SD**	**Min**	**Max**
Planning	PLAN1	0.42	0.47	0.30	0.48	0	1
	PLAN2	0.32	0.47	0.36	0.48	0	1
	PLAN3	0.32	0.46	0.35	0.49	0	1
Cybernetic control	CYBECO1	0.30	0.46	0.41	0.48	0	1
	CYBECO2	0.28	0.40	0.43	0.47	0	1
	CYBECO3	0.11	0.43	0.73	0.42	0	1
	CYBECO4	0.35	0.45	0.45	0.48	0	1
Policies and procedures	POLPRO1	0.30	0.49	0.43	0.46	0	1
	POLPRO2	0.20	0.42	0.50	0.49	0	1
Reward and compensation	REWCOMP1	0.23	0.31	0.50	0.48	0	1
	REWCOMP2	0.24	0.48	0.47	0.49	0	1
	REWCOMP3	0.11	0.31	0.71	0.48	0	1

TABLE 4 Descriptive statistics of *PMS–KT strategy alignment* and *misalignment* (research groups level).

		Perception of alignment		Perception of misalignment			
PMS elements	**Items**	**Mean**	**SD**	**Mean**	**SD**	**Min**	**Max**
Cybernetic control	CYBECO1	0.45	0.49	0.34	0.47	0	1
	CYBECO2	0.42	0.49	0.37	0.48	0	1
	CYBECO4	0.32	0.46	0.50	0.50	0	1
Policies and procedures	POLPRO1	0.31	0.46	0.48	0.49	0	1

Since the number of lecturers producing KT, such as extended patents or patents, is low, we consider the logistic function $\Lambda(x_i'\beta)$ to be more appropriate:

$$\left(p_i \equiv Pr(y_i = 1|x) = \Lambda(x_i'\beta) = \frac{e^{x'\beta}}{1+e^{x'\beta}}\right)$$

where *xi* is the vector of independent variables and β is the parameter vector. We calculate cluster-robust standard errors at the university level to control for intra-university serial correlation. The baseline equation also includes control variables.

As stated, two specific models are proposed for the two aforementioned groups for each item. In the first group, we incorporate *PMS–KT strategy alignment* as categorical variables that take a value of 1 when response scores are 4 or 5. In the second group, this categorical variable takes a value of 1 when the response scores are 1 or 2.

To facilitate interpretation of the results, marginal effects instead of estimation parameter β are reported. The tables of results include a pseudo R2 to assess goodness of fit.

The likelihood function that needs to be maximized is

$$\left(lnL = \sum_{j\in S} w_j lnF(x_j b) + \sum_{j\notin S} w_j ln\{1 - F(x_j b)\}\right)$$

where S is the set of all observations j, such that $y_j \neq 0, F(z) = e^z / (1 + e^z)$, and wj denotes the weights.

To test the validity of the survey, summary statistics of the sample are compared with the values of the pool of HEIs analysed,[3] also noting that the survey accurately replicates distribution by academic discipline. Additionally, the results show a reasonable average number (3–4) of lecturers per patent and extended patent.[4] However, this number appears to be too high for spin-offs, so this variable is discarded. Consulting services are also excluded because they do not perform properly in the estimations and may not be properly identifiable. As a result, four KT variables are analysed: R&D contracts, patents, extended patents and licences.

4 | RESULTS

Table 5 shows the effects of *PMS–KT strategy alignment* and *misalignment* on lecturers' KT engagement at the university level when considering four KT activities, i.e., R&D contracts, patents, extended patents and licences, and four elements of PMS, i.e., planning, cybernetic control, policies and procedures and reward and compensation. The results of the alignment perception response group and the misalignment perception response group are shown in separate columns. Marginal effects are reported alongside significance levels.

Regarding *planning-KT strategy alignment*, Hypothesis 1 is partially supported by the results. Only when KT strategy is perceived as a long-term goal (PLAN1) does R&D contract performance increase ($\beta = .046$; $p < .05$). In contrast, the effects diminish when there is misalignment ($\beta = -.036$). None of the other planning items has an influence on any activities.

Concerning *cybernetic control-KT strategy alignment*, the significance of the results is shown by the effect of keeping specific records of KT (CYBECO4), while misalignment is important regarding the effects of previous KT on lecturers' budgeting allocation (CYBECO3), and so both results support Hypothesis 2. CYBECO4 alignment has a positive effect on the performance of every KT activity, increasing the probability of producing KT from 1.8% in extended patents to 5.6% in R&D contracts. The results show a negative impact on performance when CYBECO3 is misaligned, with decreases ranging from 2.5% in licences to 6.4% in R&D contracts. Furthermore, R&D contracts are influenced by the provision of the appropriate means to undertake KT (CYBECO2), increasing production by 6.2%, and by CYBECO4 misalignment, reducing performance by 5.7%.

The results confirm Hypothesis 3 regarding the effect of *policies and procedures-KT strategy alignment* for patents and licences. A positive effect of alignment is observed in meetings to propose joint collaborations (POLPRO1) for licences and in activities to learn how to exploit KT capabilities (POLPRO2) for patents, increasing production by 2.8% and 6.2% respectively. A negative impact of misalignment is observed on POLPRO1 for extended patents ($\beta = -.017$; $p < .05$).

Finally, regarding *reward and compensation-KT strategy alignment* (Hypothesis 4), there is a positive effect of alignment both when support is offered during the development of the KT process (REWCOMP1) for patents and licences and when the university encourages entrepreneurial culture (REWCOMP2) in the context of extended patents and licences. A negative impact of misalignment is observed for every KT activity in REWCOMP1, with special significance for R&D contracts (the probability of contracting decreases by 5.7%) and patents (5.5%).

Among unexpected results, two theoretically positive items negatively impact R&D contracts. The results show that the allocation of resources to KT (CYBECO1) and KT impact on promotion and incentive schemes (REWCOMP3) diminishes the probability of contracting.

As discussed above, *cybernetic control* and *policies and procedures* are also analysed at the research group level. Table 6 shows the effects of these two *PMS–KT strategy alignment* and *misalignment* on lecturers' KT engagement (Hypothesis 2 and 3). Marginal effects are reported along with significance levels.

The results confirm Hypothesis 2 regarding the effect of *cybernetic control-KT strategy alignment*. All items (CYBECO1, 2 and 4) have a significant positive effect on the performance of every KT activity, with

TABLE 5 Results of the logit model[a] at the university level.

		R&D contracts		Patents		Extended patents		Licences	
PMS elements	**Items**	**Alignment**	**Misalign.**	**Alignment**	**Misalign.**	**Alignment**	**Misalign.**	**Alignment**	**Misalign.**
Planning	PLAN1	0.046**	−0.036**	−0.027	0.013	−0.012	0.002	−0.017	0.007
	PLAN2	−0.027	0.024	−0.016	0	0.003	−0.004	0.009	−0.013
	PLAN3	−0.003	−0.011	−0.018	0.02	−0.016	0.009	−0.023	0.009
Cybernetic Control	CYBECO1	−0.083**	0.015	−0.011	−0.003	0	−0.009	−0.011	0.006
	CYBECO2	0.062*	−0.021	0.013	0.001	0.002	0.011	−0.019	−0.004
	CYBECO3	0.023	−0.064***	0.007	−0.043***	−0.021	−0.027***	−0.016	−0.025***
	CYBECO4	0.056***	−0.057***	0.040***	−0.017	0.018*	0.004	0.028**	0.008
Policies and Procedures	POLPRO1	−0.003	−0.018	0.012	−0.017	0.001	−0.017**	0.028*	−0.017
	POLPRO2	−0.003	−0.021	0.062***	−0.015	0.013	−0.005	−0.011	0.002
Reward and Compensation	REWCOMP1	0.002	−0.057***	0.040***	−0.055***	0.008	−0.016*	0.042***	−0.036***
	REWCOMP2	0.016	0.009	0.035	−0.011	0.043***	−0.012	0.031**	−0.006
	REWCOMP3	−0.056***	−0.025*	−0.028	0	−0.004	0.011	−0.026*	−0.002
r2_p		0.184	0.168	0.237	0.237	0.223	0.255	0.135	0.132
espechi2		8.78	5.657	7.975	7.975	13.961	4.172	3.857	12.854
Espep		0.003	0.017	0	0	0	0.041	0.05	0
gof_p		0.689	0.642	0	0	0	0	0	0

Note: Marginal effects are reported. Significance levels: ***$p < .01$; **$p < .05$; *$p < .10$. Control variables untabulated.

[a]3812 observations.

TABLE 6 Results of the logit model[a] at the research group level.

		R&D contracts		Patents		Extended patents		Licences	
PMS elements	**Items**	**Alignment**	**Misalign.**	**Alignment**	**Misalign.**	**Alignment**	**Misalign.**	**Alignment**	**Misalign.**
Cybernetic Control	CYBECO1	0.099***	−0.042**	0.023*	−0.015	0.026**	−0.018*	0.036**	−0.032***
	CYBECO2	0.060*	−0.064***	0.068***	−0.048***	0.030**	−0.024*	0.015	−0.031***
	CYBECO4	0.181***	−0.103***	0.068***	−0.046***	0.043***	−0.035***	0.057***	−0.051***
Pol./procedures	POLPRO1	0.084***	−0.040**	−0.006	0.005	0.004	−0.006	0.032***	−0.020*

Note: Significance levels: ***$p < .01$; **$p < .05$; *$p < .10$. Control variables untabulated.

[a]3419 observations. Marginal effects are reported.

the exception of the effect of CYBECO2 (the provision of appropriate means to undertake KT) on licensing. Additionally, the results show an extraordinary negative impact on the performance of each KT activity when items are misaligned.

Similarly, the positive effect of alignment is observed for meetings to propose joint collaborations (POLPRO1) for R&D contracts and licences. A negative impact of misalignment is also observed for POLPRO1 for R&D contracts and licences. These results confirm Hypothesis 3 for these KT activities in the research group setting.

5 | DISCUSSION

The literature has proposed that PMS strategy alignment helps companies attain their strategic goals, guiding the behaviour of individuals in line with these objectives (Chenhall, 2005; Ittner et al., 2003; Kaplan & Norton, 2001), and our results provide evidence of such an effect on KT goals. The inverse claim is also confirmed. *PMS–KT strategy misalignment* means that the probability of success significantly decreases.

The aforementioned effects were tested by examining four *PMS–KT strategy alignment* elements. This study confirms that a shared vision (lack of) of entrepreneurship (planning element) positively (negatively) influences KT performance in contracting. However, in contrast to the findings of Sánchez-Barrioluengo and Benneworth (2019), these effects were not confirmed for patent, extended patent and licence activity. This result could be due to the fact that contracts are the easiest way to interact with society compared to patents and licences (Siegel et al., 2007).

Concerning the *cybernetic control* element, lecturers increase their commitment to KT when the university reports or discloses (internally) KT production in accordance with Sánchez-Barrioluengo and Benneworth's (2019) findings. Thus, registering KT outputs is a way of communicating to lecturers that KT activity matters. In addition, it has been proven that lecturers are reluctant to engage in KT activities if universities do not reflect KT values and priorities in their incentive-based budgeting schemes according to Kenno et al. (2020). In line with Sánchez-Barrioluengo and Benneworth (2019), our results also reveal that specific KT resources (e.g. staff responsibility for university–business collaboration, technology transfer offices and commercial resources) do not influence lecturers' engagement in (extended) patenting or licensing, whereas according to other research streams (Centobelli et al., 2019; Huang & Chen, 2017), engagement in R&D contracts does benefit from these resources. These findings clearly warrant further analysis, as it appears that these specific resources do not match lecturers' needs. Our results are in line with those of Landry et al. (2010), who found that financial resource allocation is not related or negatively related to contracting. However, when budgets are managed by research groups, the results differ, as KT engagement increases (decreases) when this PMS element is aligned (misaligned) with KT strategy. A possible explanation is that research groups, as smaller decision-making units closer to knowledge development, can better identify the specific needs of lecturers and their research areas and proceed accordingly.

Regarding the alignment of the *policies and procedures* element with KT strategy, our findings extend previous research (Centobelli et al., 2019; Chau et al., 2017) since patenting and licensing engagement is higher when this element of PMS is aligned and extended patent engagement is lower when it is misaligned. However, these relations are not confirmed in the case of contracting, in accordance with Huang and Chen's (2017). The lack of effect on R&D contract engagement can be explained by the fact that collaborative opportunities rarely arise in certain academic disciplines (social sciences, arts and humanities) through this *policies and procedures* element (Ozga & Jones, 2006). However, when the initiative is organized by research groups, the impact of this element, as expected, is positive. This result can be explained by the greater proximity of research groups to the real problems and needs of companies and institutions, which facilitates a more flexible and effective response (Harvey et al., 2002).

Finally, for the case of alignment between *reward systems* and KT, the provision of support during development is the most successful reward mechanism for (extended) patents and licences. In fact, as Landry et al. (2010) and D'Este and Perkmann (2011) warned, control tools should not focus excessively on monetary incentives and must consider other, more effective means. On the other hand, misalignment results show that KT engagement is hampered when HEIs do not attribute importance to training in how to develop and exploit KT. Moreover, rewarding KT performance through promotions discourages lecturers from engaging in R&D contracts and licences, as already proven by Markman et al. (2004). This result could be due to the fact that those criteria are still biased towards research performance. Effectively, HEIs use very narrowly defined metrics to assess scientific impact, and research outputs are not necessarily useful for the non-academic community (D'Este et al., 2013). Accordingly, the misalignment results reveal that when KT activities are not properly accounted for by incentive schemes, recruitment performance decreases.

6 | CONCLUSIONS

Although most HEIs intend to achieve different strategic objectives related to teaching, research and KT, their performance management practices do not always meet the requirements of these aims. Our findings support the claim that that lecturers' engagement with KT conflicts with existing institutional management mechanisms (Etomaru et al., 2022) and demonstrate not only that *PMS–KT strategy alignment* is effective but also that *PMS–KT strategy misalignment* has unintended consequences.

Consequently, the behaviour of lecturers is influenced by either the alignment or misalignment of PMSs with KT strategy, which facilitate or impede effective KT strategy implementation respectively. Moreover, lecturers involved in R&D contracting behave differently from those involved in patents, extended patents and licences. Specifically, *planning-KT strategy alignment (misalignment)* is significantly effective only for R&D contract engagement, while that of *policies and procedures* affects patents, extended patents and licences. In turn, the *alignment (misalignment)* of *cybernetic control* and *reward and compensation-KT strategy* positively or negatively influences all activities.

Overall, interesting findings emerge from this study. The evidence indicates that monitoring and providing feedback concerning KT are the most effectively aligned performance management practices to improve lecturers' engagement with all KT activities, while a lack of support in developing KT activities and a failure to consider previous KT performance in lecturers' budget allocation are misaligned management practices that have the most negative effects on lecturers' engagement in any KT activity.

In contrast, *cybernetic control* elements are virtually ineffective when applied at the university level, but the effects of alignment and misalignment on the participation of lecturers in KT are stronger when resource allocation and provision of the means for KT activity are managed by research groups.

Despite its contributions, this research faces several limitations. First, the use of online surveys entails shortcomings such as respondent acquiescence, halo effects and division biases. Second, this paper addresses the effect of *PMS–KT strategy alignment (misalignment)* by considering only a limited set of KT activities and PMS items. Finally, the methodology considers KT to be proxied by a binary variable; thus, it does not account for more detailed information concerning the intensity of lecturers' KT output.

Nonetheless, the results of this study have valuable practical implications for HEI managers. Although alignment (misalignment) is supposed to be the best (worst) managerial practice, in the case of lecturers' engagement with KT, its effectiveness significantly depends on the type of KT developed, so university managers must consider which activity they are most interested in promoting. Moreover, contrary to expectations, resource allocation (funding) and incentive-based budgeting schemes were not key elements to be considered by HEI managers during PMS implementation, as other tools, as explained previously, are more effective. Furthermore, the results obtained regarding research groups also support the recommendation of decentralizing the management of KT and considering research

groups as key decision-making units responsible for PMS implementation, when possible, because doing so has been proven to be more efficient in achieving KT objectives, especially when they are aligned with PMSs.

AUTHOR CONTRIBUTIONS

Mercedes Barrachina-Palanca: Conceptualization; Investigation; Funding acquisition; Writing – original draft; Validation; Visualization. **Maria Beatriz Gonzalez-Sanchez:** Investigation; Writing – original draft; Validation; Methodology; Visualization; Writing – review & editing. **Cristina Gutiérrez-López:** Investigation; Writing – original draft; Methodology; Validation; Visualization; Writing – review & editing.

ACKNOWLEDGEMENT

Funding for open access charge; Universidade de VIGO/CISUG.

CONFLICT OF INTEREST STATEMENT

None.

DATA AVAILABILITY STATEMENT

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

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ENDNOTES

[1] We thus calculated the sample weights as $(w_u = \frac{n_u/N}{s_u/S})$, where n is the population size and s is the sample size for each university u, while N is the total population size and S is the total sample size for all universities.

[2] For further information, see www.iune.es.

[3] In this investigation, comparing early and late responses to test for the presence of potential non-response bias is not appropriate since methods of encouraging responses were adopted at different moments and universities. Therefore, early and late responses are from individuals from different universities.

[4] To calculate this variable, data from a university database (number of extended patents and patents by researcher) are compared with data from the sample (share of faculty producing extended patents or patents).

REFERENCES

Anthony, R. N., Govindarajan, V., & Dearden, J. (2007). *Management control systems* (Vol. *12*). McGraw-Hill.
Bastos, E. C., Sengik, A. R., & Tello-Gamarra, J. (2021). Fifty years of university-industry collaboration: A global bibliometrics overview. *Science and Public Policy*, *48*(2), 177–199.
Berbegal-Mirabent, J. (2018). The influence of regulatory frameworks on research and knowledge transfer outputs: An efficiency analysis of Spanish public universities. *Journal of Engineering and Technology Management*, *47*, 68–80.
Bonner, S. E., & Sprinkle, G. B. (2002). The effects of monetary incentives on effort and task performance: Theories, evidence, and a framework for research. *Accounting, Organizations and Society*, *27*(4–5), 303–345.
Bourne, M., Franco-Santos, M., & Rivera, P. (2013). *Performance management in UK higher education institutions: The need for a hybrid approach*. Leadership Foundation for Higher Education.
Centobelli, P., Cerchione, R., Esposito, E., & Shashi, S. (2019). The mediating role of knowledge exploration and exploitation for the development of an entrepreneurial university. *Management Decision*, *57*(12), 3301–3320.
Chapman, C. S., & Kihn, L. A. (2009). Information system integration, enabling control and performance. *Accounting, Organizations and Society*, *34*(2), 151–169.
Chau, V. S., Gilman, M., & Serbanica, C. (2017). Aligning university–industry interactions: The role of boundary spanning in intellectual capital transfer. *Technological Forecasting and Social Change*, *123*, 199–209.

Chenhall, R. H. (2005). Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: An exploratory study. *Accounting, Organizations and Society*, *30*(5), 395–422.
D'Este, P., & Perkmann, M. (2011). Why do academics engage with industry? The entrepreneurial university and individual motivations. *The Journal of Technology Transfer*, *36*(3), 316–339.
D'Este, P., Tang, P., Mahdi, S., Neely, A., & Sánchez-Barrioluengo, M. (2013). The pursuit of academic excellence and business engagement: Is it irreconcilable? *Scientometrics*, *95*(2), 481–502.
Etomaru, I., Bisaso, R., & Nakayiwa-Mayega, F. (2022). Fostering knowledge translation in Africa's flagship universities: A case of Makerere University. *Higher Education Research & Development*, *41*(4), 1060–1074.
European Union (EU). (2000). *Lisbon European Council 23 and 24 March 2000, Presidency Conclusion*. https://www.europarl.europa.eu/summits/lis1_en.htm
Franco-Santos, M., Lucianetti, L., & Bourne, M. (2012). Contemporary performance measurement systems: A review of their consequences and a framework for research. *Management Accounting Research*, *23*(2), 79–119.
Franco-Santos, M., Nalick, M., Rivera-Torres, P., & Gomez-Mejia, L. (2017). Governance and well-being in academia: Negative consequences of applying an agency theory logic in higher education. *British Journal of Management*, *28*(4), 711–730.
Friedman, J., & Silberman, J. (2003). University technology transfer: Do incentives, management, and location matter? *The Journal of Technology Transfer*, *28*(1), 17–30.
Frow, N., Marginson, D., & Ogden, S. (2010). "Continuous" budgeting: Reconciling budget flexibility with budgetary control. *Accounting, Organizations and Society*, *35*(4), 444–461.
Gonzalez-Sanchez, M. B., Gutierrez López, C., & Barrachina Palanca, M. (2021). How can universities engage lecturers in knowledge transfer? Analyzing the influence of performance management systems. *Journal of Knowledge Management*, *26*(4), 1083–1110.
Guerrero, M., & Urbano, D. (2012). The development of an entrepreneurial university. *The Journal of Technology Transfer*, *37*(1), 43–74.
Harvey, J., Pettigrew, A., & Ferlie, E. (2002). The determinants of research group performance: Towards mode 2? *Journal of Management Studies*, *39*(6), 747–774.
Heinicke, X., & Guenther, T. W. (2020). The role of management controls in the higher education sector: An investigation of different perceptions. *European Accounting Review*, *29*(3), 581–630.
Huang, M. H., & Chen, D. Z. (2017). How can academic innovation performance in university–industry collaboration be improved? *Technological Forecasting and Social Change*, *123*, 210–215.
Ittner, C. D., & Larcker, D. F. (2001). Assessing empirical research in managerial accounting: A value-based management perspective. *Journal of Accounting and Economics*, *32*(1–3), 349–410.
Ittner, C. D., Larcker, D. F., & Randall, T. (2003). Performance implications of strategic performance measurement in financial services firms. *Accounting, Organizations and Society*, *28*(7–8), 715–741.
IUNE (2018). Observatory of the Spanish University Research Activity. http://www.iune.es
Kaplan, R. S., & Norton, D. P. (2001). The strategy-focused organization. In *The strategy-focused organization: How balanced scorecard companies thrive in the new business environment*. Harvard Business Press.
Kenno, S., Lau, M., Sainty, B., & Boles, B. (2020). Budgeting, strategic planning and institutional diversity in higher education. *Studies in Higher Education*, *46*(9), 1919–1933.
Lach, S., & Schankerman, M. (2008). Incentives and invention in universities. *The Rand Journal of Economics*, *39*(2), 403–433.
Landry, R., Saïhi, M., Amara, N., & Ouimet, M. (2010). Evidence on how academics manage their portfolio of knowledge transfer activities. *Research Policy*, *39*(10), 1387–1403.
Malmi, T., & Brown, D. A. (2008). Management control systems as a package—Opportunities, challenges and research directions. *Management Accounting Research*, *19*(4), 287–300.
Marginson, D., McAulay, L., Roush, M., & van Zijl, T. (2014). Examining a positive psychological role for performance measures. *Management Accounting Research*, *25*(1), 63–75.
Markman, G. D., Gianiodis, P. T., Phan, P. H., & Balkin, D. B. (2004). Entrepreneurship from the ivory tower: Do incentive systems matter? *The Journal of Technology Transfer*, *29*(3), 353–364.
Merchant, K. A., & Otley, D. T. (2006). A review of the literature on control and accountability. *Handbooks of Management Accounting Research*, *2*, 785–802.
Miller, K., McAdam, R., & McAdam, M. (2018). A systematic literature review of university technology transfer from a quadruple helix perspective: Toward a research agenda. *R&D Management*, *48*(1), 7–24.
Nichols, N., & Hayes Tang, H.-H. (2022). Navigating managerial and entrepreneurial reforms in research-intensive universities: A comparison of early career trajectories in Hong Kong and Canada. *Higher Education Quarterly*, *76*, 116–130.
Olmos-Peñuela, J., Castro-Martínez, E., & D'Este, P. (2014). Knowledge transfer activities in social sciences and humanities: Explaining the interactions of research groups with non-academic agents. *Research Policy*, *43*(4), 696–706.
O'Shea, R. P., Chugh, H., & Allen, T. J. (2008). Determinants and consequences of university spinoff activity: A conceptual framework. *The Journal of Technology Transfer*, *33*(6), 653–666.

Ozga, J., & Jones, R. (2006). Travelling and embedded policy: The case of knowledge transfer. *Journal of Education Policy*, *21*(1), 1–17.
Sánchez-Barrioluengo, M., & Benneworth, P. (2019). Is the entrepreneurial university also regionally engaged? Analysing the influence of university's structural configuration on third mission performance. *Technological Forecasting and Social Change*, *141*, 206–218.
Secundo, G., De Beer, C., Fai, F. M., & Schutte, C. S. (2019). Increasing university entrepreneurialism: Qualitative insights from the technology transfer office. *Measuring Business Excellence*, *23*(3), 253–268.
Secundo, G., Ndou, V., Del Vecchio, P., & De Pascale, G. (2019). Knowledge management in entrepreneurial universities: A structured literature review and avenue for future research agenda. *Management Decision*, *57*(12), 3226–3257.
Siegel, D. S., Veugelers, R., & Wright, M. (2007). Technology transfer offices and commercialization of university intellectual property: Performance and policy implications. *Oxford Review of Economic Policy*, *23*(4), 640–660.
Siegel, D. S., Waldman, D. A., Atwater, L. E., & Link, A. N. (2003). Commercial knowledge transfers from universities to firms: Improving the effectiveness of university–industry collaboration. *The Journal of High Technology Management Research*, *14*(1), 111–133.
Siegel, D. S., & Wright, M. (2007). Intellectual property: The assessment. *Oxford Review of Economic Policy*, *23*(4), 529–540.
Smith, K., Else, F., & Crookes, P. A. (2014). Engagement and academic promotion: A review of the literature. *Higher Education Research & Development*, *33*(4), 836–847.
Sutton, N. C., & Brown, D. A. (2016). The illusion of no control: Management control systems facilitating autonomous motivation in university research. *Accounting & Finance*, *56*(2), 577–604.
Thursby, J. G., & Thursby, M. C. (2004). Are faculty critical? Their role in university–industry licensing. *Contemporary Economic Policy*, *22*(2), 162–178.
United Nations Educational, Scientific & Cultural Organization (UNESCO). (2011). *Education for Sustainable Development*.
Wilbon, A. D. (2012). Interactive planning for strategy development in academic-based cooperative research enterprises. *Technology Analysis & Strategic Management*, *24*(1), 89–105.
Xue, L., Rienties, B., Van Petegem, W., & Van Wieringen, A. (2020). Learning relations of knowledge transfer (KT) and knowledge integration (KI) of doctoral students during online interdisciplinary training: An exploratory study. *Higher Education Research & Development*, *39*(1), 1–18.

How to cite this article: Barrachina-Palanca, M., Gonzalez-Sanchez, M. B., & Gutiérrez-López, C. (2023). Effects of performance management systems–strategy alignment on lecturers' engagement with knowledge transfer: A perspective from Spain. *Higher Education Quarterly*, *77*, 874–889. https://doi.org/10.1111/hequ.12437

APPENDIX A

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