

Striving for excellence: the role of top management team diversity in universities

Team
diversity in
universities

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Abstract

Purpose – The purpose of this paper is to evaluate the influence of top management team diversity on academic excellence in universities. Academic excellence is conceptualized as successfully gaining funds for inter-organizational research collaborations, interdisciplinary graduate schools and high-ranked scientific reputation.

Design/methodology/approach – The study applies upper echelon theory to universities. Three hypotheses are developed: (overall) top management team heterogeneity is positively associated with successful funding of excellence clusters, (overall) top management team heterogeneity is positively associated with successful funding of graduate schools and (overall) top management team heterogeneity is positively associated with academic reputation. The empirical study is based on a cross-sectional dataset with a time lag, covering characteristics of 75 German public universities from 2008 to 2013. Multiple-regression analysis is applied to test the hypotheses.

Findings – Our results indicate that disciplinary and educational diversity of upper echelons has a positive effect on the outcomes. Other top management team characteristics (age, gender, etc.) show no significant effects. Besides top management team composition, we find that a high number of faculties and a broad inclusion of internal status groups (students, tenured faculty, academic and administrative staff) and external stakeholders in decision making processes may enhance academic excellence of universities.

Research limitations/implications – First, the study contributes to the body of literature concerned with higher education. It is situated at the crossroads of management studies and higher education research, unlocking strategic management theorizing for the public context. Furthermore, the study contributes to the body of literature on strategic leadership in pluralistic organizations. It highlights the importance of heterogeneous governance structures and modular organization designs for achieving academic excellence.

Practical implications – The paper may inform practitioners in administrative or leading positions and policy-makers concerned with higher education. The more diverse a top management team is in

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terms of multiple disciplinary backgrounds, the more likely they succeed in driving the university toward academic excellence.

Originality/value – The study is among the first to evaluate the influence of top management teams in universities with a quantitative research design.

Keywords Collaboration, Strategy, Higher education, Competition, Reputation, Upper echelon

Paper type Research paper

Introduction

Higher education has changed from a system of professional dominance and democratic participation toward a more managed model of research and education, particularly in Germany (Reihlen and Wenzlaff, 2014). Driven by the race for scientific reputation, evaluated by agencies, measured by indicators and condensed into rankings, major changes in the governance of higher education have been initiated during the past 15 years. The transition basically aims to increase scientific output and knowledge production through intensified competition between individual researchers and between universities. On the institutional level, specialization and profile-building, together with intensified collaborations and networking, promise benefits to the overall productivity.

Benefits to organizational efficiency based on the division of labor fuel economic arguments for changes to higher education. However, all major German universities are public and thus led by ministerial decisions and primarily funded by taxes according to egalitarian input criteria. To enable universities to act as competitors, institutional autonomy and budget accountability have been increased (Krücken and Meier, 2006), and decision rights of central governing bodies have been strengthened (Schimank and Lange, 2009). In other words, power has been delegated by the state and concentrated in top management teams (Capano, 2011). This approach to governance is described as “steering at a distance” (Capano *et al.*, 2012) and is a common trend in higher education across Europe (de Boer *et al.*, 2007b).

To create a market-like situation for universities, rising amounts of research funding are allocated according to performance criteria. For example, the share of third-party funding by public, non-profit and private institutions has increased by approximately 35 per cent during the past 15 years and now accounts for more than one-quarter of the annual budget of public German universities (DFG, 2012). The majority of grants from external sources, nonetheless, benefits mostly particular research projects, not the universities at large. The so-called *Excellence Initiative* has taken this competition to an institutional level. Between 2007 and 2013, the German Research Foundation allocated more than €2.7 billion to universities to promote institutionalized cutting-edge research and post-graduate education.

These reforms constitute a shift from a highly autonomous and loosely coupled system toward a more tightly coupled organization that is capable of collective action and actorhood (Krücken and Meier, 2006; Lutz, 1982). Critics see a reduction in academic autonomy and participation in decision-making (Middlehurst, 2004; Lapworth, 2004). A common fear is that if universities become more managed, they will become less academic because professional norms of academia require a broad inclusion of diverse perspectives in strategic decision-making (Birnbaum, 2004).

Due to the recency of these developments, the role of strengthened top management teams remains empirically unclear. There are only few studies that look into the

relationship between characteristics of governing bodies and strategic choices of universities (e.g. Blaschke *et al.*, 2014; Nienhüser and Jacob, 2008; Röbbken, 2006). In addition, most studies concentrate on characteristics of individual leaders (e.g. presidents or vice-chancellors; see Goodall, 2009), rely on in-depth case studies (Bradshaw and Fredette, 2008; Hattke *et al.*, 2014) or do not elaborate the outcomes of strategic decision-making (e.g. Hüther, 2010). Consequently, it is necessary to consider the top management team instead of focusing on a single person and test the assumed effects against the data of a representative sample, instead of using case studies for typological analysis. This enables us to strengthen our understanding concerning the effects of the reforms and possible impacts of top management team's decisions.

So far, upper echelons theory (Hambrick and Mason, 1984) has not been used to analyze the impact of top management teams in universities. However, it provides a sound theoretical framework to analyze characteristics of top management teams, their decisions and their outcomes. Accordingly, especially in complex and pluralistic environments, heterogeneous teams are more likely to make choices that lead to improved performance (Carpenter, 2002; Denis *et al.*, 2001; Hambrick and Mason, 1984; Nielsen and Nielsen, 2013). It is our aim to test whether the socio-demographic diversity of top management teams in universities supports this performance argument.

Our empirical analysis is based on a unique longitudinal dataset of 75 public German universities. Results of the multiple regression analysis indicate that top management team heterogeneity in terms of diverse disciplinary and educational backgrounds has significant positive effects on third-party-funded collaboration and scientific reputation. In addition, a legal framework that ensures broad inclusion of status groups and external stakeholders in the decision-making processes and a high number of faculties facilitate the achievement of the desired outcomes.

First and foremost, our study contributes to the body of literature concerned with higher education. It is situated at the crossroads of management studies and higher education research, unlocking strategic management theorizing for the public context. Results indicate that recent reforms have indeed created collective agency in universities, although the influence of top management team diversity is limited. Furthermore, our study contributes to the body of literature on strategic leadership in pluralistic organizations. It highlights the importance of heterogeneous governance structures and modular organization designs for a cohesive strategic development of pluralistic organizations. Last but not least, our study informs higher education practitioners, administrators and politicians on possible impacts of their strategic decisions. It may guide policy-makers in future decisions on top management teams appointment and changes to the organizational design of universities.

The paper is organized as follows. First, we briefly discuss upper echelons theory and derive three hypotheses based on our adapted model of strategic decision-making in universities. We then present our empirical data, methodology and findings. Lastly, we conclude with a summarizing discussion.

Upper echelons theory: the organization as a reflection of its top managers

The idea that an organization reflects in its top management team has been intriguing scholars in management science and organization theory since Hambrick and Mason's (1984) seminal article. Besides updates by Hambrick (2007; Hambrick *et al.*, 1996), many

others (e.g. Carpenter, 2002; Carpenter *et al.*, 2004) further developed the idea commonly known as upper echelons (theory).

Hambrick and Mason (1984) provided a perspective on management that first situates the characteristics of the upper echelon (i.e. the top management team) in an objective situation. The top management team then has a number of strategic choices at its disposal that, in turn, affect the performance of the organization.

The (external and internal) objective situation is enacted by the top management team. For example, managers are bound by a legal framework that, on the one hand, provides them with competencies and resources to develop and act upon their strategic choices and that, on the other hand, binds their actions to certain legal obligations. The objective situation, of course, may affect strategic choices directly, too. This immediate contingency between environmental conditions and business strategy (Hofer, 1975), however, is not a major part of the discussion of upper echelons theory. After all, the top management team is said to have significant discretion in decision-making (Hambrick and Abrahamson, 1995; Hambrick and Finkelstein, 1987).

The top management team presents itself with a number of demographic and non-demographic characteristics that affect strategic choices and organizational performance (Harrison and Klein, 2007). Age, gender, tenure, educational background and socioeconomic status are an easily observable proxy to assess cognitive values without issuing psychometric tests or surveys. Research on upper echelons often concentrates on these observable characteristics of top management teams, which have altogether proven to significantly affect strategic choices and organizational performance (for an overview, see Carpenter *et al.*, 2004).

The strategic choices of the top management team cover the entire spectrum of management science and organization theory, from product innovation (Bantel and Jackson, 1989; Finkelstein and Hambrick, 1990; Smith and Tushman, 2005) to diversification (Krishnan *et al.*, 1997; Wiersema and Bantel, 1992, Michel and Hambrick, 1992), from mergers and acquisitions (Walsh, 1988) to leverage on capital intensity (Finkelstein and Hambrick, 1990; Geletkanycz and Hambrick, 1997), and from administrative complexity (Hambrick and Mason, 1984; Bantel and Jackson, 1989) to organizational design (Michel and Hambrick, 1992). Proposed relationships between strategies and upper echelon characteristics are manifold. For example, risky strategies such as unrelated diversification, product innovation or large-scale investments are more likely pursued by younger managers (Hambrick and Mason, 1984), while the strategic choice between reorganization and liquidation depends to a large extent on the proportion of external or independent managers (Daily, 1995).

The strategic choices of managers ultimately display in organizational performance, whether it is profitability, growth or survival. Of course, upper echelon characteristics may affect performance directly, too. Similar to the objective situation affecting strategic choices, however, this is part of the unexplained variance in upper echelons theory.

The upper echelons of university governance

Universities as public administrations of research and teaching find a different (external and internal) objective situation than companies in the private sector and, therefore, have rather limited strategic choices at their disposal. However, following recent reforms, the upper echelons of university governance have received considerable

discretionary power, which is why the adaptation of this perspective appears more than ever to be a fruitful endeavor.

Adapting the upper echelons perspective of organizations to universities requires us to answer three questions to begin with:

- Q1. What is the (external and internal) objective situation that enables and constrains the constitution of the upper echelons of universities and their strategic choices?
- Q2. Who constitutes the upper echelons and what are the key constructs to describe the top management team?
- Q3. What are the performance indicators of strategic choices made by the top management team?

Universities are subject to very distinctive legal frameworks. As public administrations of research and teaching, they are largely funded by the federal government, the state and the local municipality. State-level legal frameworks then outline the mechanisms that govern research and teaching by delegating formal power to different bodies (Hüther, 2010).

Most universities allow for final strategic decisions to be made by a defined composition of executives on the presidential level. For example, upper echelons are finally responsible for the selection of faculty members, tenure decisions or applications for the excellence initiative (Hüther, 2010). However, some of these top management teams are held accountable by a strong supervisory board that, similar to the private sector, involves external stakeholders in decision-making. Others, in turn, delegate important decisions to academic senates where a legally determined parity of status groups (students, tenured faculty members, academic and administrative staff) discusses and votes on strategic issues. Thus, the legal frameworks designate the external objective situation that both provides competencies and resources to managers and, at the same time, constrains the constitution of the top management team and its strategic choices. The internal objective situation, in contrast, is for the most part a matter of organizational age and the size of a university in terms of number of students, tenured faculty members as well as academic and administrative staff.

The second question that needs to be answered by adapting upper echelons theory to research on university governance pertains to the constitution of the top management team. Answers given by management science and organization theory include all senior executives (e.g. Hambrick *et al.*, 1996, Geletkanycz and Hambrick, 1997), top two tiers of an organization's management (e.g. Carpenter and Fredrickson, 2001; Carpenter, 2002) or all top managers involved in strategic decision-making (e.g. Collins and Clark, 2003; Papadakis and Barwise, 2002). Following recent reforms (Schimank and Lange, 2009), the top management team of a university is constituted by executives on the presidential level. The upper echelons engaged in university governance thus include the president, several vice-presidents and the chancellor. Executives below the presidential level such as deans of faculties or schools are not considered part of the top management team since their discretionary power for strategic choices is commonly limited to the faculty or school. Accordingly, we identify key constructs of the top management team in line with the readily observable characteristics found in research in upper echelons theory (for an overview, see Carpenter *et al.*, 2004): Age, the scope of functional responsibility

(e.g. finance), scientific discipline (field of research, e.g. chemistry), educational level (highest academic degree, e.g. PhD), gender and employment status (full time versus part time).

The third question points at available strategic choices and respective indicators. In contrast to the private sector, universities as public administrations are rather limited in taking strategic choices, although they have received considerable leeway to do business with the introduction of new public management (de Boer *et al.*, 2007a). Common strategic choices by the top management teams concern administrative issues and questions of organizational design (Hüther, 2010). The respective indicators are the functional differentiation of the administration (to assess the degree of administrative complexity) and the number of faculties (as a proxy for diversification and integration). Unique strategies of university governance then explain variations of profitability. In contrast to upper echelons theory, profitability is not measured in terms of a financial profit, return on investment or the like, but it is profitability in terms of academic reputation indicated by the number of excellence clusters, graduate schools or university rankings. As Table I shows, excellence clusters and graduate schools are designed to accelerate scientific productivity by competition, profile building and networking. Excellence clusters are only admitted if the university relocates funds to the respective research topic and if industrial partners and other research institutes join in for collaboration. Graduate schools provide structured education for young scientists in interdisciplinary programs.

Hypotheses for university governance

As pluralistic organizations, universities are exposed to demands of diverse internal and external stakeholders, who often follow divergent objectives (Denis *et al.*, 2001). Production technologies of research and teaching are unclear (Cohen *et al.*, 1972), while quality standards are set by a professionalized and highly autonomous workforce (Mintzberg, 1980). Upper echelons theory offers a general proposition for such conditions: “In turbulent, especially discontinuous, environments, team heterogeneity will be positively associated with profitability” (Hambrick and Mason, 1984, p. 203). The proposition is based on the assumption that the diversity of attributes may create novel ideas and enrich the quality of knowledge and resources available to the top management teams (Geletkanycz and Hambrick, 1997; Harrison and Klein, 2007; Kornberger *et al.*, 2006). Following our adaptation of upper echelons theory to the

Table I.
Characteristics of
excellence clusters
and graduate schools

Characteristics	Excellence clusters	Graduate schools
Competitive resource allocation	Around €1200 million for 37 clusters to promote cutting-edge research	Around €200 million for 39 graduate schools to promote young scientists and researchers
Specialization and profile building	Immediate Profile by research clusters with priority in funding decisions	Mediate Profile by young scientists and researchers
Collaboration and networking	Cross-sectorial Obligatory involvement of external research partners and industry	Inter-disciplinary Obligatory involvement of different faculties

context of universities, we develop three hypotheses for our analysis of Germany's higher education system.

First, we turn to the Excellence Initiative, initiated by the German Ministry for Research and Education in 2005. So far, it has distributed €2.7 billion to public universities over the course of three rounds. It demanded that applicants develop strategic plans for the future development of their university, including cutting-edge research topics, sophisticated collaboration and networking with external partners and interdisciplinary promotion of young scientists. Several committees, consisting of national and international researchers, higher education managers and politicians evaluated the applications (Hornborstel, 2008). In the end, the excellence initiative granted funding to 37 excellence clusters and 39 graduate schools.

We argue that a diverse top management team is more likely to meet the various demands and pass the evaluation (Geletkanycz and Hambrick, 1997; Harrison and Klein, 2007). On the one hand, we assume that disciplinary heterogeneity in the top management team is more likely to reflect the interdisciplinary demands of the excellence initiative. On the other hand, team heterogeneity in terms of age, functional responsibility, educational level, gender and employment status is more likely to highlight aspects of a university's application from different viewpoints and, thus, create more innovative applications (Kornberger *et al.*, 2006). For example, gender diversity of students, scholars and employees, an important socio-political issue in Germany, is more likely to find consideration by a respectively heterogeneous team. This leads us to the following hypotheses:

- H1. (Overall) team heterogeneity is positively associated with successful funding of excellence clusters.
- H2. (Overall) team heterogeneity is positively associated with successful funding of graduate schools.

Second, we discuss the effect of top management teams on academic reputation. Reputation, of course, is the currency of academia. Prestigious awards or widely cited publications play an important role in addressing top researchers, eager students and third-party grants. On the institutional level, universities particularly target reputation rankings such as the excellence ranking of German universities, published by CHE. This ranking considers research-related dimensions (e.g. publications, citations and dissertations), transferability (e.g. number of patents, practical implications of study programs), internationalization (e.g. incoming and outgoing scholars and students) and the orientation toward students (e.g. relation of students to professors). It also measures the academic reputation of scientific disciplines by surveying professors about the leading research university within their own discipline (for details on method and measurements of the CHE ranking, see Beerkens and Dill, 2010; Federkeil, 2002).

We argue that academic heterogeneity and a dispersed distribution of age, functional responsibility, scientific discipline, educational level, gender and employment status in top management teams are likely to account for quality criteria of the diverse academic disciplines measured in the ranking. A diverse top management teams may establish competitive advantages, either by anticipating academic trends and developing strategies, structures, and processes that support these trends (Hambrick *et al.*, 1996) or by recruiting top researchers for the respective disciplines (Goodall, 2009). Based on these arguments, we claim:

H3. (Overall) team heterogeneity is positively associated with academic reputation.

For all three hypotheses, we furthermore consider external and internal contingencies (e.g. legal frameworks, organizational size) as well as the variety of strategic choices.

Empirical analysis

Data and measures

Our data set is based on a comprehensive document analysis (e.g. organization charts and yearbooks), Internet research (e.g. personnel and financial records) and secondary data from existing surveys and public statistics (e.g. DFG, 2012; CHE, 2011, 2012; DESTATIS, 2012). It comprises information on 75 German public universities. We also had to exclude five universities because of missing data. The 75 universities, nonetheless, cover 93.75 per cent of the total population of public universities with promotion and habilitation rights, excluding pedagogic universities and arts colleges. We gathered the data between 2011 and 2013, including information on universities dating as far back as 2008. Table II provides descriptive statistics for our data set.

We account for our theoretical argument by deploying a static cross-section analysis with a time lag. Accordingly, we clustered the data into three time frames. The first

Constructs	Measures	Minimum	Maximum	Mean	SD
<i>Objective Situation</i>					
Size	Number of students	2,369	51,216	18,248	11,299.958
	Number of professors	26	733	289	171.056
	Number of scientific personnel	103	10,127	2,343	1,705.514
	Number of administrative staff	234	6,802	3,035	2,917.586
Organizational age	Years	24	628	188	193.248
Legal frameworks	Categorical ^a	–	–	–	–
<i>Upper echelon characteristics</i>					
Team size	Members	3	7	4.99	0.846
Age	Years	26	72	56.72	3.645
Functional responsibility	Heterogeneity ^b	0.667	0.917	0.865	0.041
Scientific discipline	Heterogeneity ^b	0	0.806	0.636	0.127
Educational level	Heterogeneity ^b	0	0.92	0.365	0.118
Gender diversity	Heterogeneity ^b	0	0.5	0.276	0.177
Employment status	Heterogeneity ^b	0	0.5	0.443	0.122
<i>Strategic choices</i>					
Faculties	Number of faculties	1	21	8.59	4.494
Central administrative units	Number of units	3	12	5.95	1.902
<i>Performance</i>					
Excellence cluster	Number of clusters	0	4	0.63	0.912
Graduate schools	Number of schools	0	6	0.64	1.074
Reputation	Points (CHE ranking)	0	15	4.03	4.239

Table II.

Descriptive statistics

Notes: ^a Classification according to Hüther (2010); ^b Heterogeneity according to Blau (1977)

covers top management team characteristics (independent variables) and information on the objective situation (control variables) from earlier years (2008 until 2011). Next to size and age of the universities, the objective situation is largely determined by legal frameworks. We adopt a respective classification (Hüther, 2010) which denotes the formal power of governing bodies in universities. Among these bodies are the top management team (including the president, vice-presidents and chancellor), the academic senate (constituted by tenured faculty members, students, academic and administrative staff), and the supervisory board (mainly external stakeholders). Different configurations of veto rights are used to derive four archetypical legal frameworks. The first is called “managerial-collegial-supervisory model” and describes nearly equally distributed decision-power between the top management teams, the senate, and the board. Academic senates have little to no formal competencies in the second archetype, “managerial-supervisory model”. Third, rather concentrated decision-making in the top management teams constitutes the third type, termed “managerial model”. Last, federal states which prescribe so-called “collegial model” allocate most decision-power to academic senates.

The second timespan covers outcomes of strategic choices of the top management team (control variables) which were recorded for the years 2009 to 2012. Changes to formal structures and administrative functions in universities are rather slow and path-dependent than spontaneous and dynamic, which is why we argue for a time lag of roughly one year between decisions made and outcomes observed. We take note of the last tender of the Excellence Initiative and the latest CHE excellence ranking of disciplinary academic reputation (dependent variables) within the most recent time frame from 2011 until 2012. While the funding distributed to universities in the Excellence Initiative is unambiguous, we caution about the technical and methodological limitations of rankings (Kieser, 2010). Nonetheless, the CHE provides one of the most comprehensive and prominent rankings of German universities (Beerkens and Dill, 2010).

Method

We use multivariate regression analysis to test for the proposed relationships between the characteristics of universities’ top management teams (independent variables) and organizational performance (dependent variables). Variables of the (external and internal) objective situation and strategic choices are systematically controlled for.

Following empirical research in upper echelons theory (Hambrick and Mason, 1984), we use Blau’s (1977) heterogeneity index for all categorical variables: functional responsibility scientific discipline, educational level, gender and employment status (full time versus part time) present in the top management team. The dispersion of managers’ age is represented by the coefficient of variation (Carroll and Harrison, 1998). We binary-coded legal frameworks to indicate the respective archetype. Each university can only belong to one of the four types.

We start our analysis with a look at the multicollinearity of independent and control variables for each hypothesis test. Elevated variance inflation factors (i.e. with a square root larger than 2) for the number of tenured faculty members, the number of students and the number of academic and administrative staff require us to remove these control variables from further tests. While these control variables are an obvious proxy for the size of a university, the number of faculties and the number of central administrative

units of a university do not suffer from multicollinearity and, therefore, provide a better idea of size. Moreover, these two measures hint at the diversification (the more faculties, the more diverse in terms of scientific disciplines) and integration of universities (the more administration, the tighter integrated) according to contingency approaches (Kubicek and Welter, 1985). Table III shows the results of the multivariate regression analysis, including significance levels to highlight support for our three hypotheses.

Findings

Our research findings show partial support for the first (*H1*) and third hypothesis (*H3*), while we must reject the second hypothesis (*H2*). Next, to the effects of top management team diversity on organizational performance, we identify characteristics of the objective situation and strategic choices.

First, we find that successful funding for excellence clusters (*H1*) is positively associated with disciplinary diversity in top management teams ($\beta = 0.261, p = 0.048$). Other upper echelon characteristics (age, functional responsibility, educational level, employment status and gender) yield no significant effects on organizational performance. In addition, the number of faculties positively affects the acquisition and implementation of excellence clusters ($\beta = 0.296, p = 0.029$). Model 1 explains 13.9 per cent of the variance in our sample, which we consider a moderate value (Table III). Still, it emphasizes that universities with many faculties have a significantly better chance to succeed in the competition for excellence clusters when they simultaneously use an interdisciplinary top management team.

Second, we find no support for a positive association between team diversity and the implementation of graduate schools (Table III, Model 2). However, a legal framework that ensures a broad inclusion of different status groups and stakeholders in the decision-making processes (i.e. a strong academic senate and supervisory board) increases organizational performance ($\beta = 0.322, p = 0.03$). Although such a legal framework enhances the probability for successful funding of graduate schools by 8 per cent, we must reject our hypothesis (*H2*) that top management team diversity affects successful funding of graduate schools.

Third and last, our analysis shows that academic reputation is positively associated ($\beta = 0.241, p = 0.036$) with educational diversity (i.e. the highest academic degree achieved) of top management teams (*H3*). In addition, a legal framework that ensures a broad inclusion of status groups and stakeholders ($\beta = 0.352, p = 0.006$) and a large number of faculties ($\beta = 0.436, p < 0.001$) increases institutional academic reputation. Together, these three variables explain 32.9 per cent of the variance in the ranking placement (Table III, Model 3). We consider this rather large value proof for the discretion of top management teams over strategic choices and, ultimately, their effect on organizational performance.

Conclusion

The aim of our study is to evaluate the influence of top management team composition in universities on achieving academic excellence, which we conceptualize as competitively funded, inter-organizational research collaborations (excellence clusters), inter-disciplinary promotion of young scientists (graduate schools) and scientific reputation (CHE ranking). Overall, results depict that that high degrees of organizational and managerial complexity lead to increased performance. Performance

Constructs and measures	Model 1 Excellence clusters			Model 2 Graduate schools			Model 3 CHE ranking		
	β	SE	<i>p</i>	β	SE	<i>p</i>	β	SE	<i>p</i>
TMT: Age (coefficient of variation)	0.048	2,305	0.671	0.011	2,803	0.945	-0.034	9,456	0.733
TMT: Functional diversity (Blau's het. index)	0.053	2,909	0.691	-0.060	3,538	0.661	0.120	11,935	0.304
TMT: Disciplinary diversity (Blau's het. index)	0.261*	0.93	0.048	0.098	41275	0.463	0.226	3,813	0.052
TMT: Educational diversity (Blau's het. index)	0.199	0.988	0.124	0.062	1201	0.637	0.241*	4052	0.036
TMT: Gender diversity (Blau's het. index)	0.094	0.617	0.434	0.119	0.75	0.339	0.154	2531	0.148
TMT: Employment status diversity (Blau's het. index)	-0.066	0.878	0.574	0.027	1067	0.824	-0.049	42,158	0.635
SC: Number of faculties	0.296*	0.027	0.029	0.265	0.033	0.057	0.436***	0.11	< 0.001
SC: Number of central administrative units	0.167	0.061	0.193	0.235	0.074	0.09	0.175	0.249	0.124
OS: Managerial-collegial-supervisory model	0.151	0.317	0.287	0.322*	0.386	0.03	0.352**	1302	0.006
OS: Managerial-supervisory model	0.083	0.305	0.6	0.132	0.371	0.421	0.186	1251	0.185
OS: Managerial model	-0.005	0.45	0.974	0.008	0.548	0.956	-0.056	1848	0.642
OS: Collegial model	0.033	0.345	0.815	0.249	0.42	0.09	0.098	1416	0.431
Adjusted R^2		0.139			0.081			0.329	
F-Statistic (DF)		1.993 (62)			1.541 (62)			4.028 (62)	

Notes: * $p < 0.05$; ** $p < 0.01$; TMT = top management team; SC = strategic choices; OS = objective situation

Table III. Multivariate regression analysis

in universities is complex and highly ambiguous indeed (Seglen, 1997). And as Luhmann (1995) already stated, complexity can only be reduced by complexity.

Discussion

In line with previous research on top management teams diversity in complex environments, heterogeneity is positively associated with higher performance (Geletkanycz and Hambrick, 1997; Pearce and Zahra, 1992; Nielsen and Nielsen, 2013). Studies that propose lower performance due to lack of consensus between different interests (Knight *et al.*, 1999) are not supported by our findings.

The implementation of cutting-edge research collaborations with external partners is facilitated by disciplinary diversity in the top management team (*H1*). From a resource dependence perspective, this result emphasizes the institutional function of upper echelons (Hillman and Dalziel, 2003; Pfeffer and Salancik, 1978). Accordingly, a heterogeneous top management teams is connected to different stakeholders and thus may better link the organization to diverse external partners than a homogeneous team. In addition, results for *H1* show that larger numbers of faculties increase funding for cross-sectorial research clusters. This finding may be interpreted in three ways. First, the number of faculties is a proxy for the size of a university. Larger universities, in turn, provide a better environment to acquire large-scale funds from the excellence initiative than smaller universities due to already established external collaboration networks and higher internal synergies, all of which are accounted for in the grant-decision process (Kleiner, 2012). Second, more faculties implicate a higher span of control between top management and middle-management by deans. In such a setting, collective action of faculties is difficult, which makes the control of unfavorable particular interests by upper echelons easier (Olson, 1965; Sandler, 1992). The top management teams may, thus, better align the voices of different faculties and implement a focused research strategy, which is a necessary precondition for the acquisition of excellence clusters (Kleiner, 2012). Third, more faculties allow for more focused scientific research – given that the number of scientific disciplines increases less than proportional. Specialization, in turn, facilitates more collaboration activities across internal and external organizational boundaries (for similar arguments in other knowledge-intensive organizations, see Frost *et al.*, 2010, Miozzo and Grimshaw, 2005 and Schreyögg and Sydow, 2010). Metaphorically speaking, a flotilla of small and maneuverable ships is superior to a few big tankers in regard to the capabilities for implementing and managing research collaborations.

The missing relevance of top management teams composition to the implementation of interdisciplinary graduate schools may be explained by the internal focus of this excellence facet (*H2*). Thus, resource dependence arguments to secure critical resources by building networks outside the organization are of minor relevance. A broad inclusion of status groups (academic senates) and external stakeholders (supervisory boards) in decision-making processes, however, may better account for those internal interdependencies than decision-making that is limited to single bodies by legal frameworks. A similar argument is put forth by research on the appropriate degree of participation in university governance (Birnbau, 2004; Lapworth, 2004).

This argument also supports our third hypothesis on ranking placements (*H3*). Next, to distributed power within the legal framework, diverse educational levels of the top management teams are positively related to scientific reputation. If upper echelons have

different academic degrees, they may easily take into account the demands of different levels of education. Some universities even appoint students as vice presidents for teaching and studies (e.g. University of Rostock and Zeppelin University), which, consequently, enables direct student participation in top management teams decisions. In addition, numerous specialized faculties seem to be able to generate higher disciplinary reputation than fewer diversified faculties. The improved ability to adapt to disciplinary changes in local units and to correspond to interdisciplinary developments by a new recombination of sub-units is a big advantage of such modular systems (Galunic and Eisenhardt, 2001) and is certainly very prominent for organizations of higher education and research (Weick, 1976).

Limitations

However, the overall influence of the variables tested in our model is limited (R^2 between 8 and 30 per cent). Most variance is explained by other factors than by the measured characteristics. We see three possible explanations for this result. First, the top management team has still comparably limited influence on academic excellence. In that case, other control variables like financial resources or personnel structure might explain additional variation in the chosen performance criteria. A major influence over the quality of research and teaching, nonetheless, remains the skill of individual scholars. Second, top management team diversity might have a stronger impact on other outcomes. Although the implementation of excellence clusters and interdisciplinary graduate schools depends on the support of upper echelons, other criteria might be even more affected by top management team diversity. For example, effectiveness of administration could be influenced by the functional diversity of upper echelons. Third, other factors than the socio-demographic diversity of top management team members might explain additional variance. For example, past experience of top management team members in fund acquisition could play an important role in the success probability of acquiring future funding.

We also need to address some methodological limitations of our study. Our regression models include many explaining factors and control variables but, at the same time, relatively few observations. With 93.75 per cent coverage of the total population of public universities with promotion and habilitation rights (excluding pedagogic universities and arts colleges), it is obvious that we cannot extend our data set considerably. Nonetheless, the question of causality remains valid. Of course, it is theoretically possible that we may have simply identified consistent configurations of situations, top management team characteristics, choices and outcomes, just as configuration theory would suggest (Miller, 1987). Our results then would indicate archetypes of “entrepreneurial universities”, which are in line with the political developments: they specialize, collaborate, professionalize, score high in rankings and succeed in the competition for external funding. In similar vein, the chosen time frames may not be sufficient to measure the influence of the top management team on the performance of a university. Strategic agendas, like a comprehensive reorganization, may take several years to be implemented (Blaschke *et al.*, 2014). Panel designs may be more appropriate to validate such complex relationships than our static cross-section analysis with a time lag. Several cross-sections would reveal changes in the respective dimensions over time (Hsiao,

2003) and, therefore, allow for a more precise testing of our hypothesis that top management team diversity precedes performance.

Theoretical and practical implications

First and foremost, our study is situated at the crossroads of management studies and higher education research. Recent political reforms aim to create organizational actorhood by strengthening the top management team (Krücken and Meier, 2006). We account for this change by adapting a private sector model of organizational leadership and strategy to the context of higher education. Our results indicate the relevance of upper echelon heterogeneity within this process. Although the overall influence of top management team diversity is limited, as expected, we find evidence for a positive relationship between the inclusion of different scientific disciplines and educational levels with overall performance. Thus, upper echelon approaches to university organization and performance may yield further insights in future studies.

Our results may thus contribute to the body of literature on strategic leadership in pluralistic organizations. Because we found no negative effects of top management team diversity on excellence funding or reputation, top management team diversity should indeed reflect the plurality inherent in such complex work environments. Our study also highlights the importance of heterogeneous governance structures and modular organization designs to a cohesive strategic development in such conditions. Accordingly, structures of pluralistic organizations should also correspond with internal and external complexity.

Lastly, the paper may inform practitioners in administrative or leading positions and policy-makers concerned with higher education. The more diverse a top management team is in terms of disciplinary and educational levels, the more likely it succeeds in leading the university toward academic excellence. Future recruitment decisions may take this finding into account. In addition, many specialized faculties as well as a broad inclusion of internal status groups and external stakeholders in decision-making are conditions that might enhance the performance of universities. In other words, the model of shared governance with strong supervisory boards and academic senates seems to enhance decision quality. These characteristics should be considered when legal frameworks, statutory documents and administrative support structures are designed.

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