The diversity of the English higher education system: a multilevel quantitative analysis[1]

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Abstract
Although the diversity of higher education (HE) systems is a widely debated topic in literature, this has been rarely examined considering multiple levels of analysis. This article adopts both a multilevel and longitudinal perspective to study which dimensions of horizontal diversity diversified the English HE system most. Diversity, and how this has changed over time, is investigated at the level of the HE system (macro-level) at the level of homogeneous groups of universities, i.e. mission groups (meso-level), and at the level of individual universities (micro-level). The comprehensive multivariate quantitative analysis performed across the three levels of analysis shows the polarization between research and teaching orientation emerges as the dimension on which the HE system and universities horizontally diversify most together with the internationalization of the student body. The analysis furtherly suggests that mission groups well represent the diversity of the English HE system and universities' membership in one of these groups emerged as an element that restrains distinctive institutional positioning patterns of universities. Younger universities and those not affiliated to any mission groups are indeed those that present changes in their strategic positioning paths over time, and thus affect more the diversity of the HE system. However, while the horizontal diversity of the HE system has slightly increased over time, this paper also suggests that competition has concurrently contributed to reinforcing the hierarchical stratification of English universities.

Keywords. Diversity, Differentiation, Stratification, Strategic Positioning, Cluster analysis, Classification tree

1. Introduction

Diversity in higher education (HE), here intended as the variety of Higher Education Institutions (HEIs) within a certain HE system (Birnbaum 1983), has been widely debated in the literature for decades based on the claim that a more differentiated system represents a positive aspect for both the economy and society of a country (Van Vught 2008). However, empirical works have been focused predominantly on the macro level of HE system without properly considering what occurs, in terms of diversity processes, at minor level of analysis such as individual universities or group of universities. This paper sets out to contribute to this literature by conducting an empirical analysis of diversity using the context of the English HE system, and by considering different levels of analysis (the entire HE system, groups of universities – mission groups – and individual universities' efforts) to highlight how a multi-level perspective can inform a more comprehensive understanding of diversity dynamics in HE.

In this regard, the English HE system seems to be particularly suitable for the general purpose of this article. In fact, over the last 30 years the English university system has been influenced by interdependent forces which have affected the diversity of the English university system (Brown and Carrasco 2013; Shattock 2013) and that requires a multilevel perspective in order to be fully understood.

First, the English HE system has seen a significant increase in the number of universities over the last decades (more than 70 HEIs have indeed gained 'university title' since 1992). This expansion has contributed to the growth of system diversity and competition. Older universities started to

operate alongside younger institutions (the ex 'polytechnics') which gained university title status as a result of legislative interventions during the '90s (Scott 1995). A reaction to this policy process has been the creation of distinct mission groups of universities (Russell group; 1994 group; Million+; University Alliance; GuildHE) based on prestige and mission orientation (older and more research-oriented vs younger and more teaching-oriented). Membership of a mission group can be conceived as a way to convey a message about the distinctiveness and prestige of that specific set of institutions compared to another one as well as to express different policy viewpoints favouring each its own members (Boliver 2015; Filippakou and Tapper 2015).

Second, the English government tried to balance the expansion of the HE sector with the stringency of public budgets by changing the rules governing the allocation of funds through two main competitive instruments. On the one hand, government-based funds regarding research started to be distributed (since 1986) according to research performances, evaluated through a cyclical assessment exercise, today known as Research Excellence Framework (REF) (Brown and Carrasco 2013). On the other hand, universities were progressively allowed to enhance their fees cap to increase their share of private income accrued from both national and international student fees (Shattock 2013).

Third, the corporate governance of universities has been progressively characterized by an increasing 'managerialism' (since the 1985's Jarratt report) supporting the introduction of a 'business-like' management style and figures that strengthens the power of the top-management and executive bodies to the detriment of academic collegial bodies (Shattock 2013).

Fourth, HE dynamics have been progressively expanding outside national borders, in terms of research collaborations, institutional alliances, exchange of students and academic staff. A clear example of this trend is the increasing share of international students attending an academic course in UK which has passed from 11% of the HE students' population in 2000 to 21% in 2020 (HESA, 2020. The internationalisation of HE has therefore been a major element that the strategies of universities should start to deal with.

The combined effect of these interdependent forces enters the dynamics of diversity. A first dynamic leads the universities to differentiate themselves based on their own strategies aimed at maximising their competitive capacities towards other universities by occupying market niches (Bonaccorsi and Daraio 2007). A second dynamic drives universities, subject to strong environmental pressures, to seek legitimacy through imitative behaviour of those universities that are recognised as outstanding (Birnbaum 1983; Morphew 2009). The stratification of the HE system, visible in the presence of groups of universities with different status and reputation, might finally act as an element of preservation of the institutional positioning of universities and thus of their strategic behaviour.

All these dynamics mentioned above impact on the level of diversity and require to be interpreted considering all the different levels where diversity dynamics can take place.

First, the entire HE system (macro-level of analysis) where the overall outcome of differentiation vs homogenization processes should be analysed. Second, the English HE system is stratified in different mission groups (associations of universities) with their own characteristics and dynamics, thus representing a meso-level of analysis. Third, individual universities (micro-level) enjoy a sufficient level of autonomy to pursue strategic processes which ultimately influence on the overall diversity of the system (Fumasoli and Huisman 2013).

The presenting article aims to investigate, through a quantitative analysis, how the level of horizontal diversity of the English HE system has changed over time by adopting this multilevel perspective to answer to the following research questions:

- On which dimensions does the English university system (horizontally) diversify most and how has it evolved over time?
- What variables characterize the horizontal diversity of mission groups the most? How does the differentiation between and within mission groups change over time?
- Which type of strategic positioning patterns can be identified at the university level over time? How do they impact on the horizontal differentiation of the HE system?

The term diversity is here primarily intended and analysed as external and horizontal, in other words, it refers to differences in the type and orientation of universities' activities and resources (Huisman, Meek, and Wood 2007; Van Vught 2008), specifically their core functions (teaching, research, third mission) and their level of internationalization. However, as will be illustrated in the next section, we are aware that a vertical dimension of diversity (stratification), more related to the reputation/status and social values attached to universities (Croxford and Raffe 2015; Antonowicz et al. 2018), interplay and might mediate horizontal differences among HEIs as will be discussed in the final sections.

Since the analysis of diversity is carried out considering different level of analysis, different quantitative methods have been employed for each level, as it will be illustrated in section 3. Diachronic studies on diversity at the level of HE systems are still scarce, and these have predominantly used different type of indexes (Herfindahl index, Gini coefficient, Theil entropy index, Distance measures) (Horta et al. 2008; Rossi 2010; Teixeira et al. 2012; Huisman et al. 2015). Conversely, this article will use multivariate techniques whose potential have been less explored so far.

2. A multilevel perspective on diversity in HE

Horizontal Diversity and differentiation in HE can be investigated at different levels of analysis. Starting with a macro-level perspective (the HE system), seminal works by Clark (1983), Neave (1979) and Birnbaum (1983) and later studies strived to investigate the relationship between specific policy forces, such as massification, competition, the greater complexity of universities' activities, and the level of diversity.

On the one hand, scholars adopting a neo-institutional lens, which conceives universities as legitimacy-seeking organizations, empirically illustrated decreasing level of horizontal diversity over time (Morphew 2009; Harris and Ellis 2020) as a result of isomorphic forces represented by both the influence of the institutional and policy environment and the imitative behaviours among universities.

On the other hand, empirical studies informed by a "managerial rationality perspective" (Porter 1985; Clark 1983; Fumasoli et al. 2020), usually look at competition and the greater complexity of HE population/activities as natural drivers towards greater horizontal diversity, since it should push universities to look for market niches to gain a competitive advantage (Clark 1983; Bonaccorsi and Daraio 2007; Horta et al. 2008).

However, both perspectives have often led to contrasting empirical results (Fumasoli et al. 2020), with distinctive strategic processes highlighted in highly institutionalised contexts and growing convergence found in increasingly competitive contexts (Goedegebuure et al. 1993; Rossi

2010). Therefore, two additional levels of analysis might enrich our understanding of diversity dynamics.

First, the phenomenon of mission groups can be considered as a potential example of a meso-level of analysis. This has not been sufficiently and adequately treated in quantitative or mix-methods analyses on diversity of the English HE system since the majority of studies investigated diversity between and within mission groups through qualitative analyses of strategic documents like mission statements (Bowl and Hughes 2016; Flavin et al. 2020). For example, Seeber et al. (2019, 12), in relation to the English context, found that universities adopt claims in their mission statements similar to universities belonging to the same mission group and different from universities that are closer, and 'especially from geographically close universities that belong to the same form in an attempt to preserve competitive distinctiveness'. These studies started to highlight that besides the HE system level (macro level), processes of horizontal differentiation vs convergence might also occur at the level of more or less formal groups of universities, which will thus here be considered as a meso-level of analysis.

Second, other scholars, based on the arguments put forward by Deephouse (1999), have instead argued how universities' responses to both competition and institutional pressures might differ significantly, challenging those assumptions of uniformity of behaviours. A university needs distinctiveness to secure scarce resources, but it cannot ignore field norms (institutional pressures) not to be perceived as an illegitimate actor (Fumasoli et al. 2020). Empirical studies have showed how universities strive to optimally balance both similarity and distinctiveness in their strategic documents (Kosmützky 2012; Mampaey et al. 2015; Morphew et al. 2018). Therefore, this micro-level perspective suggests that strategic behaviours of universities might impact on the overall horizontal diversity of the HE system and should be considered in an empirical analysis (Fumasoli and Huisman 2013). Nevertheless, there is still a dearth of quantitative studies that attempt to include individual positioning paths of universities in studies on diversity (exceptions are e.g. Bonaccorsi and Daraio 2008; Barbato and Turri 2020).

So far, we have discussed not only how horizontal diversity have been investigated across different levels of analysis but also that adopting a multi-level lens can enrich the overall understanding of diversity in HE. However, it might also be relevant to consider a different perspective, mainly adopted by sociologists (Teichler 2008), that illustrates how phenomena like market-led policies, the expansion of HE systems (especially in terms of number of HE students) and its increased globalization (Cantwell and Marginson 2018) might contribute to strengthen already existing academic hierarchies, i.e. to increase vertical diversity or stratification, 'rather than encourage universities to compete on the quality and relevance of their programmes' (Croxford and Raffe 2015, 1626). This ultimately leads to mission drift and thus a decreasing horizontal diversity (Meek 2000; Teichler 2008; Antonowicz et al. 2018).

This perspective has been fruitfully applied, e.g., by Croxford and Raffe (2015), who have empirically demonstrated that the diversity of the British HE system, measured by looking at different undergraduate students' background variables, is predominantly vertical. The authors stated indeed that HEIs 'vary along a single dimension of status, associated with the educational backgrounds, social class, non-local origins and (young) age of many students' (2015, 1637). The relevance of vertical differences among British universities can also be retrieved in Boliver's work (2015). In this case, status is operationalized through five dimensions (research activity, teaching quality, economic resources, academic selectivity, and socioeconomic student mix) and multiple quantitative data. The

author performed a hierarchical cluster analysis which led to the identification of four distinctive clusters of higher and lower status British universities, which overlap with affiliation of universities to mission groups. This vertical stratification is claimed to be even reinforced with an increased marketized tuition-fees system that will furtherly concentrate economic resources within a small group of universities. Therefore, this sociological perspective could thus be complementary to comprehensively understand how diversity in HE changes over time.

3. Data and Methods

Horizontal diversity can be empirically analysed by considering multiple and different aspects and dimensions related to what universities do (Bruni et al. 2020). In general terms, horizontal diversity could be operationalized by considering, e.g., universities' core functions (teaching, research, third mission), the degree of internationalization, the scope of the subject mix, and some structural elements (size or type of governance) (Bonaccorsi and Daraio 2007; Rossi 2010; Daraio et al. 2011; Huisman et al. 2015).

However, as underlined by Huisman et al. (2015, 377-378), 'there is no textbook recipe for how to measure diversity, but the selection of dimensions, variables and analytical methods must be seen in the context of the goal of the study and its analytical framework,' by paying particular attention to the contextualization of diversity measures in the specific empirical setting.

Therefore, on the basis of the purposes and analytical approach of this article as well as the specificities of the English HE, two main aspects of horizontal diversity will be here considered: the universities' core functions and their degree of internationalization. Core activities, i.e. teaching, research and third mission, might be considered as a key element of horizontal differentiation among English universities for different reasons. First, because the 1992' end of the binary divide historically reflected also partially different mission orientations between older (pre-1992) and newer universities (post-1992), with the former traditionally more research oriented than the latter (that were instead more teaching oriented) (Daraio et al. 2011; Shattock 2013). Second, competition for funds occurs in relation to both the research and teaching functions, which are also subject to distinct and cyclical national evaluation exercises (Brown and Carrasco 2013). Moreover, English universities have been also increasingly encouraged to look into opportunities coming from the business world to both get support for their activities and to contribute to the economy and society.

Then, internationalization of universities can be claimed to be a highly relevant dimension of horizontal diversity for two reasons. First, the national policy discourse has constantly push English universities to internationalize to better adequately globally with other world-class universities during the last decades. Additionally, the operation of tuition-fees system (no fee cap for non-EU students) potentially makes international students a particularly crucial financial resources for universities (Marginson 2006).

Finally, also the disciplinary mix of universities could be particularly interesting for the English setting. However, due to issue related to availability and, mainly, comparability[2] of public data over time was not possible to include any indicators related to the subject mix.

Hence, based on these considerations, Table 1 presents the indicators used to measure horizontal diversity. For each dimension (teaching, research, third mission and internationalization)

[2] The different classification of fields of study employed by HESA over time did not allow to precisely compared data related to the distribution of students by discipline unless to reduce the number of fields of study through some criteria, which, however, can be debatable and excessively reductionist.

multiple indicators have been constructed following previous studies which have progressively reached considerable consensus on how to operationalize such broad dimensions (Bonaccorsi and Daraio 2007, 2008; Daraio et al. 2011; Huisman et al. 2015; Bruni et al. 2020) which have specifically focused on how to measure diversity in HE.

Table 1. Indicators of horizontal diversity

Dimensions of horizontal diversity	Indicator	Formula	Code	Abbreviation	Source
Teaching	Educational profile	ISCED 6 students / ISCED 6+7 students	EDUCPROF	% underg. students	HESA*
	Mode of study	ISCED 6+7 'part-time' students / ISCED 6+7 students	PART	% part-time stud.	HESA
Research	PhD ratio	ISCED 8 students / ISCED 6+7+8 students	PHDRATIO	% PhD stud.	HESA
	Scientific research production	Number of Scopus publications per Full-Time Equivalent (FTE) academics	SCOPUS	Scopus publ. FTE ac.	Scopus
Third mission	Public third-party funding	Income from public third-party funding / total income	PUB_TPF	% public third-party funds	HESA
	Private third-party funding	Income from private third-party funding / total income	PRIV_TPF	% private third-party funds	HESA
Internationalization of student body	Internationalization of undergraduate students	International ISCED 6 students / total ISCED 6 students	UNDINTERNAT	% internat. underg. stud.	HESA
	Internationalization of postgraduate students	International ISCED 7 students / total ISCED 7 students	POSTINTERNAT	% internat. postgr. stud.	HESA

*Higher Education Statistical Agency

The indicators of Tab. 1 express the orientation and involvement of universities regarding a certain activity but not the quality[3], which would instead represent a vertical dimension of diversity. So, for example, the share of undergraduate students or that of part-time students over the total HE students indicate universities' orientation towards a type of teaching (undergraduate vs postgraduate) or a mode of study (part-time vs full-time). Similarly, the PhD ratio (percentage of PhD students over the total HE students) or the number of (Scopus) publications per academics are often employed as measures of research involvement/orientation. A similar consideration can be made for all the other indicators related to third mission, as the share of public/private third-party funds over the total income, and to internationalization, here measured through the internationalization of the student body. However, these last indicators, and to a lesser extent also the number of publications, might also be claimed to also express a vertical dimension of diversity since they are somehow connected to the attractiveness, and that reputation/status of universities (Marginson 2006; Daraio et al. 2011). So, e.g., on the one hand, the share of third-party funds[4] can be seen as way to operationalize the third mission or 'knowledge-exchange' orientation of a university (Huisman et al, 2015), because it underlines the relationship between universities and different types (public vs private) of stakeholders (third parties). On the other hand, indicators based on revenues imply, and are often related to, the

[3] For example, if you would like to investigate the vertical diversity of university you may consider measures as the number of citations per academics which is more related to the quality of research, or the employment conditions of graduates in relation to teaching quality.

[4] Third-party funds are flows of income coming from all services rendered to outside bodies, including the supply of goods and consultancies. The difference between public vs private third-party funds concerns the nature of subjects from which a university obtain the funding. Public parties are, e.g. hospitals, central and local governments whereas private ones are charities, companies and public corporations.

attractiveness of a universities and, ultimately, to its reputation/status. These indicators should thus be seen with this twofold interpretation.

Data were collected at the level of individual universities, covering the period from 2002 to 2020. The final sample of universities, based on the availability of public data, consists of 104 English HEIs. In addition, data on the current membership of HEIs in mission groups have also been gathered in order to include a meso-level of analysis. Although the '1994 group' does not exist at present day, we still considered this affiliation only for those universities who did not change membership in another mission group (Russell group) in the meantime. Table 2 summarizes the main features of the five mission groups by highlighting their foundation year, the number of British universities that are associated to each of them and their main distinctive features.

Table 2. Features of the mission groups

Mission group	Year of foundation	N. of UK universities affiliated at foundation (today)	Main features of members
Russell group	1994	17 (24)	Oldest universities with a large size and a strong research-intensive focus
1994 group	1994 (dissolved in 2014)	17 (0)	Old universities (pre-1992 and Robbins-era universities), small-medium size and research-intensive universities
Million+	1997	22 (23)	Large post-1992 universities with a particular concern towards widening participation to HE
University Alliance (UA)	2006	22 (12)	Post-1992 universities with a professional and technical orientation and an applied-research focus
GuildHE	2006	29 (33)	small-medium and new universities and colleges with a specialized subject mix (arts, design music, agriculture, law, business)

Source: elaboration of the authors (Shattock, 2013; Boliver 2015; Filippakou and Tapper 2015)

The distribution of the 104 universities by membership of mission groups resulted as follows: 20 universities are affiliated to the Russell group, 13 to the 1994 group, 17 to the Million+ group, 10 to the University Alliance (UA) and 15 to GuildHE. The 29 universities who did not present any membership were classified accordingly.

Different multivariate quantitative analyses were performed for each research question illustrated in the introduction section. First, at the macro-level of the entire HE system, a Principal Component Analysis (PCA) was carried out to understand on which dimensions (operationalized through the indicators of Tab. 1) the English HE system is horizontally diversified and if this diversification has changed over time. PCA is a classical multivariate analysis technique (Jonhson and Wichern, 1998): given a set of subjects (here universities) for which some quantitative variables have been measured, the main objective of PCA is to describe the information contained in such a dataset with a much lower number of variables that the observed ones. Principal components are linear combinations of the observed variables that account for much of the variance among the set of observed variables. The components are ordered so that the first component accounts for the largest possible amount of variation in the observed variables. The second component, accounts for the maximum variation that is not accounted for the first, and so on. Note that our aim is to use PCA as

a descriptive statistical tool, thus the only requirement is that data is of quantitative type (no further hypothesis are required, since we are not interested on statistical inference). In our case, for each year under study, we have a matrix of size 104x9, whose columns are the 9 quantitative indicators described in Table 1, and their rows correspond to the 104 British Universities. We applied PCA to each year under study and the vectors of coefficients show consistency along time. Additionally, to obtain a single measure of the total variability across the 9 indicators, their covariance matrix was computed, and the corresponding trace was calculated and plotted year by year.

Second, at the meso level of analysis (mission groups), a decision tree model (classification and regression tree – CART, see Breiman et al. [1984]) is implemented to show which variables were more important and discriminate better the belonging to a mission group. A Classification tree labels, records, and assigns variables to classes and is built through a process known as binary recursive partitioning. This is an iterative process of splitting the data into partitions, and then splitting it up further on each of the branches. The objective is to obtain homogeneous set of units (universities in our case) in each partition. This partitioning (splitting) is then applied to each of the new partitions. The process continues until no more useful splits can be found. The core of the algorithm is the rule that determines the initial split rule. At the end is possible to get a ranking of the variables that better discriminate the mission group. One of the main advantages of the decision tree is that no assumptions about the distributions of the variables are required, which can be both qualitative and qualitative, and the model is also able to model non-linear links and iterations between variables.

Moreover, a multivariate analysis of variance (MANOVA) was also computed for all the years here considered to investigate if and how much the within and between variance of mission groups vary over time. In particular, we applied the total variance decomposition theorem to our dataset, where the only requirement is that data is of quantitative type. Note that this theorem can be always applied with descriptive purposes given that the data are of quantitative type. In such case the multivariate normal requirement is not needed since no inference is going to be conducted. Given a set of g groups, each of which is composed by n_k individuals, $k = 1, \dots, g$, and a set of p quantitative variables observed in each group, this theorem states that the variability of the whole dataset composed by $n = n_1 + \cdots + n_g$ individuals for which p quantitative variables were observed can be split into two independent sources of variability: one that measures the variability between the existing g groups and the other that measures the variability within the groups (e.g., Jonhson and Wichern 1998). Except for the traditional definition of groups, here we split the same data structures at different time points defined by the years of observation.

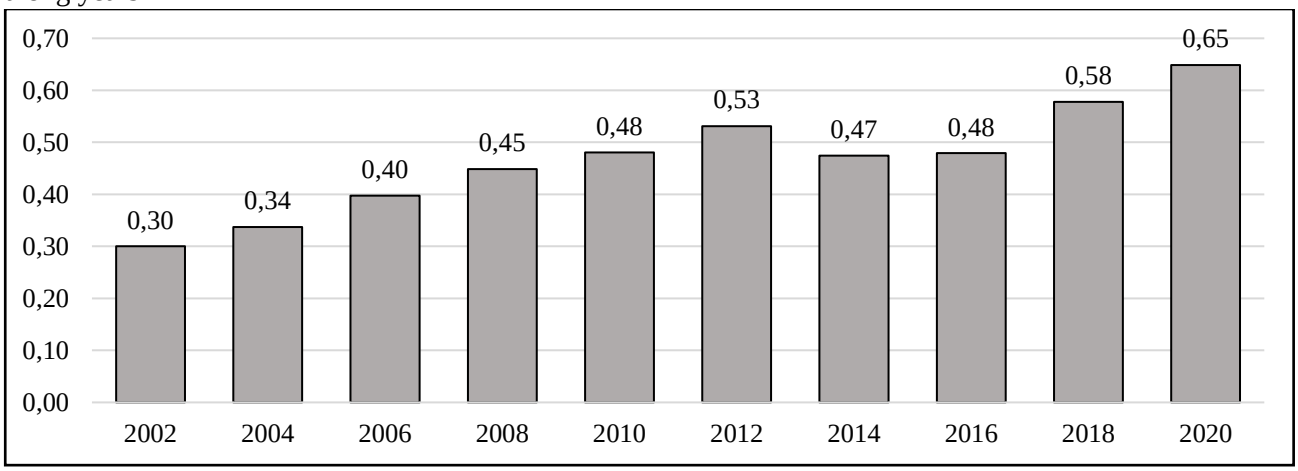
Finally, a cluster analysis was then executed to identify positioning paths of universities over time by looking at the different distribution of universities across clusters in the period of study. In particular, after standardizing all the variables (to mean equal to zero and unit variance), we start applying both hierarchical clustering and k-means clustering algorithms in order to identify the clusters in 2020 and to explore in detail the more recent situations. The centroids obtained are used to classify universities in the previous years, in this case the k-mean algorithm only assigns universities to the clusters, with the aim of highlight changes in the groups (cluster) composition.

4. Findings

4.1 *Findings at the level of the entire HE system*

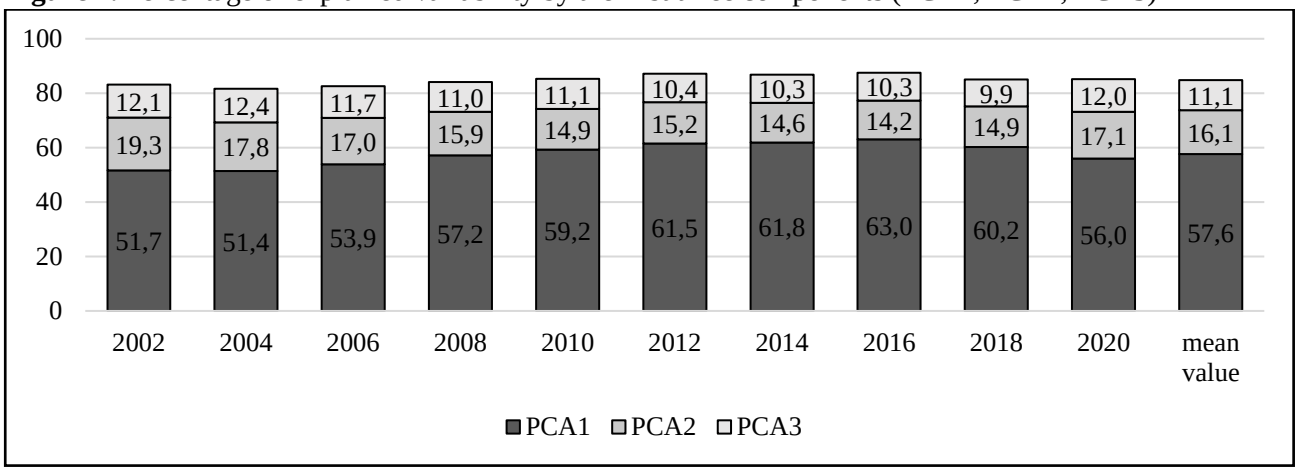
To measure if the overall level of diversity of the English HE system has increased or not during the timeframe here considered (2002-2020), we used the trace of the covariance matrix of all variables and we plot it by year (Figure 1). It can be observed that the total variation slightly increases over time passing from 0.30 in 2002 to 0.65 in 2020. In appendix (Fig. 2) we have also reported the individual variability of the single indicators using the coefficient of variation.

Figure 1. Level of diversity of the English HE system for the period 2002-2020, computed as the total variation along years



Regarding the Principal component analysis (PCA), the percentage of explained variability by the three first components is quite stable over time, ranging from 83.1% in 2002 to 85.1% in 2020, with a mean value of 84.6%. However, it can also be noted how the percentage of explained variability by the first principal component increased from 51.7% in 2002 to 56.0% in 2020, with a mean value of 57.6% (Figure 2). On the other hand, the variability explained by the second component experienced a reduction from 19.3% in 2002 to 17.1% in 2020, whereas the variability explained by third component seems quite stable ranging from 12.1% in 2002 to 12.0% in 2020. On average, the second component accounts for 16.1% and the third one explains 11.1% of the total variability. There is a common temporal pattern in relation to the eigenvectors (PCA loadings) and, consecutively, we interpret the results of the classical PCA analysis by year. As mentioned in methods section, the PCA allows to reduce the complexity of our different aspects of horizontal diversity (the 9 variables) into a smaller number of components (in this case, defined by the first three eigenvectors). These, for the purposes of this paper will show which are latent dimensions on which the English HE system is most diversified.

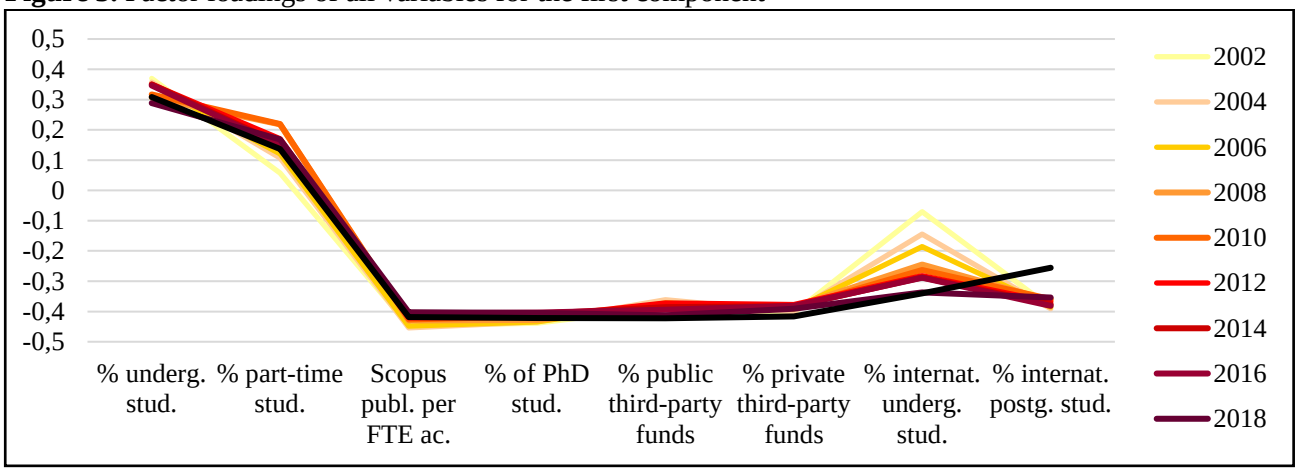
Figure 2. Percentage of explained variability by the first three components (PCA1; PCA2; PCA3)



First component

In order to interpret this first component, we look at the mean value of factor loadings of all the 9 variables considered (Figure 3). Factor loadings are the parameters that describe the strength of the relationship between observed variables (the 9 indicators) and the component. Variables that influence and explain more the component present a value greater or equal than 0.4 (in absolute value). The variables, with negative values, presenting the highest impact on this component are those related to research (Scopus publications per FTE academic, PhD ratio) present factor loading smaller than -0.4 (and thus, greater than 0.4 in absolute value). Other variables with loadings close to -0.4 are those related to either third party-funding (percentage of public and private third-party funds) or the internationalization of postgraduate and PhD students (percentage of postgraduate students). Similarly, the percentage of undergraduate students significantly influence this component but with positive values (over 0.3). Therefore, this first component clearly depicts the polarization between teaching and research orientation in determining the differentiation of English universities. In longitudinal terms, Figure 3 shows the evolution of the first eigenvector over time. Light colours correspond to early years and darker colours to lately years. We can see that this eigenvector does not change significantly passing from 2002 to 2020, underling that the aforementioned contraposition has undeniably shaped the system over the last decades.

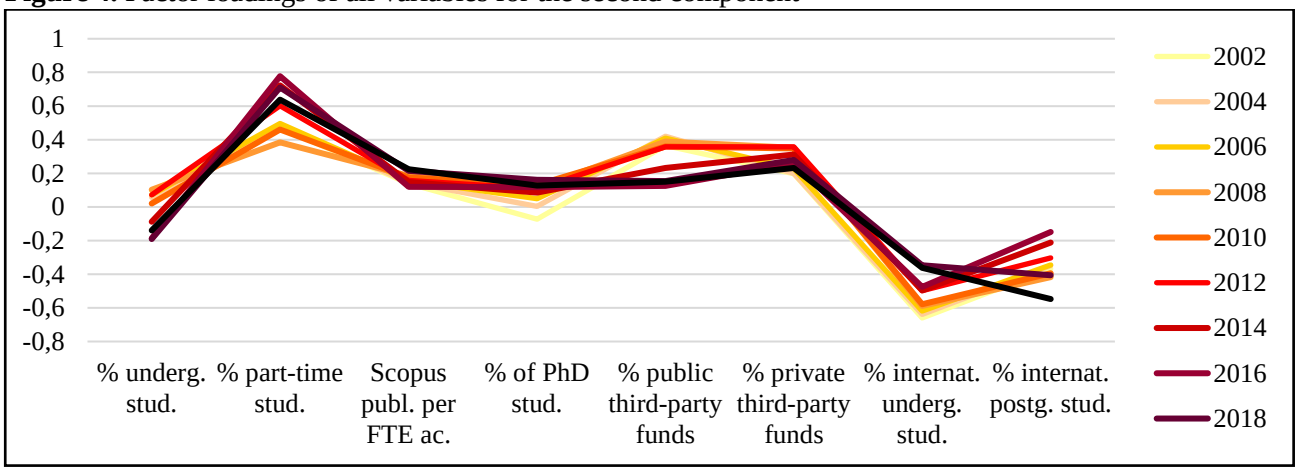
Figure 3. Factor loadings of all variables for the first component



Second component

This component instead underlines the centrality of internationalization as element of diversity of the English system. On the one hand, the variables with highest impact on this component (with negative values) are indeed, the percentage of international undergraduate students, which presents a factor loading smaller than -0.5 (and thus, greater than 0.5 in absolute value), and the percentage of international postgraduate students just around -0.35 (Figure 4). On the other hand, the percentage of part-time students is significant but with opposite values. The influence of this variable on this second component can still be interpreted in terms of international orientation of student population if it is considered that the overwhelming majority (around 93%) of part-time students are national (UK) students. Similar to the first component, a common pattern can be observed over time, though some loadings tend to swing more with time (Figure 4). This is the case for the percentage of part-time students, whose loadings go from values lower than 0.4 in 2002 to values greater than 0.7 within 2002-2020 and the percentage of undergraduate students whose loadings decrease a bit from 2002 to 2020.

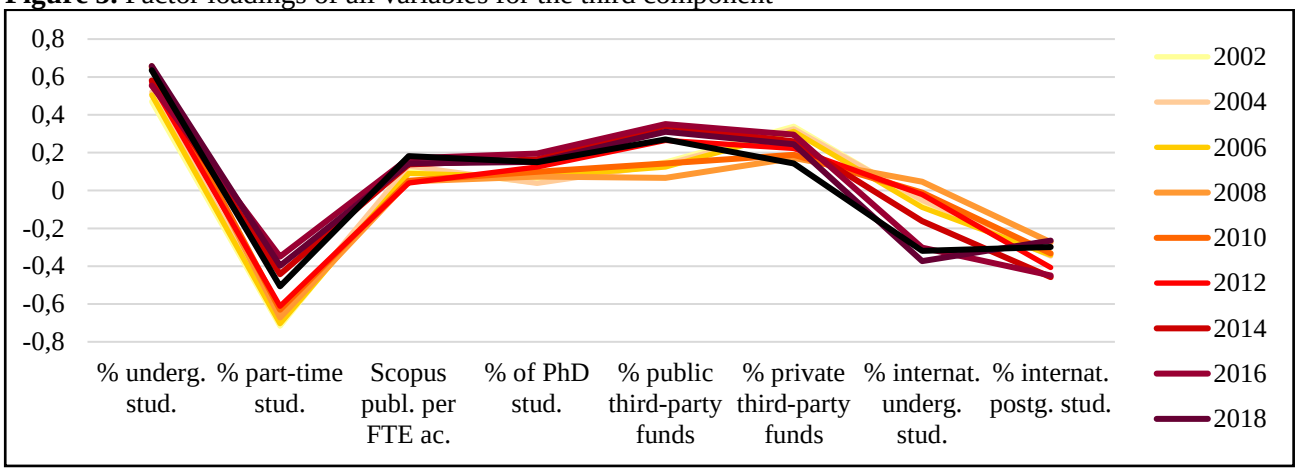
Figure 4. Factor loadings of all variables for the second component



Third component

Finally, variables with highest impact on this third component are the percentage of undergraduate students, with positive value around 0.6, and the percentage of part-time students with negative values around -0.6 (in average) (Figure 5). The strong predominance of the percentage of part-time students in explaining this component suggests that the mode of study, part-time vs full-time, is an element of diversification of the English system too, even though this component explains less variability compared to the first two as illustrated in Figure 2. For this third component, its evolution over time is also stable though the percentage of part-time students loadings decrease from absolute values around 0.7 in 2002 to values around 0.5 in 2020 (Figure 5).

Figure 5. Factor loadings of all variables for the third component



4.2 *Findings at the level of mission groups*

We estimated a decision tree (Figure 6) in which the target variable is the mission group and the possible explanatory variables are all variables from 2002 to 2016, to understand which characteristics of universities contributed most to mission group belonging.

Moreover, a multivariate analysis of variance across the five mission groups here considered (Figure 7). In this case, universities that do not belong to a specific mission group have not been considered.

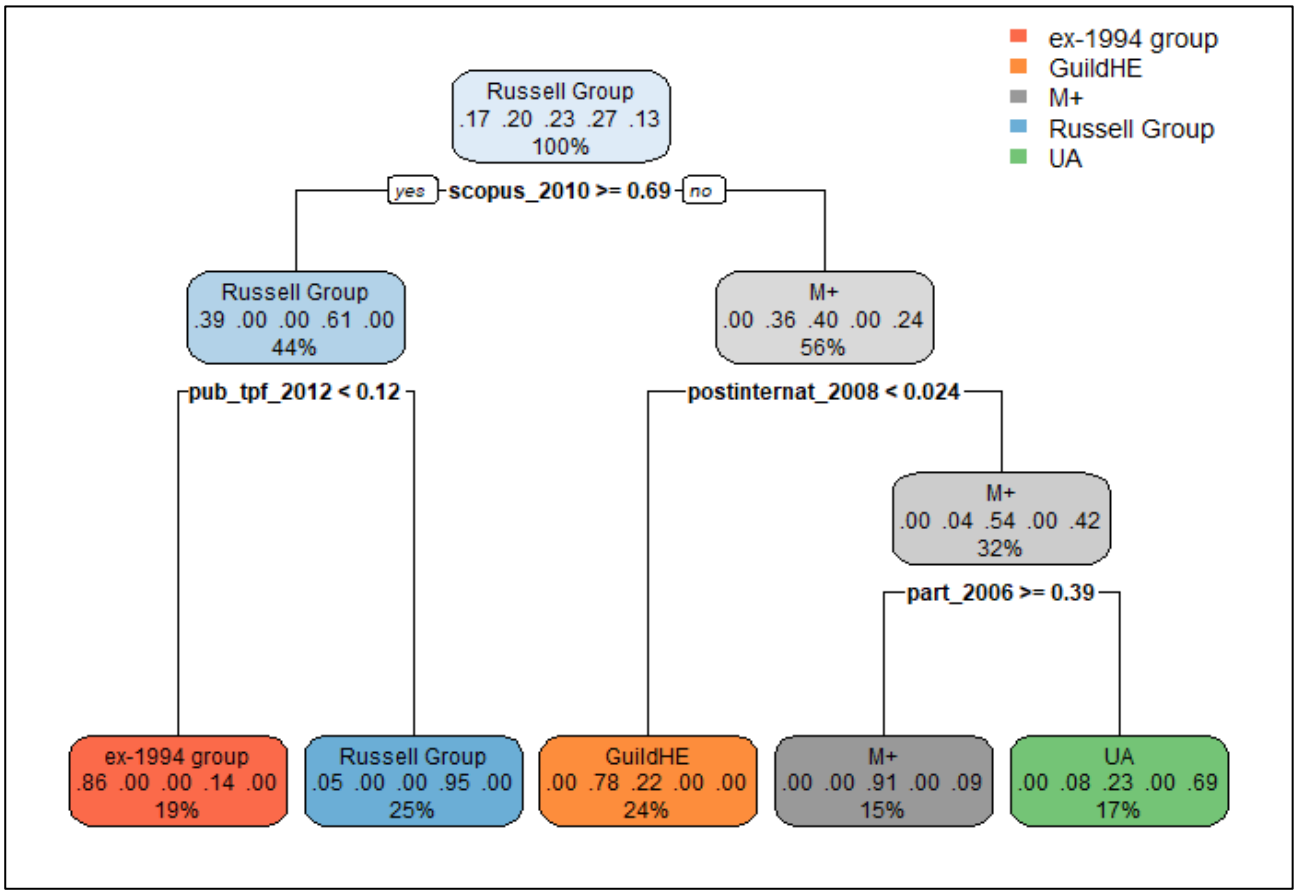
Figure 6 shows for each node the modal value (highest frequency group), the frequency distribution of mission groups and the relative frequency (how many universities out of the total belong to that node). The branches are split on the basis of the variables that discriminate the most, i.e. that produce the most different (conditional) frequency distributions.

The misclassification rate of the decision tree is very low, 16%, pointing to the capacity of variables to properly identify mission groups. Table 3 shows the confusion matrix and Table 4 shows the 12 universities that are misclassified by the Decision Tree. The probability of membership to a mission group is primarily and most importantly determined by either the research orientation of universities (in particular the variable "SCOPUS", namely Scopus publications per FTE academics) and, to a less degree, their capacity to get public third-party funding. This finding obviously confirms the relevance of the aforementioned first component of the PCA analysis. In particular, the variable SCOPUS for year 2010 (Figure 6) initially discriminates universities' membership to mission groups leading to a clear division between Russell the other mission groups, M+ group, GuildHE group and UA group. Similarly, the share of public third-party funding (PUB_TPF), especially in 2012, contributes to discriminate universities' belonging to a mission group throughout the decision tree. In particular, it can be appreciated how the probability to be part of the Russell group compared to the 'ex-1994' group is largely based on this variable (left branch of decision trees, Fig. 6).

Interestingly, variables related to the degree of internationalization of universities and the mode of study (share of part-time students, PART) sharply contribute to further discriminate the more 'teaching-oriented' universities, namely those with lower values of SCOPUS at the first split (the right part of the decision tree). In particular a higher degree of internationalization discriminates between universities in group GuildHE and group M+. Moreover, the higher share of part-time students split Group UA form the others.

Another interesting result, that arises looking also to confusion matrix and list of misclassified universities by the decision tree (Table 3 and 4), is the lower number of splits in the left part of decision tree. This seems to suggest that while the membership of more research-oriented into either Russell group or 'ex-1994' is straightforward, those of the other universities is much less fuzzy. At the second and third split on the right part of the decision tree (universities with lower values of SCOPUS at first split), it is still not so easy to discriminate universities into UA, M+ or GuildHE groups. In particularly the universities that actually belong to mission groups M+ are indeed those that have been less probably predicted during the partitioning process of the decision tree. This finding ultimately suggests that within UA, M+ and GuildHE groups might coexist slightly different souls in terms of research orientation, in other words, groups of universities that still prefer to belong to a mission group though presenting some differences with other universities of the same group. On the contrary, universities belonging to the Russel and 'ex-1994' groups are much more homogeneous.

Figure 6. Decision tree



Second, the total variance decomposition theorem allows us to understand if mission groups have become more or less similar to one another over the years looking at the within and between variances. In relation to the different sources of variability, Figure 7 illustrates that, on average, 82% of the variability is due to the differences between the mission groups, whereas the variability within these groups has a mean value of 18%. This result ultimately suggests that the large majority of the variability (diversity) of the English HE system is explained by universities membership to the mission groups, especially since the last 10 years. Furthermore, it can also be observed that the variability between the mission groups increased from 2002 to 2014, going form 79% in 2002 to 85%

in 2014, and started to decrease since then, reaching 76% in 2020. As expected, the opposite happened with the variance within the mission groups, which decreased from 21% in 2002 to 15% in 2014, and then gradually increased to 24% in 2020. On this basis it can be concluded that universities belonging to the same mission groups have become slightly more similar whereas differences among mission groups have become slightly more marked. A decreasing diversity within mission groups underlines how universities ultimately tend to conform to the common orientation of the mission group.

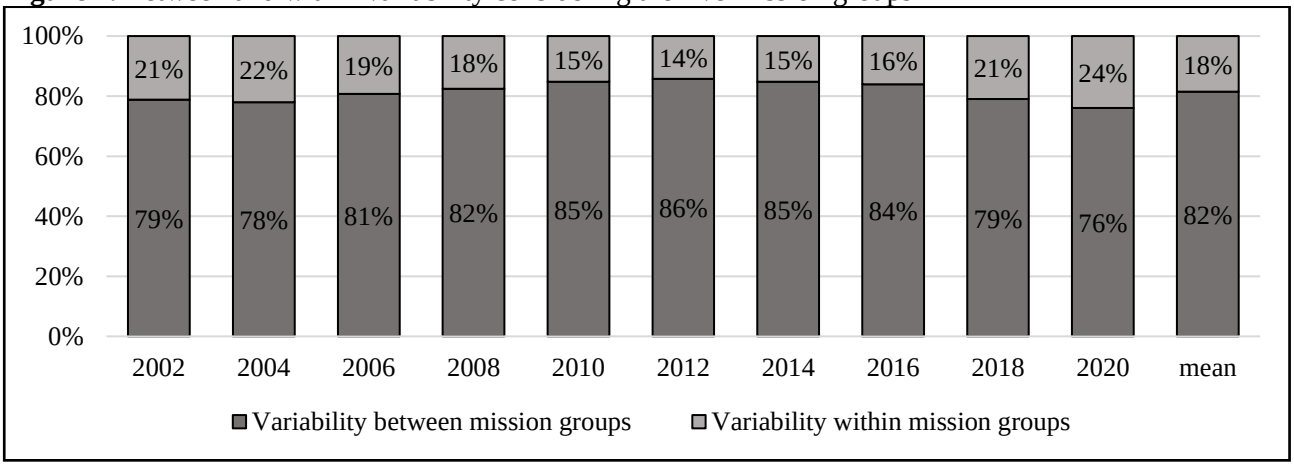
Table 3. Confusion Matrix for Decision Tree

		Tree Prediction				
		ex-1994	*GuildHE*	*M+*	*Russell*	*UA*
Mission Group	*ex-1994*	12	0	0	**1**	0
	GuildHE	0	14	0	0	**1**
	M+	0	**4**	10	0	**3**
	Russell	**2**	0	0	18	0
	UA	0	0	**1**	0	9

Table 4. List of Misclassified Universities by the Decision Tree

University	**Mission Group**	**Predicted**
The University of Leicester	ex-1994	Russel
Royal Agricultural College	GuildHE	UA
Bath Spa University	M+	GuildHE
Canterbury Christ Church University	M+	GuildHE
Cumbria University	M+	GuildHE
Leeds Trinity University	M+	GuildHE
Bedfordshire University	M+	UA
Southampton Solent University	M+	UA
Staffordshire University	M+	UA
London School of Economics and Political Science	Russel	ex-1994
The University of York	Russel	ex-1994
The University of Teesside	UA	M+

Figure 7. Between and within variability considering the five mission groups



4.3 *Findings at the level of individual universities*

As illustrated in section 2, four clusters have been identified based on the hierarchical cluster analysis using dendrograms (Appendix, Fig. 1). A cluster can be seen as a representation of the niche where universities position themselves at a certain point of time (Barbato and Turri 2020). To the purposes of this article, cluster analysis was used to investigate two aspects of diversity dynamics at university level: First, to examine if universities strive to balance both convergence and differentiation by positioning in a cluster with specific combination of the dimensions (indicators) of diversity here considered. Second, to investigate if and which positioning paths can be identified over time. Positioning path is here intended as change in cluster membership from 2002 to 2020. In this way it is possible to observe which universities affect more the overall diversity of the system through its positioning paths and according to which strategy (increasing distinctiveness vs imitation).

(I) So, to understand if and on which dimensions universities somehow balance both sameness and distinctiveness through their membership in a specific cluster, Table 5 provides a summary of the 9 variables for each cluster in 2020 (2002's findings are in Appendix, Tab. 1). Consistently with PCA findings and the decision trees, clusters are primarily polarized in terms of research vs teaching orientation. Both in 2002 and 2020, clusters n. 3 and 4 are clearly more research-focused presenting significantly higher values of both SCOPUS and PHDRATIO as well as indicators related to third mission (share of public/private third-party funds). This polarization is also reflected and confirmed by looking at the distribution of mission groups across the four clusters, as provided by Table 6.

Table 5. Mean and standard deviation for all variables across the four clusters (2020)

Variable /Cluster	**Cluster n. 1 (n=21)**		**Cluster n. 2 (n=52)**		**Cluster n. 3 (n=26)**		**Cluster n. 4 (n=5)**	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
% underg. stud.	0.695	0.103	0.780	0.076	0.725	0.050	0.549	0.051
% part-time stud.	0.158	0.069	0.197	0.110	0.092	0.035	0.146	0.066
Scopus publ. per FTE ac.	0.752	0.366	0.647	0.564	1.738	0.317	2.770	0.515
% of PhD stud.	0.022	0.014	0.016	0.010	0.059	0.013	0.127	0.039
% public third-party funds	0.025	0.021	0.025	0.032	0.121	0.042	0.160	0.031
% private third-party funds	0.005	0.005	0.006	0.008	0.030	0.019	0.080	0.013
% internat. underg. stud.	0.207	0.124	0.079	0.046	0.211	0.053	0.362	0.167
% internat. postg. stud.	0.456	0.126	0.197	0.134	0.444	0.089	0.502	0.168

Table 6. Distribution of universities by cluster (2020) and mission group

Cluster 2020	**Mission group**						
	GuildHE	**M+**	**Russell Group**	**UA**	**1994 group**	**N. A.***	***Total***
Cluster n. 1	0	5	0	5	3	8	21
Cluster n. 2	15	12	0	5	1	19	52
Cluster n. 3	0	0	15	0	9	2	26
Cluster n. 4	0	0	5	0	0	0	5
Total	15	17	20	10	13	29	104

*****Not affiliated to any mission group

However, also similar clusters (1 and 2 vs 3 and 4) present specificities which might suggest an attempt to balance both differentiation and similarity. Universities belonging to cluster n. 1 differentiate from universities of cluster n.2 in terms of the international orientation of their student

population whereas universities of cluster n.2 are more distinctive in terms of share of undergraduates and part-time students over the total HE students. Therefore, although both universities are predominantly teaching-oriented they appear as distinctive on different dimensions of diversity, as the the degree of internationalization, their educational profile or mode of study. Universities belonging to cluster 3 and 4 are clearly both research-oriented universities. Nevertheless, there is an evident difference between these two groups not only in terms of their research orientation and production but also on their degree of internationalization and their third mission orientation, here conceived as the capacity to attract third-party funds from both private (like businesses) and public (public administrations, hospitals) sources. This last is significantly higher among universities of cluster n. 4 (10% and 16% of the income come respectively from private and public third-party funds) than universities belonging to cluster n. 3 (3% of private and 12% public third-party funds). The five universities of cluster n.4 can indeed be considered as an elite of English universities with particularly high levels of research and international orientation.

(II) In terms of positioning paths, here conceived as a change in cluster membership during the timeframe considered, it can first be observed that only 23 out of 104 universities (22%) changed cluster membership looking at the 2002-2020 difference (see Tab. 7). Moreover, Tab 2 in Appendix report universities' cluster membership for each year of the analysis and affiliation to a mission group.

In this regard, Cluster n. 4 remains almost identical over the years. Only one university, the London School of Economics, passed from cluster n. 4 to cluster n. 3, while the other universities managed to secure their distinctive positioning as 'elite' of the English HE system.

Table 7. Distribution of universities by 2020 and 2002's clusters

Clusters 2020	**Clusters 2002**				
	Cluster n. 1	**Cluster n. 2**	**Cluster n. 3**	**Cluster n. 4**	***Total***
Cluster n. 1	11	9	1	0	21
Cluster n. 2	8	42	2	0	52
Cluster n. 3	2	0	23	1	26
Cluster n. 4	0	0	1	4	5
Total	21	51	27	5	104

A second positioning path which shows a stronger research orientation over the years, can be identified in those universities who passed from clusters 1 to cluster 3 over time (e.g. University of Kent and Royal Holloway). Also the opposite trend can be observed for those universities (e.g. St George's Hospital University and University of Keele) who passed from cluster n.3 in 2002 to cluster n.1 or n. 2 in 2020. The path of these universities might not necessarily point to a failure in protecting their initial positioning but also a strategic choice to concentrate more some activities rather than others.

However, the majority of changes (16 out of 23) concerns universities that passed from cluster n.2 to cluster n.1 or vice versa, signalling, in relation to the first situation (from cluster n. 2 to n. 1) e.g. an increasing international orientation of their student population (e.g. Coventry, Anglia Ruskin, West London and Northampton doubled or even more their share of international undergraduate students). By contrast, universities that passed from cluster n. 1 to n. 2 increased their teaching orientation. The percentage of undergraduates on the total HE students of these universities has indeed increased relevantly (e.g. Royal Agriculture; Oxford Brookes; London Metropolitan; Bradford).

If positioning paths are observed in terms of both mission groups and age (considering pre-1992 vs post-1992 universities), it emerges that the around 43% of universities who changed cluster over time are not associated with any mission group (10 out of 23) while another 40% are universities belonging mainly to either M+ or UA. Only 4 universities belonging to either Russell group or the ex-1994 group changed cluster from 2002 to 2020. This finding suggests that the membership to a mission group somehow might represent a 'reputational' resource (especially for those universities belonging to Russell group) that should be preserved by positioning in niches (clusters n.3 and 4) aligned with the main values of these groups. Furthermore, the fact that 15 out of 20 universities that changed cluster are younger universities (post-1992 or newer institutions), underlines how the strengthening of a long-term and prospective niche is a process that might probably require a significant period of time.

5. Discussion

As highlighted in section 2, horizontal diversity in HE has been mainly investigated only at level of the entire HE systems, leading to contrasting empirical results. Against this background, this article quantitively examined diversity at three levels of analysis (the entire HE system, the mission groups, the individual universities) of the English HE field to deeper understand if and how it has changed over time. The statistical analysis performed at each level proved to complement one another and helps to shed light on the relationship between horizontal and vertical diversity as discussed below.

Starting from the entire English HE system (macro-level of analysis), the empirical investigation aimed to understand on which dimensions the English university system horizontally diversify most and if the level of diversity has increased or decreased over time. In this regard, the findings of the PCA highlight how the polarization between research and teaching orientation of universities and the degree of internationalization are the dimensions that most horizontally diversifies English universities throughout the entire timeframe. This is also supported by the decision tree (meso-level of analysis) and the variables that main differentiate the four clusters (micro-level). Furthermore, the overall level of diversity of the English HE system has slight increased from 2002 to 2020. Therefore, the analysis seems to support a 'managerial rationality perspective' (Fumasoli et al. 2020) according to which that a more intense competition push universities to differentiate themselves, ultimately enhancing the horizontal diversity of the HE system (Bonaccorsi and Daraio 2007; Horta et al. 2008; Rossi 2010; Teixeira et al. 2012).

Regarding a meso-level of analysis (mission groups), variables related to research orientation, and third mission involvement, are those that most account for universities' association with the five mission groups. Moreover, the MANOVA shows that the variability between mission groups is indeed much larger than that within groups and even slightly increasing over the more recent years here considered. Therefore, the affiliation to a mission group somehow emerged as an element that keep universities anchored to the values and features that the same mission group claims to represent. This consideration is also confirmed by considering positioning paths of universities as claimed below.

At the level of universities (micro-level), the empirical analysis performed confirms again that the relevance of the dichotomy "teaching-oriented vs research-oriented universities" in explaining the clusters. In addition, these last point to (more or less intentional) attempts to balance both similarity

and distinctiveness as suggested by the recent literature on strategic efforts retrieved from both mission statements/strategic plans and positioning patterns (Mampaey et al. 2015; Morphew et al. 2018; Barbato and Turri 2020). So, despite being both clearly teaching-oriented clusters, the n.1 and n.2 still differ in terms of their internationalization and educational profile. This might signal an attempt to gain a distinctive competitive advantage by some universities. Finally, looking at the positioning paths of universities, allows us to highlight that universities that are not affiliated to any mission group are those that have strived to change more significantly their positioning (cluster) over time, somehow confirming that membership to a mission group emerged as an element might set boundaries on strategic distinctiveness.

While the empirical focus on this paper is on the horizontal diversity of English universities, the analyses carried out at the meso (mission group) and micro (universities) seem to highlight the primacy of vertical diversity over the horizontal one. Four main elements can be presented to support this consideration.

First, mission groups can be considered as an instrument of position-taking within the HE field, which express a certain status and prestige of a university next to differences in mission orientation (Shattock 2013; Filippakou and Tapper 2015). As aforementioned, the MANOVA analysis ultimately shows that the large majority of the variability (thus the diversity) of the English HE system is explained by universities membership to the mission groups, especially since the last 10 years. In addition, the variables that better discriminate English universities' membership to mission groups, (the number of Scopus publications per academics, the percentages of private/public third-party funds and that of postgraduate international students), also entail a dimension of vertical diversity (related to the quality and status and, thus to the attractiveness, of universities).

Second, there is a significant degree of correspondence between the four clusters identified through the empirical analysis and the mission groups, and this is constant throughout the entire timeframe. 2002 and 2020's clusters are quite similar, and they can be predominantly distinguished by looking at their greater or lower values of indicators related to research production and international attractiveness. Moreover, the same analysis clearly identifies the presence of an 'elite tier' of world-class English universities (see also Boliver 2015), represented by cluster n. 4, which displays particularly high levels of research and international orientation without being different on other (horizontal) dimensions from cluster n.3.

Third, the majority of positioning paths here identified (see section 4.3) highly resemble those discussed by Cantwell and Marginson (2018, 147) in relation to highly stratified HE systems. So, for example, the majority of universities that passed from cluster n. 1 to 2 are younger and less prestigious institutions that seem to reflect a 'pure demanding absorbing' or a 'boutique teaching intensive' strategy, which sees a significant or constant student growth and a relevantly minor focus on research. Other middle strata universities resemble instead the 'wannabe artisanal research', with a constant student size and a growth in the research production and orientation (e.g. from cluster n. 1 to 3).

Finally, it should be underlined that the number of cluster changes over time has been not frequent: only 22% of the universities changed clusters from 2002 to 2020. This is another element pointing to the rigidity of the stratification of the English HE system.

Therefore, based on these elements, it could thus be asserted that the growth of diversity of the English HE system might have been occurred not only horizontally but also, and predominantly, vertically. In other words, the English HE context has progressively become even more stratified, and research is the core element that defines the hierarchy of this stratification, as was claimed by Teichler

(2008). This paper tends thus to confirm Croxford and Raffe's words (2015, 1626) that institutional differentiation in HE is mainly hierarchical and 'that institutional hierarchies are rigid and self-perpetuating'.

6. Conclusion

The present study presents methodological, theoretical and policy implications. In methodological terms this article illustrates that including a meso and micro level of analysis in studying diversity can enrich our understanding of what occurs at the level of the HE system. In particular, examining how the diversity of the HE system is represented by formal (or informal) groups of universities can highlight whether these might limit (or not) distinctive strategic positionings from universities. A micro-level analysis can instead ascertain which types of universities proved to undertake the most distinctive positioning patterns over time, thus increasing more the overall differentiation of the HE system (Fumasoli and Huisman 2013; Barbato and Turri 2020).

In theoretical terms, the findings of this article suggest that theoretical pluralism and contamination is needed to fully understand how universities react to environmental-level dynamics as increasing competition. Despite facing the same pressures, universities can indeed react differently (Mampaey et al. 2015; Morphew et al. 2018) and this generates multiple and heterogeneous effects on the overall diversity of the HE system. This becomes even more relevant to take into account the potential effects of vertical diversity on meso and micro level dynamics (Van Vught 2008), where a sociological perspective on the role of status and prestige can enrich the understanding of strategic positioning efforts (Paradeise and Thoenig 2013; Huisman and Mampaey 2018).

This article also presents a relevant implication in terms of policy design. While horizontal diversity is expected to better achieve the purpose of HE, a highly stratified HE system might undermined these positive effects (Birnbaum 1983). Policymakers have constantly promoted policies aimed at increasing competition to promote horizontal differentiation among universities. In this regard, the findings of this article tend to highlight a unintended effect of competition over institutional diversity. While the horizontal diversity English HE system has slightly increased over time, many empirical elements points to a strengthening of vertical diversity over the horizontal one. In other words, the increasing competition among English universities has contributed to strengthen the stratification of the HE system (Teichler, 2008), making more possible vertical movements along the hierarchy instead of horizontal efforts of distinctiveness. This means that government policies aiming to introduce or strengthen competition, should always bear in mind the impact of competition on both horizontal and vertical diversity. While competition can push universities to find a distinctive positioning, ultimately affecting horizontal diversity, this seems to be possible mainly in those dimensions that do not define the stratification of the system. Otherwise, competition seems to further fossilize the system, by helping the richest to become even richer (Boliver 2015).

Finally, this article presents some limitations that are worth to be underlined. First, the timeframe of the empirical inquiry covers almost 18 years from 2002 to 2020. A longer period of time could improve the understanding of strategic behaviours of universities, which might take more time to become clearer and stable.

Second, other more complex dynamical models could be implemented. However, we decided to use PCA for two reasons. First, because PCA is a well-known and widely used multivariate

statistical technique that enabled us to obtain comprehensive indicators of the English HE diversity, which are easier to interpret; and second because we were interested in tracking and visualizing the evolution of each dimension contributing to the system diversity across the period of study.

Third, although horizontal diversity has been here operationalized according to previous studies, the availability and comparability of public data over time has partially limited the operationalization process, excluding other dimensions, especially related to teaching, such as universities' disciplinary specialization (see, e.g. Teixeira et al. 2012; Rossi 2010) or widening participation (Bowl and Hughes 2016), and to third mission, through data about spin-offs and patents as well as public engagement. Considering some of these measures might contributed to investigate the horizontal diversity of the English HE even more comprehensively in future studies.

Moreover, to comprehensively empirically examined a vertical dimension of diversity would imply to consider also other aspects of status/reputation such as academic entry requirements and socio-demographic characteristics of students (Croxford and Raffe 2015) or quality scores generated by evaluation exercises and league-tables/rankings, especially those related to research excellence (Teichler 2008; Horta et al. 2008; Antonowicz et al. 2018). However, many of these data, especially quality scores coming either national evaluation exercises or rankings/league-tables are everything but a straightforward picture of universities' quality and might be subject to biases (Daraio et al. 2011). These data should thus be managed and analysed carefully.

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Appendix

Figure 1. Dendrogram of the 2020 hierarchical cluster analysis

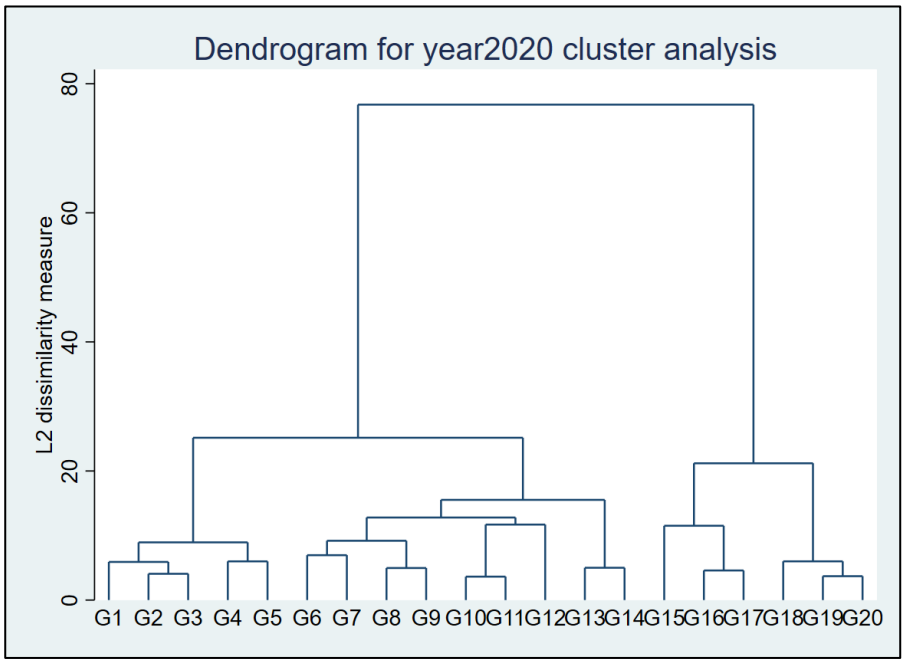

Figure 2. Individual variability (coefficient of variation) of the indicators

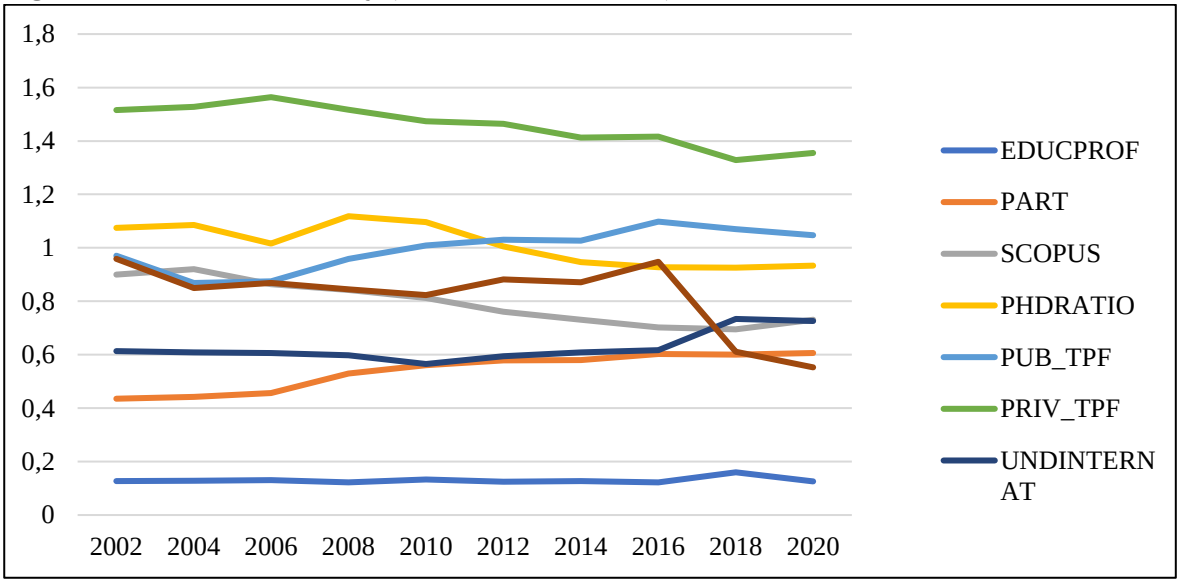

Table 1. Mean and standard deviation for all variables across the four clusters (2002)

Variable /Cluster	Cluster n. 1 (n=21)		Cluster n. 2 (n=51)		Cluster n. 3 (n=27)		Cluster n. 4 (n=5)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
% underg. stud.	0.740	0.088	0.832	0.073	0.710	0.052	0.605	0.104
% part-time stud.	0.331	0.109	0.336	0.164	0.321	0.119	0.204	0.095
Scopus publ. per FTE ac.	0.377	0.358	0.202	0.164	1.153	0.163	1.594	0.421
% of PhD stud.	0.021	0.018	0.010	0.007	0.049	0.018	0.109	0.036
% public third-party funds	0.033	0.026	0.037	0.045	0.151	0.048	0.157	0.054
% private third-party funds	0.012	0.012	0.006	0.007	0.062	0.037	0.138	0.068
% internat. underg. stud.	0.112	0.048	0.053	0.030	0.096	0.020	0.113	0.059
% internat. postg. stud.	0.090	0.045	0.021	0.018	0.103	0.039	0.204	0.122

Table 2 cluster memberships of English universities included in the analysis and their affiliation to a mission group

Russell group	**Cluster membership**									
	2020	**2018**	**2016**	**2014**	**2012**	**2010**	**2008**	**2006**	**2004**	**2002**
Imperial College of London	4	4	4	4	4	4	4	4	4	4
King's College London	4	4	4	4	4	3	3	4	4	3
London School of Economics/Pol. Science	3	3	1	3	3	3	3	3	4	4
Queen Mary University	3	3	3	3	3	3	3	3	3	3
University College London (UCL)	4	4	4	4	4	4	4	4	4	4
University of Birmingham	3	3	3	3	3	3	3	3	3	3
University of Bristol	3	3	3	3	3	3	3	3	3	3
University of Cambridge	4	4	4	4	4	4	4	4	4	4
University of Durham	3	3	3	3	3	3	3	3	3	3
University of Exeter	3	3	3	3	3	3	3	3	3	3
University of Leeds	3	3	3	3	3	3	3	3	3	3
University of Liverpool	3	3	3	3	3	3	3	3	3	3
University of Manchester	3	4	3	3	3	3	3	3	3	3
University of Newcastle	3	3	3	3	3	3	3	3	3	3
University of Nottingham	3	3	3	3	3	3	3	3	3	3
University of Oxford	4	4	4	4	4	4	4	4	4	4
University of Sheffield	3	3	3	3	3	3	3	3	3	3
University of Southampton	3	3	3	3	3	3	3	3	3	3
University of Warwick	3	3	3	3	3	3	3	3	3	3
University of York	3	3	3	3	3	3	3	3	3	3

Ex '1994 group'	**Cluster membership**									
	2020	**2018**	**2016**	**2014**	**2012**	**2010**	**2008**	**2006**	**2004**	**2002**
Birkbeck University	2	2	2	2	2	2	2	2	2	2
Goldsmiths College, University of London	1	1	1	1	1	1	1	1	1	1
Loughborough University	3	3	3	3	3	3	3	3	3	3
Royal Holloway, University of London	3	3	1	3	3	1	1	3	3	1
School of Oriental and African Studies	1	3	1	3	3	3	1	1	1	1
University of Bath	3	3	3	3	3	3	3	3	3	3
University of East Anglia	3	3	3	3	3	1	3	3	3	3
University of Essex	3	3	1	1	3	1	1	3	3	3
University of Lancaster	3	3	3	3	3	3	3	3	3	3

University of Leicester	3	3	3	3	3	3	3	3	3	3
University of Reading	1	3	3	3	3	3	3	3	3	3
University of Surrey	3	3	3	3	3	3	3	3	3	3
University of Sussex	3	3	3	3	3	3	3	3	3	3

Million plus	**Cluster membership**									
	2020	**2018**	**2016**	**2014**	**2012**	**2010**	**2008**	**2006**	**2004**	**2002**
Anglia Ruskin University	1	2	2	2	2	2	2	2	2	2
Bath Spa University	2	2	2	2	2	2	2	2	2	2
Bedfordshire University	1	1	2	1	1	1	1	1	1	1
Bolton University	2	2	2	2	2	2	2	2	2	2
Canterbury Christ Church University	2	2	2	2	2	2	2	2	2	2
Cumbria University	2	2	2	2	2	2	2	2	2	2
Leeds Trinity University	2	2	2	2	2	2	2	2	2	2
London Metropolitan University	2	2	2	2	1	1	1	1	1	1
London South Bank University	2	2	2	2	2	2	2	2	1	2
Middlesex University	1	1	1	1	1	1	1	1	1	1
Southampton Solent University	2	1	2	2	2	2	2	2	2	2
Staffordshire University	2	2	2	2	2	2	2	2	2	2
University of Central Lancashire	2	2	2	2	2	2	2	2	2	2
University of East London	1	2	2	2	1	1	1	1	1	1
University of Sunderland	2	1	2	1	1	1	2	1	1	2
University of West London	1	2	2	2	1	2	2	2	2	2
University of Wolverhampton	2	2	2	2	2	2	2	2	2	1

University Alliance (UA)	**Cluster membership**									
	2020	**2018**	**2016**	**2014**	**2012**	**2010**	**2008**	**2006**	**2004**	**2002**
Birmingham City University	2	2	2	2	2	2	2	2	2	2
Coventry University	1	1	1	1	1	1	1	2	2	2
Kingston University	1	1	2	1	1	1	1	1	2	2
Leeds Metropolitan University	2	2	2	2	2	2	2	2	2	2
Oxford Brookes University	2	2	2	1	1	1	1	1	1	1
University of Brighton	2	2	2	2	2	2	2	2	2	2
University of Greenwich	1	1	2	1	1	1	1	1	1	1
University of Hertfordshire	1	2	2	1	1	1	1	2	1	1
University of Teesside	1	2	2	2	2	2	2	2	2	2
University of the West of England	2	2	2	2	2	2	2	2	2	2

GuildHE	**Cluster membership**									
	2020	**2018**	**2016**	**2014**	**2012**	**2010**	**2008**	**2006**	**2004**	**2002**
Arts University at Bournemouth	2	1	2	2	2	2	2	2	2	2
Bishop Grosseteste University	2	2	2	2	2	2	2	2	2	2
Buckinghamshire New University	2	2	2	2	2	2	2	2	2	2
Falmouth University	2	2	2	2	2	2	2	2	2	2
Harper Adams University	2	2	2	2	2	2	2	2	2	2
Newman University	2	2	2	2	2	2	2	2	2	2
Norwich University of the Arts	2	2	2	2	2	2	2	2	2	2
Plymouth Marjon University	2	2	2	2	2	2	2	2	2	2
Ravensbourne University London	2	1	2	2	2	2	2	2	2	2
Royal Agricultural College	2	1	2	2	2	2	2	2	1	1
St Mary's Twickenham University	2	2	2	2	2	2	2	2	2	2
University of Chichester	2	2	2	2	2	2	2	2	2	2
University of Winchester	2	2	2	2	2	2	2	2	2	2

University of Worcester	2	2	2	2	2	2	2	2	2	2
York St John University	2	2	2	2	2	2	2	2	2	2

Not affiliated to any mission group	**Cluster membership**									
	2020	**2018**	**2016**	**2014**	**2012**	**2010**	**2008**	**2006**	**2004**	**2002**
Aston University	2	1	2	1	1	1	1	1	1	1
Bournemouth University	1	1	2	2	2	2	2	2	2	2
Brunel University	3	3	3	3	3	3	3	3	3	3
Chester University	2	2	2	2	2	2	2	2	2	2
City University	1	1	1	3	1	1	1	1	1	1
De Montfort University	1	1	2	2	2	2	2	2	2	2
Edge Hill University	2	2	2	2	2	2	2	2	2	2
Liverpool Hope University	2	2	2	2	2	2	2	2	2	2
Liverpool John Moores University	2	2	2	2	2	2	2	2	2	2
Manchester Metropolitan University	2	2	2	2	2	2	2	2	2	2
Nottingham Trent University	2	1	2	2	2	2	2	2	2	2
Sheffield Hallam University	2	2	2	2	2	2	2	2	2	2
St George's Hospital University	2	3	3	2	3	3	3	3	4	3
University of Bradford	2	2	2	1	1	1	1	1	1	1
University of Derby	2	2	2	2	2	2	2	2	2	2
University of Gloucestershire	2	2	2	2	2	2	2	2	2	2
University of Huddersfield	2	1	2	1	2	2	2	2	2	2
University of Hull	2	1	2	1	1	1	2	2	1	1
University of Keele	2	2	2	1	1	1	3	3	3	3
University of Kent	3	1	1	1	1	1	1	1	1	1
University of Lincoln	2	2	2	2	2	2	2	2	2	1
University of Northampton	1	2	2	2	2	2	2	2	2	2
University of Northumbria	1	1	2	2	2	2	2	1	2	2
University of Plymouth	2	2	2	2	2	2	2	2	2	2
University of Portsmouth	1	1	2	1	1	1	2	2	1	1
University of Roehampton	2	2	2	2	1	2	2	2	2	2
University of Salford	2	2	2	1	1	1	1	2	2	2
University of the Arts (London)	1	1	1	1	1	1	1	1	1	1
University of Westminster	1	1	1	1	1	1	1	1	1	1