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Operationalization of Diversity in Turkish Higher Education System

Türkiye Yükseköğretim Sistemi'ndeki çeşitliliğin işlemselleştirilmesi

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Özet

Dünyanın "Bilgi Ekonomisi" gerçeklerini yaşadığı günümüzde, ülkelerin refah düzeyleri, bilgiyi üretebilme ve bu bilgiyi kullanabilme yeteneklerine doğrudan bağlıdır. Bu çerçevede, yükseköğretim politikaları ile ilgili konuların ve bu konular arasında yükseköğretim kurumlarının çeşitliliğinin, hükümetlerin öncelikli gündem maddelerinden olması beklenir. Türkiye'nin Yükseköğretim Sistemi için de durum farklı değildir. Bu makale, Türkiye'nin Yükseköğretim Sistemi üzerinde gelecekte yapılabilecek çeşitlilik/farklılık (*diversity*) çalışmalarına temel oluşturmayı hedeflemektedir. Makale, yükseköğretim sistemlerinin çeşitliliği konusunda geçmiş bilimsel çalışmaların detayları çerçevesinde öncelikle altı aşamadan oluşan bir "Araştırma Akışı" önermektedir. Sonraki aşamada Türkiye Yükseköğretim Sistemi'nin güncel yapısı dikkate alınarak sistemin temel bileşenleri (oyuncuları) belirlenmekte, yükseköğretim sistemlerinin "kendi kendini uyarlayabilen karmaşık sistemler" oldukları varsayımı ile Türkiye Yükseköğretim Sistemi'nin kavramsal yapısı şematik olarak çizilmektedir. Çalışma kapsamında çeşitliliğin işlemselleştirilmesi (*operationalization*) amacıyla, mümkün olan en geniş şekliyle bir Boyut-Seti geliştirilmiştir. Yükseköğretim sisteminin bileşenlerinin özsel (*inherent*) karakteristikleri ile bileşenler arasındaki etkileşimleri kapsayan bu Boyut-Seti ile ilgili veri ulaşılabilirliği ve/veya veri derleme yöntemleri ayrıca listelenmiştir. Geliştirilen Boyut-Seti ve önerilen "Araştırma Akışı"nın Türkiye Yükseköğretim Sistemi'ndeki çeşitliliğin inceleneceği bilimsel çalışmalara temel oluşturacağı düşünülmektedir.

Anahtar sözcükler: Çeşitlilik, farklılaşma, işlemselleştirme, kendi kendini uyarlayabilen karmaşık sistemler, yükseköğretim kurumları, yükseköğretim sistemi, sistem analizi.

Abstract

Considering the very obvious fact that the world has entered a phase of "knowledge economy", and countries' future welfare will highly depend on their ability to create and apply knowledge, one can quite easily infer that policy issues regarding higher education systems will be at the heart of governments' agenda, so the diversity and diversification. The case of Turkish Higher Education System will not be an exception. This paper attempts to develop a basis for prospective diversity studies on Turkish Higher Education System. At first, a six step "Research Stream" was proposed along with a detailed literature review evaluating previous research studies on HESs' diversity. In the light of the structure of contemporary Turkish HES, key components (players) of the system were determined and system's conceptual framework was depicted assuming that HESs are complex adaptive systems. A comprehensive Dimension-Set for operationalization of diversity was then developed, reflecting inherent characteristics of and interactions between the components, at its widest possible extents. Data availability and/or data generation methods for each dimension were listed. The provided Dimension-Setand proposed "Research Stream" are deemed to foster prospective research studies on the diversity in Turkish HES.

Key words: Complex adaptive systems, diversification, diversity, higher education institutions, higher education systems, operationalization, system analysis.

Over the last three-four decades, diversity and diversification had been one of the major issues both for policy makers and researchers within the higher education realm. While governments were aiming at increasing and/or maintaining the level of diversity in their countries' higher education systems, scholars were conducting

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research on the operationalization[1] and measurement of diversity and devising conceptual frameworks for explaining the mechanisms behind its changes over time.

Considering the very obvious fact that the world has entered a phase of "knowledge economy", and nations' future welfare will highly depend on their ability to create and apply knowledge (van Vught, 2008), one can quite easily infer that policy issues regarding higher education systems (HES hereafter) will be at the heart of governments' agenda, so the diversity and diversification.

Turkey, a candidate country for EU membership, was reported to have a higher education age cohort of 5.5 million in 2005[2]. Projections indicate that this number will slightly decrease over the forthcoming decades and will stabilize around 5 million by 2025 (Teziç, 2007).

For being able to compete in the international arena of "knowledge economy", Turkey had to and will have to govern her higher education system in a very wise manner. Despite this fact, it has been very frankly confessed by the Higher Education Council of Turkey, which is the governing body of higher education (HE hereafter) since 1981, that no strategic plans had been able to be prepared and followed until 2007, when the first strategy plan was prepared, discussed with the stakeholders, accepted and published as a "white paper" with the hope of shaping the future of Turkish Higher Education, if not impeded by populist government interventions (Teziç, 2007).

Although the above mentioned strategic plan and other policy papers such as governments' programs and State Planning Office's plans do not explicitly indicate the aim of escalating the level of diversity, they contain far many strategies and intentions which will inevitably cause diversification in the Turkish HES in the near future, which in turn necessitates conception of tools for measuring the diversity within Turkish context.

This paper claims to develop a basis for prospective diversity studies on Turkish HES. Another major intention of the paper is to deepen readers' insight on previous diversity research.

To this end, the paper is structured as follows: After elaborating assumptions and definitions that will be stuck to throughout the paper in Section one (Assumptions and Definitions: Diversity and Diversification of/in Higher Education Systems), I propose a *Research Stream* which delineates major steps of a typical diversity research in Section two (A Proposed Research-Stream for Researching Diversity and Diversification in Higher Education Systems). After explaining the structure of contemporary Turkish HES in Section three (System Thinking, General Systems Theory and Systems Analysis Approach for HESs), Section four (Brief Information on the Structure of Turkish HES) focuses on previous research studies on the diversity in Turkish HES, whereas Section five (An Overview of Preceding Research Studies on the Diversity in Turkish HES) explains how Systems Analysis approach decently suits to comprehend HESs. Finally, in Section six (Dimension Set for Operationalization of Diversity in Turkish HES), I present a *Dimension-Set* for Turkish HES which may be utilized when designing further diversity research studies in Turkish context.

It is worth to underline here that diversification of the system (in time) is not within the scope of this paper, which, however, may be a very challenging subject for further studies and be supported by the outcomes of this study.

Another complementary area for further study is analyzing the evolution of Turkish HES from a "diversification" point of view in line with HE policy documents (programs and action plans of governments, development plans of State Planning Office, Programs of political parties) which have influenced system's diversity and will do so in the future.

Assumptions and Definitions: Diversity and Diversification of/in Higher Education Systems

There are several definitions of diversity, differentiation and diversification in the relevant literature, among which some may be regarded as confusing or even conflicting. In this paper the following definitions and assumptions are stuck to.

The very first assumption persevered throughout the whole study is that Higher Education Systems, the diversity/ diversification of which we investigate, are *complex systems*. A complex system is a system composed of interconnected parts that as a whole exhibit one or more properties (behavior among the possible properties) not obvious from the properties of the individual parts. It should be noted that many definitions tend to postulate or assume that complexity expresses a condition of numerous elements in a system and numerous forms of relationships among the elements. At the same time, what is complex and what is simple *is relative* and *changes in time*[3].

[1] Operationalization is the process of defining a concept as the operations that will measure the concept (variables/dimensions) through specific observations (Retrieved 27.9.2008, from http://en.wikipedia.org/wiki/Operationalization)

[2] Ages between 19-22

[3] Retrieved 27.9.2008, from http://en.wikipedia.org/wiki/Complex_system

Diversity is defined by Huisman as "the variety of types and the dispersion of entities across these types" (Huisman, 2000). A similar definition is raised by van Vught as "diversity is a term indicating the variety of entities within a system" (van Vught, 2008). As such, diversity exhibits a static nature, basically presenting a snap-shot picture of the variety and dispersion within the system.

If we think of a change in the diversity in a system within a time frame, it can either come forth because of a change in the number of types or a change in the dispersion of entities across these types, or a combination of both. The first one of these two phenomena is called *differentiation* whereas any combination of two is called *diversification*. For the sake of easiness and clarity, I will refrain from using the term differentiation hereafter and merely use diversification.

Another useful description of diversity and diversification raised by Huisman (1995) is that diversification is a *process* whereas diversity the *product* of this process.

It is worthwhile to note that contrary to the static nature of diversity, diversification denotes a dynamic process and can be defined as the change in diversity over a time period, Δt.

From a *differential* mathematical point of view, if we define diversity as a function of (let's say) internal and external variables[4](dimensions[5]) and time (as an additional dimension), diversification can be defined as the first (partial) derivative of diversity over time:

$$\text{diversification} = \frac{\partial\,(\text{diversity})}{\partial t}$$

where

diversification: f (internal variables, external variables, t)

It should be underlined here that internal and external variables themselves are functions of time[6] as well, which are basically driven by coercive, mimetic and normative factors[7], and other mechanisms explained by theoretical frameworks such as "population ecology" and "resource dependency" experienced within the system. The interaction of these factors with each other and their influence on system's diversity has been widely studied by scholars in HE area.

A Proposed Research-Stream for Researching Diversity and Diversification in Higher Education Systems

As described by Huisman and van Vught (Huisman, 1995; van Vught, 2008), although diversity and diversification had been studied in depth in the past centuries mostly by biologists, ecologists and sociologists such as Darwin (1859), Durkheim (1893), Parsons (1966), Merton (1968), researching diversity and diversification in higher education area dates only back to late 1960's. Since then, many research studies were conducted and published with a varying accent on different aspects and forms of diversity.

After analyzing major research studies on diversity and diversification in detail with respect to their research methodologies, I ended up with a *Research-Stream*, at its widest boundaries, which deemed to have been followed by the majority of scholars in this field. The six-step stream is graphically presented in Fig. 1.

I will not go over the details of each step, as the figure is thought to be self-explanatory, but I prefer to explain some points for strengthening my framework.

- All studies are assumed to follow all the steps through 1 to 6.
- The level of concentration on each step differs between individual studies. Some studies do not concentrate on some steps at all.
- The steps are assumed to be followed in order along with some *recursions* that were exercised for fine-tuning previous steps.

Applying the proposed *research-stream* to the categorization proposed by Huisman (1995) yields the following outcomes:

- *Operationalistic* studies focus on Step 1 with all its substeps and Step 2
- *Interpretative* studies focus on Step 1.a and 1.b, but do not put much effort on Step 1.c, 1.d., 1.e and 2.
- *Atheoretical* studies do not focus on Step 5, whereas *Theoretical* ones do so.
- *Product Studies* mainly concentrate on Step 3a.
- *Product and Process Studies* focus on Steps 3a, 4a and 4b.

[4] Using the classification of Birnbaum, B. (1983). Maintaining Diversity in Higher Education.

[5] The terms *variable* and *dimension* are used interchangeably throughout the paper.

[6] This renders the non-linear and complex nature of Higher Education Systems.

[7] According to van Vught (2008) *coercive* isomorphism results from the pressures applied by other organizations (in the environment) on which the organization is dependent (e.g., governmental policies and laws). *Mimetic* isomorphism stems from uncertainty caused by poorly understood technologies, ambiguous goals and the symbolic environment, which induces organizations to imitate the behaviour of perceived successful organizations. *Normative* isomorphism stems from professionalization. Professionalism leads to homogeneity both because formal professional training produces a certain similarity in professional background and because membership of professional networks further encourages such a similarity.

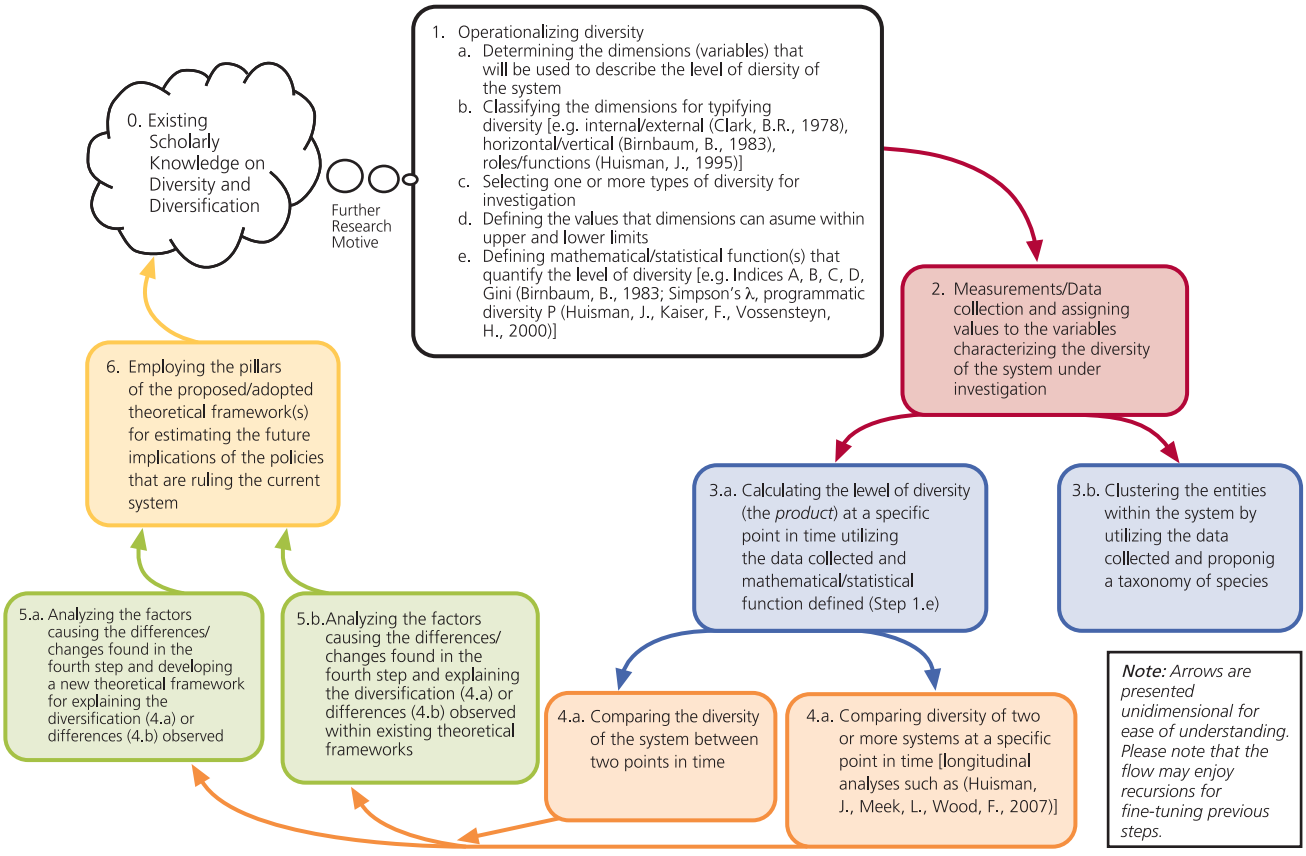

Fig. 1. Proposed research stream

Considering the widely respected work of Birnbaum (1983), which is attributed by Huisman (1995) as *a product/process-operationalistic-atheoterical* study, we can infer that it principally focuses on Steps 1, 2, 3.a, 4.a, putting less emphasis on 5.b and widely enjoying 6.

The research-stream of a more recent study by Huisman et al. (Huisman, Meek & Wood, 2007) may be addressed as, having strong accent on Step 1 - Step 2 - Step 3.a, Step 4.b and a slight touch on Step 5 and Step 6.

Two consecutive steps of the proposed stream, among others, deserve special attention. These sub-steps, which have crucial role for settling the "point of view" or the "main objective" of the study, are Steps 1.b and 1.c.

The importance of these two steps is reflected in Huisman's comprehensive study (1995) on classification of the studies on diversity and diversification. Huisman classified the studies in the literature into three groups:

- Studies concentrating on *External Diversity*, which depend on external (to the HE institutions) variables and focus on differences between higher education organizations
- Studies concentrating on *Internal Diversity*, utilizing internal dimensions describing the nature within the HE institutions
- Studies focusing on *Differentiation of Functions Roles and Structure*, which often look at the higher education system from a macro-perspective.

If we scrutinize the very recent study of van Vught (2008) by applying the proposed *research-stream*, the importance of Steps 1.b and 1.c is self-evident by the statements of the author:

"For our purposes, the distinction between external and internal diversity is the crucial one. We will focus on the differences between institutions rather than on differences within institutions."

It is the researcher's own decision what type (form) of the diversity(ies) to choose and investigate throughout the next steps in the *research-stream*. The researcher may either prefer to use types that had already been proposed by other researchers (*such as* Birnbaum 1983, Huisman 1995, Clark 1978) or establish a brand new form of diversity, (maybe partly inspired by already proposed ones), by using the dimensions stemmed from Step 1.a as the *building blocks*.

As mentioned previously, the decisive argument here is where to settle the "point of view" or "main objective" of the study[8]. If the study, for instance, aims at focusing on maintaining the diversity in a country's higher education system and ultimately raising policy implications, the researcher would draw a particular set of dimensions from Step 1a, which is different than if he would have chosen for a comparative diversity research among higher education institutions with respect to minimum enrolment grade requirements.

Various forms of diversity may be constructed for different "points of view"s, such as:

- Diversification of a higher education system, in macro scale, for what it offers to students (if the main perspective is the escalation of diversity for meeting student needs better)
- Diversification of HEIs by their scientific output
- Diversification of HEIs by the tuition fees they ask from the students
- Diversification of HEIs by some input variables and/or processes and/or output variables

The crucial importance of Steps 1.b and 1.c reveals the importance of the preceding Step 1.a, as well. Step 1.a provides the researcher with a *dimension-set*, which will be used in the following steps. Therefore the quality and the extent of Step 1.a, namely "*determining the dimensions (variables) that will be used to describe the level of diversity in the system*" is very important for aspiring and assuring the level of comprehensiveness of overall research study.

The richness of the dimension-set is particularly important considering potential impediments that may be confronted with when measuring/collecting the required data in the forthcoming steps.

System Thinking, General Systems Theory and Systems Analysis Approach for HESs

For centuries, scholars tended to investigate many phenomena by creating conceptual *systems*, i.e. by defining an arbitrary boundary that encompasses a set of interacting or interdependent entities, real or abstract, forming an integrated whole. The arbitrary boundary of the system is demarcated by scholars themselves according to the individual purposes of analysis, discussion and understanding.

The tendency to conceptualize systems was based on the conviction that the component parts of a system can be best understood in the context of relationships with each other and with other systems, rather than in isolation. This conviction, though, did not emerge spontaneously, particularly due to the influence of widely respected reductionistic approach of Rene Descartes who advocated the merits of segregating the whole into its components, i.e. the *Analytical Approach*. Descartes's approach contributed a lot to the evolution of modern science but fell short to describe complex systems of modern era where syntheses are needed instead of, or better to say, along with analyses.

Although the roots of systems thinking goes back to antiquity, system theory, as an area of study, was first originated in biology in the 1920s and gained its momentum after the second world war by the works of Ludwig von Bertalanffy, Anatol Rapoport, Kenneth E. Boulding, William Ross Ashby, Margaret Mead, Gregory Bateson, C. West Churchman. It focuses on the nature of complex systems, and can be defined as a framework by which one can analyze and/or describe any group of objects that work in concert to produce some result. The history, evolution and conceptual details of systems theory are beyond the scope of this paper but one can refer to Ludwig von Bertalanffy (1975) for further information.

Just like the Yin vs. Yang, analysis vs. synthesis or analytical thinking vs. systems thinking are *inevitably integrated couples*. Effective and efficient modeling of a system's behavior is only possible by comprehensively analyzing the system at first. Only then the complexity of the system can be built up by further methods of general systems theory (GST) such as system dynamics (SD).

By closely scrutinizing the literature on diversity and diversification one can directly infer that the subject matter of these studies is a "system" namely the Higher Education System.

[8] According to systems philosophy, there are no "systems" in nature. The universe, the world and nature have no ability to describe themselves. With respect to nature, conceptual systems are merely models that humans create in an attempt to understand the environment in which they live. The system model is used because it more accurately describes the observations. Because systems are models created only for understanding, the most fundamental property of any system is that a system has an arbitrary boundary. Humans create the boundaries to suit their own purposes of analysis, discussion and understanding. This is true of every conceptual model that was devised through which humans try to understand the universe. Arbitrary does not mean random or meaningless. Arbitrary merely means without previous dependency. We assume that the Universe is objective, but our experience is tempered by our subjective understanding. We see what we look at. Systems are further expressed by listing the elements relationships, wholes, and rules associated with that system. Again, this is an arbitrary exercise true of all models humans create. http://en.wikipedia.org/wiki/Systems_philosophy

As explained in the first section of this paper, one of the main assumptions of the current study is that HESs are complex systems. At this point I want to elaborate this assumption and suggest that higher education systems are not only *complex* but also *complex adaptive*, which means that they are *complex* in that they are diverse and made up of multiple interconnected elements and *adaptive* in that they have the capacity to change and learn from experience. This assumption conforms well to theoretical frameworks that had already been developed in the literature (Huisman, 1995; van Vught, 2008) which simultaneously respected resource dependency and population ecology approaches.

This paper claims to generate a dimension-set (Step 1.a) for prospective diversity studies on Turkish HES, at its widest possible extents. To this end, *Systems Analysis* approach was stuck to for defining all players (stakeholders, components, etc.) of the system and the interaction between them.

As defined in the Web Dictionary of Cybernetics and Systems[9], "*System Analysis is an explicit formal inquiry carried out to help someone, referred to as the decision maker, identify a better course of action and make a better decision than he might otherwise have made. …The typical use of systems analysis is to guide decisions on issues such as national or corporate plans and programs, resource use and protection policies, research and development in technology, regional and urban development, educational systems, and health and other social services… A systems analysis related to public decisions is often referred to as a Policy Analysis… A systems analysis that concentrates on comparison and ranking of alternatives on basis of their known characteristics is referred to as Decision Analysis…*".

Considering these explanations renders Systems Analysis an appropriate tool for investigating diversity in HESs.

Brief Information on the Structure of Turkish HES

According to law 2547, there are four types of HEIs in Turkey, namely state universities, private universities, state institutes of technology and private short cycle vocational schools.

Faculties and departments within universities and within institutes of technology conduct undergraduate programs of 4-6 years. Short-cycle vocational schools conduct two years programs. Master's and doctoral level graduate programs are run by graduate schools (*Enstitü* in Turkish).

At undergraduate and short-cycle level, universities may not recruit their students by their own exams[10]. Students are placed to universities by ÖSYM according to the grades they attained in centralized student selection exam and the "preference lists" that they officially submit to ÖSYM. The placement mechanism runs as a perfect demand-supply market, where exam grades correspond to money and places at universities to scarce goods (Kılanç, 2007).

Law 2547 defines four governing bodies of HES in Turkey: YÖK, YDK, ÜAK and ÖSYM. The Council of Higher Education (YÖK, *Yüksek Öğretim Kurulu*) is an autonomous body with juristic personality which governs all higher education, directs the activities of the institutions of higher education, within the context of duties and powers given by this law. To the Council of Higher Education are attached the Higher Education Supervisory Board (YDK, *Yüksek Öğretim Denetleme Kurulu*) and the Measurement Selection and Placement Center (ÖSYM, *Ölçme Seçme ve Yerleştime Merkezi*) together with the relevant units responsible for planning, research, development, evaluation, budget, investment and coordination. Higher Education Supervisory Board, YDK, is responsible for supervising and controlling the universities in educational and other activities to insure their conformity to the national objectives as determined by the law and principles laid down by YÖK. Student Selection and Placement Center, ÖSYM, is responsible for defining enrolment standards, carrying out centralized exams and placing candidate students to university programs. Inter-university Board's (ÜAK, *Üniversiteler Arası Kurul*) duties are to establish regulations, co-ordinate and evaluate teaching, research and publication activities, to propose measures for the needs and improvement of academic staff and to establish principles regarding doctoral work and granting of academic staff positions and degrees.

State HEIs are required to follow the organizational and administrative structure as defined by law 2547. This mandate is valid for private universities as well, buy only on academic issues. Private universities are autonomous with regard to administrative and financial practices but within strict audit schemes of YÖK.

Institutional governing bodies of HEIs are, the Rector, the Senate, the University Administrative Board, The Deans, the Faculty Board, the Faculty Administrative Boards, Heads of Department and the Secretary General. As a direct reflection of managerial approach of Law 2547, the Rector is equipped with high authority and responsibilities. As explained by Mızıkacı (2006), "*The Rector is the authority who takes the Chair in university boards, implements the resolutions, reviews and decides*

[9] Retrieved 27.9.2008, from http://web.archive.org/web/20070822174827/pespmc1.vub.ac.be/ASC/indexASC.html

[10] Except some programs only for "special talented" students such as sports, plastic arts...

on the proposals of the university board and ensures co-ordination among subsidiary organizations attached to the university. The Rector holds the final responsibility for the use and development of the educational, research capacity and other assets of the university such as the planning and implementation of curriculum and research activities; supervision and delegation of duties within the university and related units. In private universities, the duties of the Rector are subject to the principles and provisions drawn by the Board of Trustees."

Detailed information on the structure of Turkish HES can be found in (Mızıkacı, 2006), but with regard to Fig. 2, the following definitions deemed necessary to be given for clarity. Law 2547 defines the Secretary General as the head of central administration. Revolving funds are defined as the sources of income universities can create, in line with the principles established and with the approval of YÖK, within their own facilities, e.g., hospitals, research centre and conservatories. Research and Applied Studies Centers carry out research and applied studies to meet the applied study needs of various areas and to provide preparatory and support activities for various professional areas, with the aim of supporting education in institutions of higher education.

An Overview of Preceding Research Studies on the Diversity in Turkish HES

In-depth examination of preceding research studies and policy papers on Turkish HES indicates that diversity and diversification did not widely attracted scholar attention. In most of these papers, diversity is either very cursory touched upon or implicitly expressed. Among these, the report prepared by Ergüder et al. (2003) on behalf of Turkish Businessmen and Industrialists Association, is an outstanding one, discoursing the need of enhanced diversity in HES for meeting the present future needs of stakeholders.

The only comprehensive scientific study on the diversity and diversification of Turkish HES was conducted by Erden (2006). It is quite remarkable that Erden didn't prefer to use the term diversity in her study, but plurality and heterogeneity, instead. As she pointed out, her study "*.... examined the Turkish higher education field to understand plurality and its effects on an*

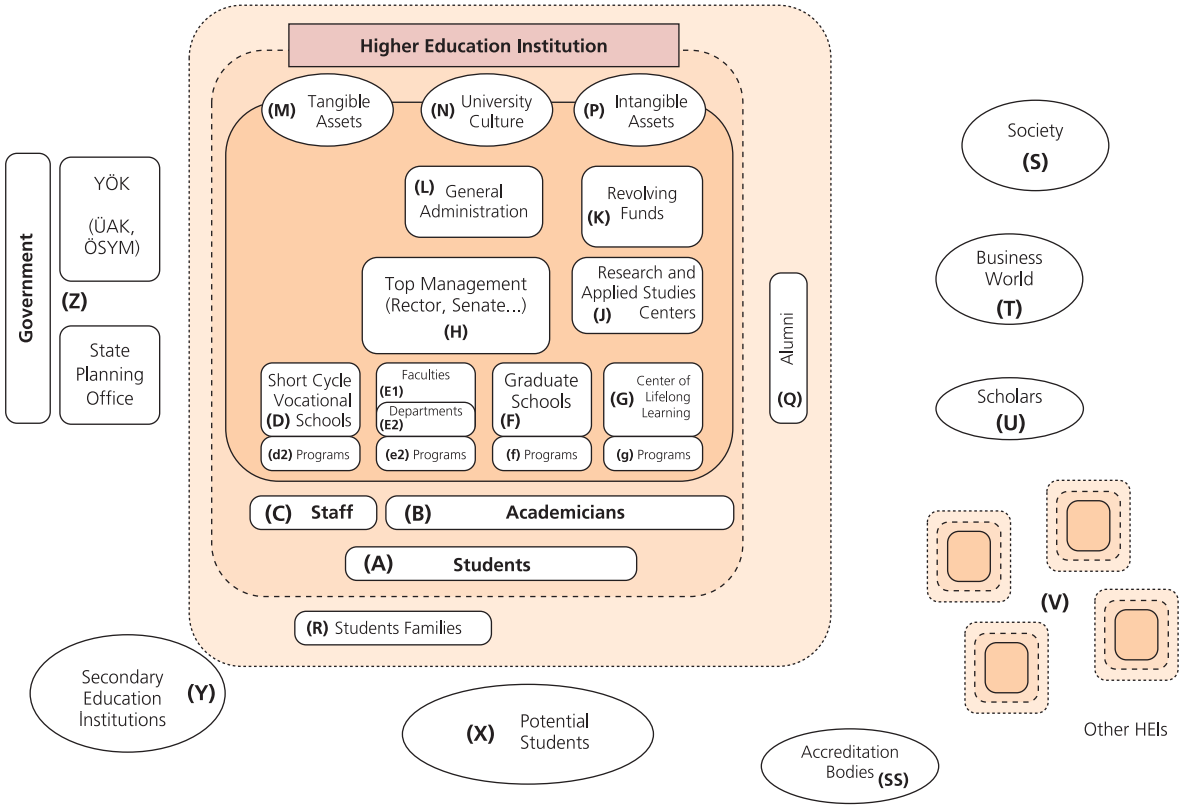

Fig. 2. Components of Turkish Higher Education System

organizational field in an effort to extend new institutional theorizing. In doing this, the aim was to see how isomorphic pressures affected organizations against the backdrop of a multiple model organizational field. In addition, as the study had three data sets in three time points, it allowed for an analysis of periods with different institutional set ups. As such, the three periods displayed, first the early years when there was no strong coercive force in the field, which was followed by a period under strong coercive pressures toward homogenization, and a third period when the coercive body had allowed room for heterogeneity". Erden classified Turkish HEIs into six groups basically according to their historical characteristics: Classical (German influence), Formerly-Academy (French influence, legacy of binary-structured period), American-Modeled, Post-1973 , Post-1991 and Non-Profit Private; and studied the level of diversity in HES in 1975, 1985 and 2002 with respect to 3 groups of dimensions: Patterns of Activities, Structure, Procedures.

Another study, which even not focusing directly on diversity and diversification but proposing a taxonomy of Turkish HEIs is Mızıkacı's work, prepared for UNESCO (Mızıkacı, 2006). In her study, HEI's were classified into four groups, namely Public Universities, Public Institutes of Sciences, Private Universities, Private Vocational Schools (short cycle), and evaluated in terms of financial sources, controlling systems, mission statements, institutional size and discipline intensification. Proposing the classification presented in Table 1, Mızıkacı concluded that Turkish Higher Education system exhibits a homogeneous structure, but this conclusion is rather broad and contextual.

Another detailed study was again done by Mızıkacı in 2010 where she examined isomorphic and diversifying changes in Turkish private higher education institutions. According to her, Turkish foundation universities fall into two main groups. Universities in Group 1 compromises isomorphic, non-elite and demand absorbing characteristics while those fall into Group 2 tend to be distinctive, semi-elité and serious (Mızıkacı, 2010).

Dimension Set for Operationalization of Diversity in Turkish HES

In the light of the information provided in the preceding sections of this paper, Fig. 2 depicts Turkish HES with all its components, each of which is labeled by a letter, that are later used in Tables 2 and 3. These tables include the dimensions and data availability information regarding the components of the system and deemed to be the major contribution of this study to further diversity research in Turkish context.

The analysis of HES in Fig. 2 is structured such as to allow multi-level operationalization and measurement of diversity, both at institutional level and also system wide. Individual HEIs are considered to be open[11] sub-systems interacting with other components of the HES. It is the descriptive inherent characteristics of individual components and of the interactions between them which are deemed to portray "the diversity".

There may be far many other ways to divide higher education systems into its components by systems analysis approach, though not many exist in the literature (Galbraith, 1998; Kennedy, 1998; Salhieh, 2003). An outstanding study is Reavill's "Stakeholder Model" (Reavill, 1997). After discussing the product/process model, the service/process model and Checkland's soft systems methodology, Reavill identifies 10 stakeholders of a HES, namely: (1) the student, (2) the employer, (3) the family and dependents of the student, (4) universities and their employees, (5) the suppliers of goods and services to universities, (6) the secondary education sector, (7) other universities, (8) commerce and industry, (9) the nation, as represented by the government, (10) tax payers, national and local. Reavill clearly states that these stakeholders are not the exclusive ones and more might be well identifiable.

Table 1. Taxonomy of Turkish HEIs proposed by Mızıkacı, 2006

Type	Funding	Control	Mission	Size	Disciplinary stracture
Public universities	Public	Public	Teaching, research, public service	Large	Comprehensive
Public institutes of sciences	Public	Public	Teaching, research	Small	Specialized
Private universities	Private with public support	Public	Teaching, research, pulic service	Small	Comprehensive
Private vocational schools	Private with public support	Public	Teaching, research public, service	Small	Comprehensive

[11] An open system is a state of a system, in which a system continuously interacts with its environment. Open systems are those that maintain their state and exhibit the characteristics of openness previously mentioned. Retrieved 27.9.2008, from http://en.wikipedia.org/wiki/Open_system_(systems_theory)

Table 2. Dimension-capital regarding the (inherent) characteristics of the components of Turkish HES

Actor/ITEM (diversity with regard to)	Dimension	Data availability			
		Ready	Source	To be collected/ calculated	Proposed method
HEI (General)	Type of ownership *(State, private (non-profit), private (for-profit)*	HEI	• Laws, by-laws • YÖK statistics *(web site)*	-	-
	Institutional type *(State University, private university, private short cycle, vocational school, state institute of technology)*	HEI	• Laws, by-laws • YÖK Statistics *(web site)*	-	-
	Number and/or type of faculties	HEI, E1	• Yearly HE statistics by ÖSYM	-	-
	Number and/or type of departments	HEI, E2	• ÖSYM guide for candidate students (yearly)	-	-
	Number and/or type of short cycle schools	HEI, D		-	-
	Number and/or type of graduate schools	HEI, F	• Yearly HE statisctics by ÖSYM	-	-
	Number of research and applied studies centers	HEI, G	• YÖK statistics *(web site)*	-	-
	Total budget	HEI	-	HE	1. Mining HEI's internal data 2. Mining YÖK's database
	Composition of budget *(Sources)*	HEI	-		
	Age of HEI	HEI	• Laws, by-laws • YÖK statistics *(web site)*	-	-
Students (A)	Total number of students Age distribution Gender distribution Number of foreign students	HEI	Yearly HE statistics by ÖSYM	D, d, E1, E2, e2, F, f, G, g	1. Mining HEI's internal database 2. Mining YÖK's database
	Financing status *(Self-financing, family-financing, financed by an institution, ...)*	-	-	HEI, D, d, E1, E2, e2, F, f, G, g	1. Survey • *(traditional)* • *(questionnaire)* 2. Mining HEI's internal database
	Accommodation *(With family, university dormitory, ...)*	-	-		
	Income level	-	-		
	Retention rate	-	-		
	Average study time	-	-		
	Research assistantship at the same university?	-	-	G, g	
	Educational background *(Highschool graduate, bachelor graduate, masters graduate, doctoral graduate)*	-	-		
Acedemicians (B)	Total number of academicians Academic title distribution *(Professor, associate professor, assistant professor, ..)* Appointment type *(Full time, part time...)* Gender distribution	HE, D, E1, F	Yearly HE statistics by ÖSYM	d, E2, e2, f, G, g	1. Mining HEI's internal database 2. Mining YÖK's database
	Number of foreign academicians	HEI			
	Inbreeding-outbreeding ratio	-	-	HEI, D, d, E1, E2, e2, F, f	1. Survey • *(traditional)* 2. Mining HEI's internal database
	Academic tradition background *(Tradition of the university of bachelor, master and doctoral degrees attained)*	-	-		
	Origin of academic degrees *(Foreign/domestic university)*	-	-		1. Mining HEI's internal database 2. Mining ÖSYM's KPDS or ÜDS database
	Foreign language level	-	-		
Staff (C)	Total number of non-academic staff	-	-	HEI	1. Survey • *(traditional)* 2. Mining HEI's internal database
	Educational background *(Highschool graduate, bachelor, masters graduate, doctoral graduate)*	-	-		
	Gender distribution	-	-		
Top management (H)	Academic/business background of members of board of trustees *(Only for private universities)*	-	-	HEI, H, D, E1, F, G, J	1. Survey • *(traditional)* 2. Mining HEI's internal database
	Academic tradition background of rector and deans *(Tradition of the university of bachelor, master and doctoral degrees attained)*	-	-		
	Origin of academic degrees of rector and deans *(Foreign/domestic university)*	-	-		
	Managerial experience of rector and deans	-	-		
Tangible assets (M)	Campus university/city university	-	-	HEI	1. Survey • *(traditional)* 2. Mining HEI's internal data
	Multi-campus/single campus university	-	-		
	Closed area/open area *(Per student)*	-	-		
	Library facilities *(Number of books, journals, allocated budget)*	-	-		
	Non-academic facilities *(Sports, social infrastructure,...)*	-	-		
	Number of computers *(Per student)*	-	-		
	IT investment budget *(Per student of % of total budget)*	-	-		
	Average age of campus	-	-		
Intangible assets (P)	Image of the HEI *(in the eyes of society, potential students, business world, scholars, ..)*	-	-	HEI, D, E1, E2	1. Survey • *(questionnaire)*
University culture (N)	Historical tradition *(Anglo-American, German, ...)*	-	-	HEI	1. Survey • *(traditional)* 2. Document and literature review
Student families (R)	Socio-economic indicators *(Educational background, average income, ...)*	-	-	HEI, D, d, E1, E2, e2, F, f, G, g	1. Survey • *(questionnaire)*

Table 3. Dimension-capital regarding the Interaction between the components of Turkish HES

Description (diversity with regard to)	Interaction	Dimension	Data availability: Ready	Source	To be collected/ calculated	Propoped method
Programmatic offers to potential students (short cycle)	**D, d → X**	Number of programs Number of available seats Day-time/Night-time programs Distance education programs Number of programs with partial/full scholarship Number of programs totally conducted in a foreign language Number of programs partially conducted in a foreign language Level of tuition fee	d	ÖSYM guide for candidate students (yearly)	D	Arithmetic calculation
Programmatic offers to potential students (undergraduate)	**E2, e2 → X**	Number of programs Number of available seats Day-time/Night-time programs International Joint Programs *(Turkish acronym: UOLP)* Distance education programs Tuition fees Number of programs with partial/ full scholarship Number of programs totally conducted in a foreign language	e2	ÖSYM guide for candidate students (yearly)	E2, E1	Arithmetic calculation
		Number of prrograms partially conducted in a foreign language Number of Vertical Movement Seats *(Turkish acronym DGS)*		ÖSYM guide for DGS candidate students (yearly)		Arithmetic calculation
Programmatic offers to potential students (graduate)	**F, f → X**	Number of programs Number of available seats Day-time/Night-time programs Distance education programs Number of programs Tuition fees Number of programs with partial/full scholarship	- - - - - - -	- - - - - - -	F, f	Survey • *(traditional)* • *(HEI web site)*
Programmatic offers to potential students (lifelong learning)	**G, g → X**	Number of programs	-	-	F, f	1. Survey • *(HEI web site)* 2. Document review • *(by laws)*
Academic program construction	**H → B → A** (D → B → A) (E1→B → A) (F → B → A)	Duration of courses *Semi-yearly, yearly* Grading system *Numerical, letter*	- -	- -	D, E1, F	1. Survey • *(HEI web site)* 2. Document review • *(by laws)*
Student affairs (academic)	**H → B → A** (D → B → A) (E1 → B → A) (F → B → A)	Academic counseling Horizontal transfer opportunities and ratio Double major opportunities and ratio Carrier counseling	- - - -	- - - -	D, E1, F	1. Survey • *(HEI web site)* 2. Document review • *(by laws)*
Student affairs (social)	**A → N** **H → A → N** **H → A** **H → A → N**	Number of student clubs Student clubs particaption Total budget of student clubs Student services *(Accommodation, health services, transportation,...)* Scholarships Students representation in strategic management of the HEI	- - - - -	- - - - -	HEI, D, d, E1, E2, e2, F, f, G, g	Survey • *traditional*

Table 3. Dimension-capital regarding the Interaction between the components of Turkish HES *[Continued]*

Description (diversity with regard to)	Interaction	Dimension	Data availability: Ready	Source	To be collected/ calculated	Propoped method
ERASMUS exchange	**A → V**	Number of Erasmus student *(Imported/exported)*	-	-	A, D, d, E1, E2 e2, F, f, G, g	Survey • *(traditional)* • *(HEI web site)*
	B → V	Number of Erasmus academician number *(Imported/exported)*	-	-	B, D, d, E1, E2, e2, F, f, G, g	
	C → V **H → V**	Number of Erasmus staff number *(Imported/exported)*	-	-	C, H	
Third party accreditation	**SS → V** (SS → HEI (H;L) (SS → D, E, F) (SS → G)	Accredited units *(ABET, ...)*	-	-	HEI, H, I, D, E, F, G	Survey • *(traditional)* • *(HEI web site)*
		Certified units *(ISO 9001, ...)*	-	-		
Enrollment indicators (short cycle) (undergraduate)	**X → A** (X → D, d) (X → E2, e2)	Minimum enrolment point in the centralized Student Selection Exam	d, e2	ÖSYM guide for DGS candidate students (yearly)	D, E2, E1	Arithmetic calculation
		Success rank distribution of enrolled students in the centralized Student Selection Exam *(min, max, mean, median)*	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Gender distribution	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		SEI graduation points *(Turkish acronym OPB) (enrolled students' academic success in SEIs*	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Weighted SEI graduation points *(Turkish acronym AOPB) (combination of students' academic success in SEIs and the success of SEIs'graduates in the central Student Selection Exam)*	d, e2 (raw)	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Preference rank 1 *(the rank that the enrolled students preferred the programs in their preference lists)*	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Preference rank 2 *(the rank that that all candidate students preferrred the programs in their preference lists)*	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Total number of times being preferred	d, e2 (raw)	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Location distribution *(do the enrolled students come from the some city or not?)*	d, e2 (raw)	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Year of graduation from SEIs	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Educational status of enrolled students *(such as: just graduated from the SEI, SEI graduate but not enrolled to university before, currently university student, university graduate...)*	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Number of special students 1 *(enrolled students who were granted support by TÜBİTAK, the National Science Institution)*	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Number of special students 2 *(number of enrolled students who had graduated from SEIs with the 1 st rank)*	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Enrollment ratio *(enrolled student / available seats)*	d, e2	ÖSYM data only shared with HEIS (yearly)	D, E2, E1	Arithmetic calculation
		Registration ratio *(registered student / placed students)*	d, e2 (raw)	ÖSYM guide for candidate students (yearly)	D, E2, E1	Arithmetic calculation
	Y → A (X → D, d) (X → E2, e2)	Type of graduated SEI *(such as vocational highschools, foreign language highschools, science highschools, ...)*	d, e2	ÖSYM data only shared with HEIs (yearly)	D, E2, E1, Y	Arithmetic calculation

Table 3. Dimension-capital regarding the Interaction between the components of Turkish HES *[Continued]*

Description (diversity with regard to)	Interaction	Dimension	Data availability: Ready	Source	To be collected/ calculated	Propoped method
Enrollment indicators (short cycle)	**X → A** (X → D, d)	Number of sudents enrolled by centralized student selection Exam vs. enrolled by direct vertical movement *(Sınavsız geçiş in Turkish)*	d, e2	ÖSYM data HEIs (yearly)	D, E2, E1	Arithmetic calculation
Enrollment indicators (graduate)	**X → A** (X → F, f)	Minimum enrolment points in the centralized Academic Graduate Education Exam *(Turkish acronym: ALES)*	-	-	F, f	Survey • *(traditional)* • *(HEI web siite*
		Inbreeding/outbreeding ratio	-	-	F, f	Survey • *(traditional)*
Alumni orientation and success	**Q → HEI** (Q → V) (Q → Z)	Success of graduates in DGS exam *(Centralized Vertical Transfer Exam)*	-	-	HEI, D, d	Mining ÖSYM's internal data
		Success of graduates in KPSS Exam *(Centralized State Officer Selection Exam)*	d, e2	ÖSYM Guide for KPPS Candidate Students (yearly)	HEI, D, E1, E2, e2, F, f, G	1. Arithmetic calc. (HEI, D, E1, E2) 2. Mining ÖSYM's internal data *(F, f, G)*
		Success of graduates in ALES exam *(Centralized State Officer Selection Exam)*	-	-	HEI, E1, E2, e2	Mining ÖSYM's internal data
	T → Q (T → Z)	Average income of graduates	-	-	HEI, D, d, E1, E2, e2, F, f, G	1. Survey • *(traditional)* 2. Mining ÖSYM's internal data
		Orientation of graduates *(State-employed, private-employed, academic-career, in Turkey, abroad,...)*	-	-		
		Status of graduates *(Managerial, operational)*	-	-		
Alumni loyalty	**Q → HEI** (T → N)	Existence and budget size of Alumni Association	-	-	HEI, D, d, E1, E2, e2, F, f, G, g	Survey • *(traditional)*
		Participation to Alumni Association	-	-		
		Level of financial support by Alumni	-	-		
External horizontal transfer	**A → V** (A → D → V) (A → E2 → V) (A → G → V)	Number of transfer students (to / from) (year of study)	- - -	- - -	HEI, D, d, E1, E2, e2, F, f	1. Survey • *(traditional)* 2. Mining ÖSYM's internal data
Working conditions for academicians	**H → B**	Average salary paid to academicians	-	-	HEI, D, d, E1, E2, e	Survey • *(traditional)* 2. Mining ÖSYM's internal data
		Socioeconomic fringe benefits *(Health insurance, social security,...)*	-	-		
		Academic incentives and premiums	-	-		
		Average weekly lecturing load	-	-		
		Average number of students per academician	HEI, D, d, E1, E2, e (raw)	YÖK HE Statistics (yearly)	HEI, D, d, E1, E2, e	Arithmetic calculation
Working conditions for staff	**H → C**	Average salary paid to staff	-	-	HEI, D, d, E1, E2, e	Survey • *(traditional)* 2. Mining HEI's internal data
		Socioeconomic fringe benefits *(Health insurance, social security, ...)*	-	-		
		Performance incentives and premiums	-	-		
		Average number of students per staff	-	-		
University-business relationship	**T → HEI** (T → J) (T → D, E2 → F)	Financial support provided by industry to R&D projects	-	-	HEI	1. Survey • *(traditional)* 2. Mining HEI's internal data
	HEI → T	Number of techno-parks	-	-	HEI	
	T → HEI (T → D, E2, F) (T → G)	Share of joint courses in the curriculum	-	-	HEI, D, d, E1, E2, e2, F, f, G, g	
	T → HEI (T → D, E2, F) (T → G)	Number of non-academic lecturers from business	-	-		
	T → HEI (T → H)	Business representation in strategic management *(board of trustees, lay groups)*	-	-	HEI, H	

Table 3. Dimension-capital regarding the Interaction between the components of Turkish HES *[Continued]*

Description (diversity with regard to)	Interaction	Dimension	Data availability: Ready	Source	To be collected/ calculated	Propoped method
Research output	**B → U** (B → D → U, T, V) (B → E1 → U, T, V) (B → F → U, T, V) (B → J → U, T, V)	Number and impact of papers published	HEI	YÖK database (yearly)	D, d, E1, E2, e2, F, f, J	1. Survey • *(traditional)*
		Number of patents received	-	-	HEI, D, d, E1, E2, e2, F, f, J	
		Number and impact of scientific awards received	-	-		
	HEI → U	Number and level of scientific journals owned	-	-	HEI, D, d, E1, E2, e2, F, f, J	2. Mining HEI's internal data
		Number and level of scientific confrences held	-	-		
		Number of master and doctoral level theses completed	-	-	F, f	
Social projects	**HEI → S**	Number and impact of societal projects	-	-	HEI	1. Survey • *(traditional)*
		Budget devoted to societal projects	-	-		2. Mining HEI's internal data
Revolving fund performance	**HEI → S, T**	Type of revolving fund activiteas	-	-	HEI, D, E1, E2, G	1. Survey • *(traditional)* 2. Mining HEI's internal data 3. Mining State Statistics Institute
		Income generated by revolving fund activities	-	-		
Support processes	**L → B** (T → Z)	Outsourcing ratio of supporting services *(Security, maintenance, ...)*	-	-	HEI, L	1. Survey • *(traditional)*
Government incentive	**z → HEI** (T → Z)	Amount of government incentive obtained *(Only for private universities)*	-	-	HEI, L	Mining YÖK's internal data

Similarly, it is worthwhile to underline that the scope and content of the model depicted in Fig. 2 may not be claimed to be perfect and/or complete, but is believed to be comprehensive enough for fostering operationalization of diversity. As described in Section two (A Proposed Research-Stream for Researching Diversity and Diversification in Higher Education Systems), "*…systems are models created only for understanding and the most fundamental property of any system is that a system has an arbitrary boundary. Humans create the boundaries to suit their own purposes of analysis, discussion and understanding. This is true of every conceptual model that was devised through which humans try to understand the universe.*"

Basing on the model in Fig. 2, Tables 2 and 3 include various dimensions which are deemed to be used for measuring the diversity in Turkish HES.

The reason to group the dimensions in two tables is that Table 2 focuses on the inherent characteristics of the components and Table 3 concentrates on the interactions between the components. Data availability information provided in these tables is detailed on the basis of sub-units of HEIs, where available.

It should be noted here that the scope and content of Tables 2 and 3, like of Fig. 2, may not be claimed to be perfect/or complete, but dynamic and expandable by further scientific elaboration. The main priority of this paper has been the versatility and the robustness of the conceptual framework rather than the extent of its content. It is evident that, if a versatile and robust model is at hand, new stakeholders may be easily plugged in the system and the dimension-set (inherent characteristics and interactions) may be enriched accordingly.

Summary and Conclusion

Considering the very obvious fact that the world has entered a phase of "knowledge economy", and nations' future welfare will highly depend on their ability to create and apply knowledge one can quite easily infer that policy issues regarding higher education systems will be at the heart of governments' agenda, so the diversity and diversification. The case of Turkish Higher

Education System will not be an exception. This paper claims to develop a basis for prospective diversity studies on Turkish HES. Another major intention of the paper is to deepen readers' insight on previous diversity research.

There are several assumptions that were stuck to throughout the paper. One major assumption is that Higher Education Systems are *complex systems*. This assumption was elaborated in line with theoretical frameworks developed by Huisman and van Vught (Huisman, 1995; van Vught, 2008) which simultaneously respect resource dependency and population ecology approaches. At last, HESs were suggested to be *complex adaptive* systems, indicating that they are complex in that they are diverse and made up of multiple interconnected elements and *adaptive* in that they have the capacity to change and learn from experience.

One major output of this paper is a six step versatile "Research Stream" which is deemed to encompass vast majority of prospective research studies. Once followed as a guideline, the stream with its modular and recursive structure, aims at delineating any typical diversity research from the very start to the final end.

One further output of the study is the conceptual framework of Turkish HES's (■ Fig. 1), encircling key components of the system with the assumption that HESs are complex adaptive systems and system analysis approach appropriately suits for analyzing them.

The final output of the paper is a comprehensive Dimension-Set for operationalization of diversity in Turkish HES. This set of dimensions, at its widest possible extents, claims to reflect inherent characteristics of components and interactions between them. Data availability and/or data generation methods for each dimension were also listed.

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