COMPARISON OF STATE AND PRIVATE UNIVERSITIES IN TURKIYE IN TERMS OF INSTRUCTION AND R&D REGARDING THE REPORTS OF THE TURKISH COUNCIL OF HIGHER EDUCATION (YÖK)

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Annotation

Turkish Council of Higher Education (YÖK) started to publish University Monitoring and Evaluation General Reports since 2019. Three reports (2019-2020-2021) have been published. Average annual data of state and private universities in Turkey are available in these reports. These reports also include data about various aspects of university education under the titles of Instruction and Research & Development (R&D). This study aims to determine pros and cons of state and private universities for Turkish and international university applicants by comparing the data averages of the 2019, 2020 and 2021 reports about the Instruction and the Research & Development (R&D) of both university types. Under the Instruction title; data about number of accredited undergraduate programs, occupancy rate of the programs, number of students participating in teknokent (technopole) or technology transfer office (TTO) projects, number of programs in the top 5% of the public servant selection exam (KPSS), number of international symposiums, congresses or artistic exhibitions, number of social responsibility projects implemented by students, number of industrial projects implemented by students and number of printed books and e-publications for each student were examined. Under the Research & Development title; data about number of publications published in national peer-reviewed journals and in SCI, SCI-Expanded, SSCI and AHCI indexed journals, number of cited publications in the top 10%, number of applied and granted patents, utility models and designs, number of R&D projects supported by national and international institutions and organizations, ratio of investment budget spent on R&D, income except for subsidy, innovation and product development income from laboratory services within the scope of R&D and number of joint projects with industry were examined. Document analysis method was used in the study as a qualitative research method. Document analysis includes the analysis of written materials containing information about the phenomenon or facts to be investigated. In the field of education: Textbooks, instructional regulations, internal and external correspondence, official documents... can be used as data source (Yıldırım and Şimşek, 2013, pp.217-218). Data averages of state and private universities were evaluated. Data differences among universities in same category were not included. The results shows that both state and private universities have pros and cons in terms of instruction and R&D, but state universities are advantageous regarding data numbers and diversity. While private universities are profit-oriented and attach importance to individual development, state universities are more collaborative and are community-oriented.

Key words: *state university, private university, universities in Turkiye, instruction, R&D.*

Introduction

University preference of candidate students is an important decision that shapes their personal and professional satisfaction. Two main types of universities preferred by candidates are state and private universities. As in the rest of the world, Turkish university candidates also take various factors into consideration when choosing a university. In this research, instructional data and R&D data of state and private universities that may affect the university selection of candidates are examined comparatively based on the reports published by Turkish Council of Higher Education (YÖK). However, Turkish higher education system structured by YÖK should be briefly introduced beforehand.

In 1981, in accordance with the new Higher Education Law (No. 2547), the administration of higher education in Turkiye became centralized after all higher education institutions tied to the Council of Higher Education (YÖK). After this restructuring, all institutions of higher education were designed as universities. Expansion of higher education throughout the country was achieved, application to higher education was centralized, and a central university exam and placement were introduced. In addition to public universities, the first nonprofit foundation university in Turkey started to provide education for students in 1986. Since then, the number of

public and private universities has continued to increase (URL-1). Types of institutions and academic units in Turkish higher education structured by YÖK are:

Faculty (College)

A division conducting higher education, scholarly research and publication. Students earn a Bachelor's degree at the end of an educational programme that lasts for at least four years.

Graduate School

An institution in universities concerned with graduate education, scholarly research and applications. Graduate schools award MA, MSc or PhD degrees.

4-Year School

An institution of higher education which is mainly concerned with providing instruction for a specific profession. It lasts for eight semesters.

Conservatory

An institution of higher education in which artists are trained for music and the performing arts. It lasts for eight semesters.

Post-Secondary Vocational School

An institution of higher education that is aimed at training human capacity in specific professions and provides instruction lasting four semesters.

Research and Application Center

An institution of higher education carrying 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 (www.studyinturkiye.gov.tr).

Turkish higher education provides six basic degrees for students: Associate's degree (short cycle): Awarded on completion of a two-year study program. Bachelor's degree (1st cycle): Awarded after the completion of a four-year course and 240 ECTS of study. Master's degree program (2nd cycle): Two-year program leading to the Master of Arts (MA) or Master of Sciences (MS). Doctoral degree program (3rd cycle): Usually an eight-semester program leading to the PhD degree. Specialization in Medicine Programs: They are equivalent to doctoral degree programs and are carried out in the faculties of medicine, university hospitals and research and training hospitals. Proficiency in Art: It is at least a six-semester post-Master's program in the visual and performing art branches making it equivalent to a Doctorate.

Council of Higher Education (YÖK) started to publish University Monitoring and Evaluation General Reports since 2019. Three reports (2019-2020-2021) have been published. To examine in more detail, the 2019 report (URL-2) and the 2020 report (URL-3) are available on the YÖK website. In the 2021 Report (URL-4), it was stated that Turkiye had total 207 higher education institutions (208 in 2022). 129 state universities, 74 private universities and 4 private higher vocational schools. These universities had total 174.494 academicians (78.687 female, 95.807 male). 147,853 of these academicians at state universities, 26.321 at private universities and 320 at private vocational schools. 3.740.332 formal education students attended to higher education. 3,124,705 of the students attended to state universities, 604,066 to private universities and 11,561 to private higher vocational schools.

Instructional, fiscal and social regulations and implementations of state and private universities attracts the attention of many applicant students and researchers. Approximately 60.000 articles are available only in Turkiye related to both types of universities (URL-5). In his study, Akar (2012, p.114) states that academic reputation, university location and instructional resources are the most important factors for students to determine university to attend. Çatı, İştar and Özcan (2016, p.163) express that academic prestige, instructional opportunities, campus and sociability are found to be the four main factors that affect students' university preference. Heathcote, Savage and Hosseinian-Far (2020, p.16), point out in their study conducted in UK that entry tariff, location, reputation and perception of quality are some of the factors that affect university choice. Nietzel (2021) showed that 19 of USA universities, which take important place in the first 50 of world university rankings, expended the highest R&D budget. Contribution to future career, education quality, popularity, multiculturalism, quality and tuition are important factors to choose a university. Ilgan, Ataman, Uğurlu, and Yurdunkulu (2018); Wiese, Van Heerden, and Jordaan (2010); McDuff (2007).

Objectives

The studies above show that students search and consider many factors when choosing a university. Naturally, instruction and R&D opportunities are significant factors for students during university selection. University applicants, who have opportunity to choose both public and private universities, have difficulties in evaluating the pros and cons of these universities in terms of Instruction and R&D. Studies reveal that students who will choose a university have difficulty in making decisions due to some background reasons such as professional indecision, financial income, cultural capital and habitus, and sometimes they cannot make the right choice (Özgüven, 2011; Yelken, 2008; Özcan, 2016; Hu and Hossler, 2000). Özcan (2016, p. 17)

states that “There are hardly any comprehensive studies on university preferences in Turkey. The studies carried out remained at the local level.” In short, university applicants have problems and challenges related university selection and need informative sources for the right choice. In this case, how can university candidates obtain informative and simplified sources when choosing a university?

This study aims to determine pros and cons of state and private universities in Turkiye by comparing the data averages from the 2019, 2020 and 2021 University Monitoring and Evaluation General Reports about the Instruction and the Research & Development (R&D) of both university types. Thus, this study contributes Turkish and international university candidates with informative and simplified data to guide their university selection.

Methodology and Data

Document analysis method is used in the study as a qualitative research method. Document analysis includes the analysis of written materials containing information about the phenomenon or facts to be investigated. In the field of education: Textbooks, instructional regulations, internal and external correspondence, official documents... can be used as data source (Yıldırım and Şimşek, 2013, pp.217-218).

In the study, the data of the reports about number of accredited undergraduate programs, occupancy rate of the programs, number of students participating in teknokent (technopole) or technology transfer office (TTO) projects, number of programs in the top 5% of the public servant selection exam (KPSS), number of international symposiums, congresses or artistic exhibitions, number of social responsibility projects implemented by students, number of industrial projects implemented by students and number of printed books and e-publications for each student were examined and compared under the Instruction title.

Also, the data of the reports about number of publications published in national peer-reviewed journals and in SCI, SCI-Expanded, SSCI and AHCI indexed journals, number of cited publications in the top 10%, number of applied and granted patents, utility models and designs, number of R&D projects supported by national and international institutions and organizations, ratio of investment budget spent on R&D, income except for subsidy, innovation and product development income from laboratory services within the scope of R&D and number of joint projects with industry were examined and compared under the R&D title.

Instruction

Instruction is a planned set of activities that answers the question of “how” to achieve the curriculum objectives. It comprehends course content, teaching methods and techniques, and the implementation of teaching plans (Korkmaz, 2014, p.8). An effective instruction with proficient academicians effects university reputation and perception of quality positively. Some data averages from 2019, 2020 and 2021 university monitoring and evaluation general reports of the Turkish Council of Higher Education related instructional activities of universities are examined below:

Number of accredited undergraduate programs

Accredited undergraduate program numbers are important for universities because they might be seen as a basis to indicate student numbers and instructional diversity.

Table 1.

Number of accredited undergraduate programs

	State Uni.	Private Uni.	General
Accredited university number	51	24	75
Accredited program number	395	169	564
Accredited program number average	7.76	6.78	7.43

As it is seen in the Table 1, state and private universities have the average of accredited programs at similar rates. This shows that increase in the number of students and diversity of the programs are demanded from both types of universities and supported by the Turkish Council of Higher Education (YÖK). Higher education diversity is consistent with the economic conception of innovation, and thereby better relating academic diversity to theories of market structure and to the social benefits of efficiency, and responsiveness to public need. (Dill and Teixeira, 2000, p. 115).

Occupancy rate of the programs

Occupancy rate of the programs is important for universities because it might show the effectiveness of existing programs, student interest and student numbers.

Table 2.

Occupancy rate of the programs

	State Uni.	Private Uni.	General
Occupancy rate average of programs	91.0	83.1	87.0

As it is seen in the Table 2, state universities have a significant difference and high occupancy rate. This shows that programs of state universities are demanded by more students. Three reasons can be suggested for this situation: 1) Participation to state university programs is free of charge in general or some state universities ask for low enrollment fee and these foster students to attend state universities. 2) Existing programs of some private universities are not considered sufficient for post-graduation demands of students. 3) State universities have effective existing programs that fostering students to participate in. "Reference groups, families, reputation and attributes of universities, personal factors, location, job prospects, university fees, financial aid/scholarship, and information sources are important factors when a candidate is selecting a university" (Aydın, 2015, p.109).

Regarding the Table 2, private universities have lower occupancy rate than state universities. But 83.1% occupancy rate can not be accepted as ineffectiveness. Starting innovative and job-guaranteed programs, as well as increasing scholarship opportunities can increase the occupancy rate of private universities.

Number of students participating in teknokent (technopole) or technology transfer office (TTO) projects

Teknokents and technology transfer offices are prestigious for a university and attracts students. Also, they show that a university attaches importance to practical, up-to-date and innovative education.

Table 3.

Number of students participating in teknokent (technopole) or technology transfer office (TTO) projects

	State Uni.	Private Uni.	General
Project participant university numbers	64	32	96
Project participant student numbers	14845	3472	18317
Average of project participant student n.	228	109	168

As it is seen in the Table 3, state universities have a significant difference and high participation rate. This indicates that technokents and TTO projects are more constructed, encouraged and applied by state universities. Governmental subsidies and procedural conveniences in cooperation may increase participation numbers of state universities. Even assuming that financial resources of some private universities are limited, it would be useful for them to reduce procedural steps and participate joint projects with state universities. They may also claim to use existing facilities of state universities. "TTO is often able to benefit from its capacity to pool inventions across research units within universities and to build a reputation for honesty" (Macho-Stadler, Pérez-Castrillo and Veugelers, 2006, p.502).

Number of programs in the top 5% of the public servant selection exam (KPSS)

KPPS is a country-wide examination to select public servants who are going to work under governmental bodies and rules. The prestige, salary and social opportunities of working in a government institution are influential factors for many fresh graduates to apply this exam. High ranked universities and programs regarding appointment numbers of this exam are accepted as qualified and demanded by university applicants.

Table 4.

Number of programs in the top 5% of the public servant selection exam (KPSS)

	State Uni.	Private Uni.	General
Number of universities including programs in the top 5%	84	9	93
Number of programs in the top 5%	483	22	505
Average program numbers in the top 5%	5	2	3

* The data obtained from 2020 and 2021 reports. This data was not included in the 2019 report.

As it is seen in the Table 4, state universities have a significant difference and high appointment numbers in the top 5% of the public servant selection exam (KPSS). This shows that state universities can be accepted more successful by university applicants. They can be also accepted to enable higher employment opportunity. Increasing instructional program diversity and advertising high employment rate of graduates may increase applicants' interest to attend private universities. Regarding Aytunga states below; academic self-efficacy effects the success in KPSS exam and a top-ranked university in KPSS effects self-efficacy positively. "According to these findings, it can be said that the academic self-efficacy beliefs of the primary school teacher candidates are related to their expectations of being a teacher by attending the KPSS and having a good score" (Aytunga, 2012, p.23).

Number of international symposiums, congresses or artistic exhibitions

International symposiums, congresses or artistic exhibitions are indicators of internalization, academic recognition, multicultural education and institutional and intellectual accumulation of knowledge. These increase quality, prestige and recognition of the university.

Table 5.

Number of international symposiums, congresses or artistic exhibitions

	State Uni.	Private Uni.	General
Number of universities that organize international events	106	54	160
Number of organized international events	2028	716	2744
Average of organized international events	19	13	16

As it is seen in the Table 5, state and private universities have the average of organized international events at similar rates. This means that internalization, academic recognition, multicultural education and institutional and intellectual accumulation of knowledge are given importance in both type of universities.

Number of social responsibility projects implemented by students

Social responsibility projects prepare students to their profession and enhance their cultural capital. They increase students' sense of belonging to their university and society. Thus, they contribute to formation of university culture. Also, these projects improve inter-institutional relations.

Table 6.

Number of social responsibility projects implemented by students

	State Uni.	Private Uni.	General
Number of universities where social responsibility projects implemented by students	98	58	156
Number of social responsibility projects implemented by students	4844	1799	6643
Average number of social responsibility projects implemented by students	49	30	39

As it is seen in the Table 6, state universities have a significant difference and high social responsibility numbers implemented by students. This shows that state universities give students more opportunities to socialize and prepares them for their profession. In addition, their inter-institutional relations are stronger. It may be beneficial for private universities to encourage social projects and support their students to attend these projects. "The integration of social responsibility into education is a daunting–and rewarding–task of assisting students in understanding diverse values and gaining action skills" (Cetindamar and Hopkins, 2008, p. 409).

Number of industrial projects implemented by students

Industrial projects are important for students because they prepare students to their profession and enable them to start a job easier than unexperienced applicants. These projects also contribute to university prestige and inter-institutional relations.

Table 7.

Number of industrial projects implemented by students

	State Uni.	Private Uni.	General
Number of universities where industrial projects implemented by students	89	34	123
Number of industrial projects implemented by students	4159	1210	5369
Average number of industrial projects implemented by students	49	26	37

As it is seen in the Table 7, state universities have a significant difference and high social responsibility project numbers implemented by students. This shows that state universities enable students to be ready for a job than private universities. In addition, their inter-institutional relations are stronger. It can be prestigious for private universities to attempt more industrial projects and support their students to attend these projects. It also creates industrial reliability and sustainability. "...advantages for students were identified, namely the opportunity to work in an industrial environment, gain experience, apply technical competences, develop teamwork capabilities, project management, critical thinking, problem-solving and communication skills. The university might gain industrial recognition while supervisors gain more practical experience, and access to case studies to show in classes" (Alves et al., 2014, p.56,8).

Number of printed books and e-publications for each student

Printed books and e-publication numbers for each student mean easy access to information and improvement of research skills. Instructional materials are supportive for an effective and permanent learning. Printed books and e-publications contribute to individual and academic development, so they are important in students' university choices. They also demonstrate the importance given by universities to the academic development of students

Table 8.

Number of printed books and e-publications for each student

	State Uni.	Private Uni.	General
Average number printed books for each student	6.5	8.9	7.7
Average number e-publications for each student	56.5	144.4	100.4

As it is seen in the Table 8, private universities have a significant difference and high numbers of printed books and e-publications for each student. The large number of students in state universities may be one of the reasons for this situation. This also shows that private universities give more importance to material richness for academic development of students. They also support individual development of students more than state universities. It would be useful for state universities to increase book and e-publication numbers for students. They can cooperate with private universities to use existing facilities of these universities. "Good textbooks serve to turn the guidelines in the official government syllabus into a rich source of content, texts, and activities that would be beyond the capacities of most teachers to develop on their own" (Richards, 2001, p.6).

RESEARCH AND DEVELOPMENT (R&D)

Research and development data could be examined under the title of instruction. However, R&D activities may show differences from typical instruction activities, so they were examined under a new title. R&D applications may have unique methods. They do not need to be implemented in an educational institution. R&D requires knowledge but its purpose may differ from educational achievements. R&D activities are result and product oriented. Instruction and R&D activities are interdependent to each other, yet R&D is a creation process, not instruction focused activity. R&D is the process where theory turns into practice and what is intended becomes reality. Guellec and Potterie (2004, pp.2-4), define R&D as major source of technical change and new technology. However, they do not accept only R&D as major source, also other activities, such as education and learning by doing are important sources for of productivity growth.

Some data averages from the 2019, 2020 and 2021 university monitoring and evaluation general reports of the Turkish Council of Higher Education related R&D activities of universities are examined below:

Number of publications in national peer-reviewed journals and in SCI, SCI-Expanded, SSCI and AHCI indexed journals

National and international publication numbers of a university indicates that the university has strong international relations, contributes to science world and hosts qualified academicians that using scientific methods. The 2021 report states that total 38,225 national and 76,669 international publications have been published in 2020-2021 academic year in Turkey.

Table 9.

Number of publications in national peer-reviewed journals and in SCI, SCI-Expanded, SSCI and AHCI indexed journals

	State Uni.	Private Uni.	General
Publication numbers in national journals per university	171	50	221
Publication numbers in national journals per academician	0.33	0.20	0.26
Publication numbers in international journals per university	460	150	305
Publication numbers in international journals per academician	0.35	0.35	0.35

As it is seen in the Table 9, both types of universities have more publications in international journals than national ones. This shows that both have strong international relations and recognition. Also, it can be said that academicians both type of universities want to be internationally recognized and want to contribute the world science. Regarding the national journals, state universities have more publications than private universities. Given reasons below may lead to this finding; private university academicians find international publications more prestigious, state universities have more academicians, and state universities have more publishment equipment and journals in total. It would be useful for private universities to increase publishment equipment and national journal numbers. Statements below supports the findings: “This situation has a negative impact on the quality of the journal over time because it is difficult for journals that are not scanned by important indexes to receive qualified studies. Especially in our country, this situation has become very evident. Because, in academic promotions, publications are required especially in journals that are within the scope of certain international indexes” (Asan, 2017, p.34).

Number of cited publications in the top 10%

The report states that number of cited publications in the top 10% includes the data of 2016-2020 years from the Web of Science. A large number of citations (references) can show that the study attracts national and international interest and is considered scientifically important. Also, it is prestigious for writer and his/her institution.

Table 10.

Number of cited publications in the top 10%

	State Uni.	Private Uni.	General
Number of universities cited in the top 10%	116	58	174
Number of publications cited in the top 10%	16914	4277	21191
Average number of publications cited in the top 10%	144	72	108

As it is seen in the Table 10, state universities have a significant difference and high cited publications numbers in the top 10%. This may be the result of public universities’ having more programs and educational diversity. It would be useful for private universities to promote academic staff to publish more articles in international journals and to increase educational diversity. “Within the sample, the most highly rated attributes are quality and reputation of journal and fit with the scope of the journal; open access is the least important attribute. Researchers at other research-intensive institutions are considered the most important audience, while the general public is the least important" (Tenopir et al., 2016, p.1).

Number of applied and granted patents, utility models and designs

Patents, utility models and designs are important indicators of R&D effectiveness. These can demonstrate that a university is innovative, open to development and has diversity in income sources. In addition, it can be said that academicians are qualified in their speciality.

Table 11.

Number of applied and granted patents, utility models and designs

	State Uni.	Private Uni.	General
Applied patent, utility model and design numbers	1240	567	1807
Average numbers of applied patents, utility models and designs	13.2	14.3	13.7
Granted patent, utility model and design numbers	479	222	701
Average numbers of granted patents, utility models and designs	6.9	7.1	7

As it is seen in the Table 11, state and private universities have similar average numbers (private universities are partially ahead) of granted patents, utility models and designs. Approximately 3/1 of applied patents, utility models and designs were granted. This means that innovation and production are important in both type of universities. Besides, both support to increase and diversify income sources. “Furthermore, we show that past successes in the production of innovation(patents) increases the efficiency of the R&D-innovation relationship” (Crépon and Duguet, 1997, p.262).

Number of R&D projects supported by national and international institutions and organizations

R&D projects contributes to universities in terms of trained staff, income increase, prestige, equipment acquisition, development of scientific methods, national and international cooperation. Most of the universities with the highest success rankings are the ones that invest huge amounts to R&D activities. Results of R&D activities do not affect only the university but also the home country and even the rest of the world. R&D projects do not only bring income to the university, they also provide income to financial supporters with their outcomes.

Table 12.

Number of R&D projects supported by national and international institutions and organizations

	State Uni.	Private Uni.	General
Supported R&D projects numbers	6173	1542	7715
Average numbers supported R&D projects	56	29	42

As it is seen in the Table 12, state universities have a significant difference and high numbers of supported R&D projects. This may show that state universities encourage their academic staff more for R&D projects and have a wider network for R&D support. In general, high numbers of R&D projects can get state universities into more advantageous in terms of trained staff, income increase, prestige, equipment acquisition, development of scientific methods, national and international cooperation. It would be useful for private universities to encourage their academic staff more for R&D projects and to cooperate with other private or state universities on R&D projects. Green used this statement after his study on R&D projects: “Termination was more likely for big investment projects and for projects that were not advocated by business sources, i.e., originating solely from within R&D” (Green, 1995, p.229).

Ratio of investment budget spent on R&D

Investment budget for R&D shows the significance of R&D projects for a university. R&D investment ratio may indicate that there will be an increase in the long-term income sources of the university which will contribute to the further development of the university. Increased number of R&D projects means increased income, prestige, qualified academicians and an innovative development.

Table 13.

Ratio of investment budget spent on R&D

	State Uni.	Private Uni.	General
Median value of budget ratio spent on R&D (%)	1.42	1.51	1.47
Average budget ratio spent on R&D (%)	4.05	2.94	3.40

*The median value data obtained from the 2021 report. This data was not included in the 2019 and 2020 reports.

As it is seen in the Table 13, state and private universities have approximate values in terms of R&D expenditures. Regarding the median value, private universities spent more

investment budget for R&D projects than state universities. However, average budget ratio shows that state universities spent more investment budget for R&D projects than private universities. The budget imbalance and income disparity among private universities make it difficult to interpret the results. In this case, it can be assumed that some private universities spend a high budget on R&D, while others spend a low ratio. In this study, average numbers of data are evaluated, so it can be said that both state and private universities spend a small percentage of their budget on R&D. In general, it is a contradiction for universities giving importance R&D projects and implementing many projects to spend such a small percentage of budget for R&D. It would be beneficial for state and private universities to increase the R&D budget ratio to implement more and qualified projects. Given statements supports the findings: "Particularly, findings indicate that economic conditions and university location affect outputs. Exogenous factors outside universities' control affect how universities create and disseminate knowledge transfer activities, and consequently determine their level of interaction with firms" (Berbegal-Mirabent, García and Ribeiro-Soriano, 2015, p.1413).

Income except for subsidy

In this section, the average ratio of universities' total revenues such as consultancy, projects, research, revolving funds and other funds, to their annual budgets were examined. Governmental subsidies were excluded. Income without governmental subsidies may show that a university conducts more R&D activities and the rate of income from R&D projects is high.

Table 14.

Income except for subsidy

	State Uni.	Private Uni.	General
Median value of income ratio except for subsidy (%)	5.48	6.43	6.00
Average value of income ratio except for subsidy (%)	7.88	11.06	9.47

*The median value of income except for subsidy data obtained from the 2021 report. This data was not included in the 2019 and 2020 reports.

As it is seen in the Table 14, private universities have higher average income ratio except for subsidy. This may show that private universities have more income diversity than public universities. It is possible that one of these income sources is R&D incomes. Also, private universities may have conducted more profit-oriented and value-added R&D projects. It may not be convenient to make a definite interpretation without certainty of the ratio of other income sources such as funds. The result of a study in Spain partly support these findings: "More traditional sectors, such as Industrial Design and Production, receive high support through subsidies, and new technologies (Biomedicine and ICTs) are selectively supported using credits. Similarly, other technology intensive areas (Materials, Chemicals, Agro-foods, Energy) receive low support through subsidies" (Santamaría, Barge-Gil and Modrego, 2010, p.561).

Innovation and product development income from laboratory services within the scope of R&D

Income ratio from laboratory services related innovation and product development is an important indicator in the success of R&D. It shows that there is an effective R&D infrastructure, qualified staff. It can be assumed that the university have a strong in national and international relations. Also, it shows that R&D as an active income source.

Table 15.

Innovation and product development income from laboratory services within the scope of R&D

	State Uni.	Private Uni.	General
Income from laboratory services within the scope of R&D (Million Turkish Lira)	91.86	9.21	101.07
Median value of income from laboratory services within the scope of R&D (Thousand Turkish Lira)	202	269	202

*The median value of income except for subsidy data obtained from the 2021 report. This data was not included in the 2019 and 2020 reports.

*The income data obtained from 2020 and 2021 reports. This data was not included in the 2019 report.

As it is seen in Table 15, state universities have more income from laboratory services on innovation and product development within the scope of R&D in general, but the median value shows that private universities gain more income per service. This shows that private

universities provide more profit-oriented services. This may be a result of using modern, value-added and rare equipment that provide more income. Also, state universities may be providing low-cost services to more partner institutions. In short, high incomes obtained from laboratory services indicate that both university types have strong R&D infrastructure and they attach importance to innovation.

Number of joint projects with industry

In the 2021 report, data about the number of joint projects with industry like productivity improvement, product development, innovation included. The number of joint projects with industry is an important indicator of R&D effectiveness. Number of joint projects with industry may show that the university has industry experienced staff and students, academic and industrial recognition, prestige, R&D equipment, national-international cooperation and regular income.

Table 16.

Number of joint projects with industry

	State Uni.	Private Uni.	General
Number of joint projects with industry	3993	793	4786
Average number of joint projects with industry	59	19	39

As it is seen in Table 16, state universities have a significant difference and high numbers of joint projects with industry. This may show that state universities have more industry experienced staff and students, academic and industrial recognition, prestige, R&D equipment, national-international cooperation and earning potential. It would be useful for private universities to encourage their academic staff and students for more joint projects with industry. “In fact, academic research actually drives business by providing new scientific discoveries and advanced technologies that accelerate innovation. Many firms therefore see universities as ideal partners to outsource their R&D activities and remain competitive. In return, university–industry R&D partnerships represent a valuable source of additional funding for university research” (Berbegal-Mirabent, García and Ribeiro-Soriano, 2015, p.1412).

Conclusion

Regarding the Instruction and R&D, both state and private universities have pros and cons. It should be stated that data average of state and private university was evaluated in this study. Data differences among universities in same category were not included. For example, 3 private universities and 8 state universities, which are regularly in the top 1000 of world university rankings, were not evaluated separately from other universities. The data averages of all universities in the same category were evaluated.

Regarding the Instruction:

1-Both state and private universities aim to have more accredited program and more students. Student occupancy rates of state university programs are higher than private universities. Free or low enrolment charge of state universities can be the main determinant for this data.

2-Student numbers participating in teknokent (technopole) or technology transfer office (TTO) projects are higher in state universities. Public universities would be promoting these projects and would have extensive cooperation opportunities.

3-State university graduated have higher appointment numbers in the top 5% of the public servant selection exam (KPSS). This shows that state universities can be accepted more prestigious by university applicants.

4-State and private universities have the average of organized international events at similar rates. Internalization, academic recognition, multicultural education and institutional and intellectual accumulation of knowledge are given importance in both type of universities.

5-State university students attend social responsibility projects more than private university students. State universities provides more opportunities for students to socialize and prepares them for their profession.

6-State university students implement more industrial projects than private university students. State university students have more opportunities to have experience on their profession before graduation, so can find a job easier by having work experience.

7-Private universities provide more printed books and e-publications for each student. Private universities give more importance to written material richness and individual academic development of students.

Regarding the R&D:

8-Academicians of both state and private universities have more publications in international journals than national ones. This shows that academicians want to be internationally recognized and want to contribute the world science.

9-Academicians of state universities have higher citation numbers in the top 10%. This may be the result of public universities' having more programs and educational diversity.

10-State and private universities have same average numbers of granted patents, utility models and designs. This indicates that innovation and production are important in both type of universities.

11-State universities have more R&D projects supported by national and international institutions and organizations. This may be a result of strong national and international cooperation.

12- Both private and universities give importance to R&D projects and implement many projects but they allocate small percentage of their budget for R&D. This creates a contradictory situation. The quality of R&D projects should be increased as much as their quantity.

13-Private universities have higher average income ratio except for governmental subsidies. They may be conducting more profit-oriented R&D projects.

14-Innovation and product development income from laboratory services within the scope of R&D is higher in private universities. This may show that private universities provide more profit-oriented services as a result of using modern and rare equipment that provide more income. Also, state universities would be prioritizing to provide low-cost services to more partner institutions.

15-State universities have more joint projects with industry. This brings advantages to state universities in terms of more industry experienced staff and students, academic and industrial recognition, prestige, R&D equipment, national-international cooperation and earning potential.

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