2020-2021

Key Performance Indicators (KPIs) Report

Master of Data Science Program

2020-2021

Kingdom of Saudi Arabia Ministry of Education Princess Sattam bin Abdulaziz University College of Computer Engineering and Sciences (056)		المملكة العربية السعودية وزارة التعليم جامعة الأمير سطام بن عبد العزيز كلية هندسة وعلوم الحاسب (056)

Prince Sattam bin Abdulaziz University

College of Computer Engineering and Sciences

Key Performance Indicators (KPIs) Report

Data Science Master Program

Academic year: 2020-2021

I-Key Performance Indicators (KPIs) Report for Data Science Master Program Academic year: 2020-2021

1-Introduction

1.1-Measurement and evaluation processes are one of the important mechanisms that indicate the program's achievement of quality assurance standards. Therefore, the current report aims to describe the results of the 19 key performance indicators for the Master's Program in Data Science for the year 2020-2021, which include the 19 main key performance indicators identified by the NCAAA. The program key performance indicators include a number of qualitative indicators that depended on the results of opinion polls for the beneficiaries of the program in addition to quantitative indicators based on statistics. The current report provides a logical analysis of the results and data achieved by examining the various and relevant data and comparing them with reference points. The internal and external identification of areas of strength and weakness, and disclosure of the reasons behind the achieved results. The report also includes the program's development plans to address weaknesses, which the results indicated did not achieve the target levels.

1.2- Internal benchmarks: The Data Science master program has taken its own performance for the past year as an internal benchmark, since the academic year 2020-2021 is the first year of the program, the internal benchmarking is not available for this year.

1.3- External benchmarking: Executive master program of data science of other universities in KSA, the data for the academic year 2020-2021 is not available for the external program.

1.4- Check performance indicators: The results of measuring the main key performance indicators for the year 2020-2021 showed that almost all of these indicators achieved the targeted levels.

2-List of Program Performance Indicators

Standard	KPIs Code	Key Performance Indicators
Standard 1: MISSION AND GOALS	KPI-PG-1	Percentage of achieved indicators of the program operational plan objectives
Standard 3: TEACHING AND LEARNING	KPI-PG-2	Students' Evaluation of quality of learning experience in the program
	KPI- PG-3	Students' evaluation of the quality of the courses
	KPI- PG-4	Students' evaluation of the quality of scientific supervision
	KPI- PG-5	Average time for students’ graduation
	KPI- PG-6	Rate of students dropping out of the program
	KPI- PG-7	Graduates’ employability
	KPI- PG-8	Employers' evaluation of the program graduates’ competency
Standard 4: STUDENTS	KPI-PG-9	Students' satisfaction with the provided services
Standard 5- FACULTY MEMBERS	KPI-PG-10	Ratio of students to faculty members
	KPI-PG-11	Percentage of faculty members’ distribution based on academic ranking
	KPI-PG-12	Proportion of faculty members leaving the program
Standard 6- Learning Resources, Facilities, and Equipment	KPI-PG-13	Satisfaction of beneficiaries with learning resources
	KPI-PG-14	Satisfaction of beneficiaries with research facilities and equipment

Standard 7- RESEARCH AND PROJECTS	KPI-PG-15	Percentage of publications of faculty members
	KPI-PG-16	Rate of published research per faculty member
	KPI-PG-17	Citations rate in refereed journals per faculty member
	KPI-PG-18	Percentage of students' publication
	KPI-PG-19	Number of patents, innovative products, and awards of excellence

3- A summary of the indicators that achieved the target

Standard	number of performance indicators	The number of performance indicators that have achieved the target
Standard 1: MISSION AND GOALS	1	0
Standard 3: TEACHING AND LEARNING	7	6
Standard 4: STUDENTS	1	1
Standard 5- FACULTY MEMBERS	3	0
Standard 6- Learning Resources, Facilities, and Equipment	2	0
Standard 7- RESEARCH AND PROJECTS	5	5
Total	19	12

4- Presentation of the results of the performance indicators of the program

Code	Key Performance Indicators	Actual Benchmark	Target Benchmark	Internal Benchmark	External Benchmark	New Target Benchmark
KPI-PG-1	Percentage of achieved indicators of the program	75%	95%	70%	NA	95%

	operational plan objectives					
KPI-PG-2	Students' Evaluation of quality of learning experience in the program	4	3.75	4	NA	4
KPI-PG-3	Students' evaluation of the quality of the courses	4.45	3.75	4.5	NA	3.75
KPI-PG-4	Students' evaluation of the quality of scientific supervision	4.1	4.5	4.1	NA	4.5
KPI-PG-5	Average time for students' graduation	4	4	4	NA	4
KPI-PG-6	Rate of students dropping out of the program	0%	0%	15.3%	NA	0%
KPI-PG-7	Graduates' employability	73%	90%	73%	NA	90%
KPI-PG-8	Employers' evaluation of the program graduates' competency	4.9	3.75	4.9	NA	4.5
KPI-PG-9	Students' satisfaction with the provided services	4	4	4	NA	4
KPI-PG-10	Ratio of students to	1.3:1	1:1	1.5:1	NA	1:1

	faculty members					
KPI-PG-11	Percentage of faculty members' distribution based on academic ranking	Prof: 0% Assoc.: 20% Assist: 80% Male: 60% Female: 40%	Prof: 22.9% Assoc.: 43.8% Assist: 33.3% Male: 66.7% Female: 33.3%	Prof: 0% Assoc.: 28.5% Assist: 71% Male: 71.4% Female: 28.5%	NA	Prof: 22.9% Assoc.: 43.8% Assist: 33.3% Male: 50% Female: 50%
KPI-PG-12	Proportion of faculty members leaving the program	28.6%	0%	28.6%	NA	0%
KPI-PG-13	Satisfaction of beneficiaries with learning resources	2.3	3.75	2.3	NA	3.75
KPI-PG-14	Satisfaction of beneficiaries with research facilities and equipment	3	3.75	3	NA	4
KPI-PG-15	Percentage of publications of faculty members	100%	75%	100%	NA	95%
KPI-PG-16	Rate of published research per faculty member	5:1	2:1	1.4:1	NA	3:1

KPI-PG-17	Citations rate in refereed journals per faculty member	20:1	25:1	19.5:1	NA	25:1
KPI-PG-18	Percentage of students' publication	45.4%	10%	45%	NA	50%
KPI-PG-19	Number of patents, innovative products, and awards of excellence	1	1	0	NA	1

5-Analyze the results of each indicator

Standard 1: Mission and Goals

Table1: KPI-PG-1: Percentage of achieved indicators of the program operational plan objectives.

NCAAA KPI Reference Number: KPI-PG-1: Percentage of achieved indicators of the program operational plan objectives				
Data Science Master Program KPI Reference Number: KPI-PG-1				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
75%	95%	70%	NA	95%

-KPI Analysis of Percentage of achieved indicators of Data Science Master Program operational plan objectives

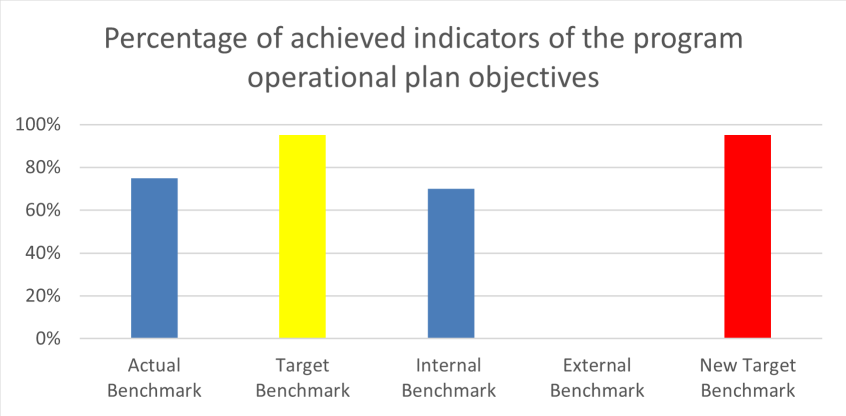

Figure 1: Percentage of achieved indicators of the program operational plan objectives.

Analysis (strengths and recommendations): The above table indicates the achievement and implementation of program operational plan objectives for the year 2020-2021. The Data Science master program at PSAU University selected 19 KPIs in order to measure the objectives of the program and follow up the operational plan implementation annually. As per the recommendations of NCAAA, this is a newly introduced KPI during the academic year 2020-2021. The Data Science Master Program starts 2020-2021 therefore data was not available before this year and hence, the achievement of performance indicators was not measured. Although it was concluded in 2020-2021, the KPI indicated progress and achieved an average value of 75%. Therefore, it is important to concentrate on the fact that the evaluation of the department of information system's operational plan objectives is lower than the target benchmark. But, the actual benchmark is better than the internal benchmark (2019-2020).

Strengths:

• A clear mission and the involvement of the faculty members and students.

• Students' satisfaction over the courses offered the facilities and services available to them.

• Program advisory committees evaluate the program and recommend updates in order to measure the extent of the performance in accordance with the strategic plan.

Recommendations:

• The involvement of the program alumni with the job market should be encouraged.

• Actual performance should be improved based on the suggested improvement plans.

*Explanation:

1. Name of the internal benchmark provider:The program has taken its own performance for the past year as an internal benchmark.

2. Why was this internal benchmark provider chosen? As it is the only Data science Master program at PSAU University, the program has taken the average of its own performance indicators during the last year (2019-2020).

1. How was the benchmark calculated?

Percentage of performance indicators of the operational plan objectives of the program that have achieved the targeted annual level to the total number of indicators targeted for these objectives in the same year.

**Explanation:

No external Benchmark

Standard 3: TEACHING AND LEARNING

Table2: KPI-PG-2: Students' evaluation of quality of learning experience in the program.

NCAAA KPI Reference Number: KPI-PG-2: Students' Evaluation of quality of learning experience in the program				
Data Science Master Program KPI Reference Number: KPI-PG-2				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
4	3.75	NA	NA	4

1-KPI Analysis of Students' Evaluation of quality of learning experience in the program

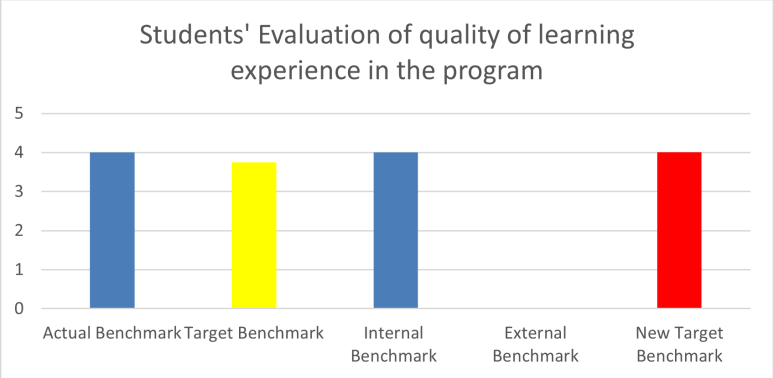

Figure 2: Students' Evaluation of quality of learning experience in the program.

2-Analysis (strengths and recommendations): The actual benchmark exceeds the target benchmark this academic year 2020-2021 that is the second year of the program. The actual benchmark is equal to the internal benchmark. This benchmark has been measured through the program evaluation survey. No external benchmark.

-Strengths:

The students' response regarding this indicator is satisfactory.

• The availability of teachers and advisors for guidance.

• The program has developed the ability of the students to work effectively within groups.

• The program has improved the communication skills of the students.

• -Recommendations:

The program should improve the facilities like classrooms, laboratories, library etc.

*Explanation:

Name of the internal benchmark provider: The program has taken its own performance for the past year as an internal benchmark. In the academic year 2019-2020, this KPI cannot be measured. The measurement time of this KPI should be at the end of the final year of graduation through the program evaluation survey. Therefore, the internal benchmark of this KPI is not available for this academic year. It will be available through the next academic year 2021-2022.

The program has taken the average of its own performance indicators during the past year (2019-2020) as an internal benchmark.

1. How was the benchmark calculated?

Average overall rating of final year students for the quality of learning experience in the program on a five-point scale in an annual survey.

**Explanation:

No external Benchmark

Table3: KPI-PG-3: Students' evaluation of the quality of the courses.

NCAAA KPI Reference Number: KPI-PG-3: Students' evaluation of the quality of the courses				
Data Science Master Program KPI Reference Number: KPI-PG-3				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
4.45	3.75	4.5	NA	3.75

1-KPI Analysis of Students' evaluation of the quality of the courses

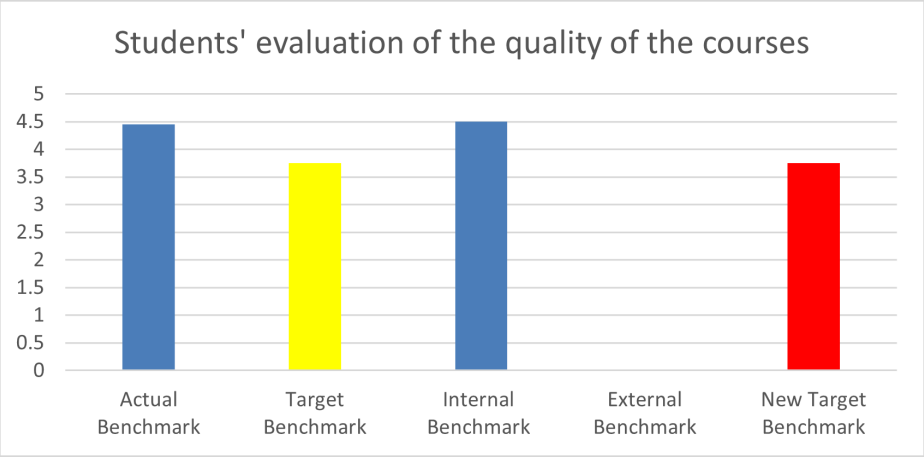

Figure 3: Students' evaluation of the quality of the courses.

2-Analysis (strengths and recommendations): Based on the table above the actual benchmark exceeds the target bench mark in the second academic year of the program and almost equal to the internal benchmark . No external benchmark.

-Strengths:

• Registration procedures for courses are easy and efficient.

• Motivation offered by the program to students for better learning.

-Recommendations:

• The master program of Data science can develop new techniques in courses, these techniques will help to satisfy the course quality.

*Explanation:

Name of the internal benchmark provider: The program has taken the average of its own performance indicators during the past year (2019-2020) as an internal benchmark.

1. How was the benchmark calculated?

Average students' overall rating of the quality of courses on a five- point scale in an annual survey.

**Explanation:

No external Benchmark

Table4: KPI-PG-4: Students' evaluation of the quality of scientific supervision.

NCAAA KPI Reference Number: KPI-PG-4: Students' evaluation of the quality of scientific supervision				
Data Science Master Program KPI Reference Number: KPI-PG-4				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
4.1	4	NA	NA	4

1-KPI Analysis of Students' evaluation of the quality of scientific supervision

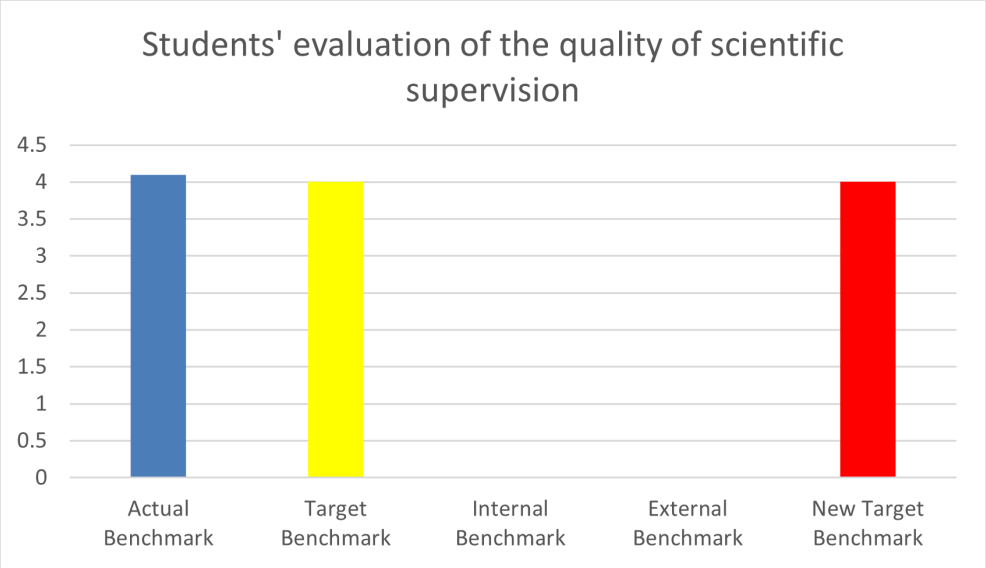

Figure 4: Students' evaluation of the quality of scientific supervision.

2-Analysis (strengths and recommendations): The actual benchmark slightly exceeds the target benchmark in the second academic year of the program and this benchmark should be measured at the graduation date. No external benchmark.

- Strengths: supervisors of research have done brilliant jobs with students. In terms of research, the capstone projects have been well supervised.

- Recommendations: Recruit more assistant professors, associate professors and professors with high experience and high quality.

*Explanation:

Name of the internal benchmark provider: The program has taken its own performance for the past year as an internal benchmark. In the academic year 2019-2020, this KPI cannot be measured. The measurement time of this KPI should be at the end of the final year of graduation through the quality of scientific supervision survey. Therefore, the internal benchmark of this KPI is not available for this academic year. It will be available through the next academic year 2021-2022.

1. How was the benchmark calculated?

Average students' overall rating of the quality of scientific supervision on an all-point scale in an annual survey. Average of all questions in supervision survey

**Explanation:

No external Benchmark

Table5: KPI-PG-5: Average time for students' graduation.

NCAAA KPI Reference Number: KPI-PG-5: Average time for students' graduation				
Data Science Master Program KPI Reference Number: KPI-PG-5				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
4	4	NA	NA	4

1-KPI Analysis of Average time for students' graduation

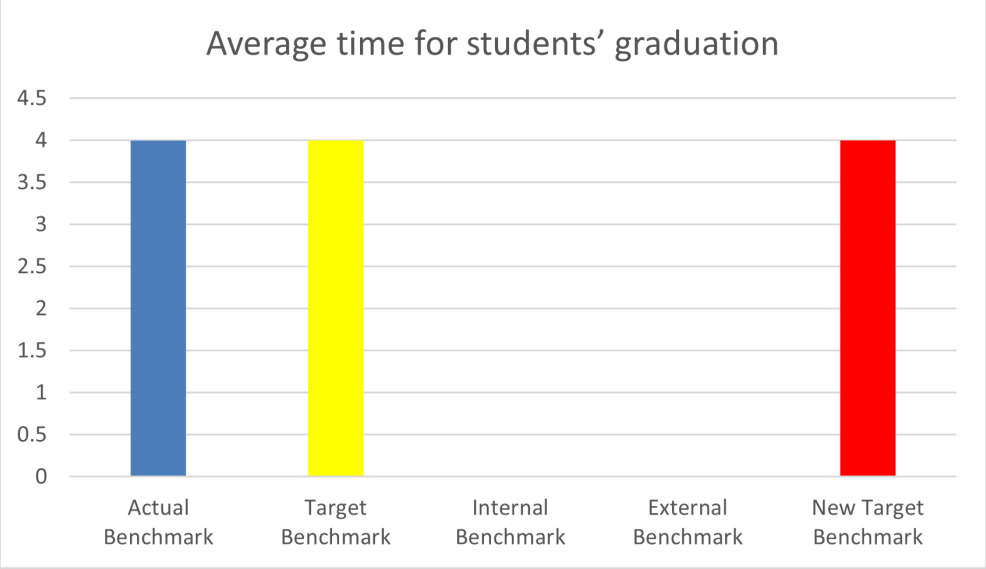

Figure 5: Average time for students' graduation.

2-Analysis (strengths and recommendations): The actual benchmark of 4 semesters that is calculated by the average time (in semesters) spent by students to graduate from the program. Therefore the actual benchmark matches the target benchmark. It is the second year of the program, the benchmark should be measured at the graduation date. No external benchmark.

- Strengths:

• Average time for students' graduation surveys are conducted regularly which allows for consistent evaluation of the graduation student from Data science Master.

- Recommendations:

• The program must provide and motivate in the view of services as well as practical skill development to attract the students with high grades as planned in the strategic plan of the Information system department.

*Explanation:

-Name of the internal benchmark provider: The program has taken its own performance for the past year as an internal benchmark. In the academic year 2019-2020, this KPI cannot be measured. The measurement time of this KPI should be at the end of the final year of graduation. Therefore, the internal benchmark of this KPI is not available for this academic year. It will be available through the next academic year 2021-2022.

1. How was the benchmark calculated?

Average time (in semesters) spent by students to graduate from the program.

**Explanation:

No external Benchmark

Table 6: KPI-PG-6: Rate of students dropping out of the program.

NCAAA KPI Reference Number: KPI-PG-6: Rate of students dropping out of the program				
Data Science Master Program KPI Reference Number: KPI-PG-6				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
0%	0%	15.3%	NA	0%

1-KPI Analysis of Rate of students dropping out of the program

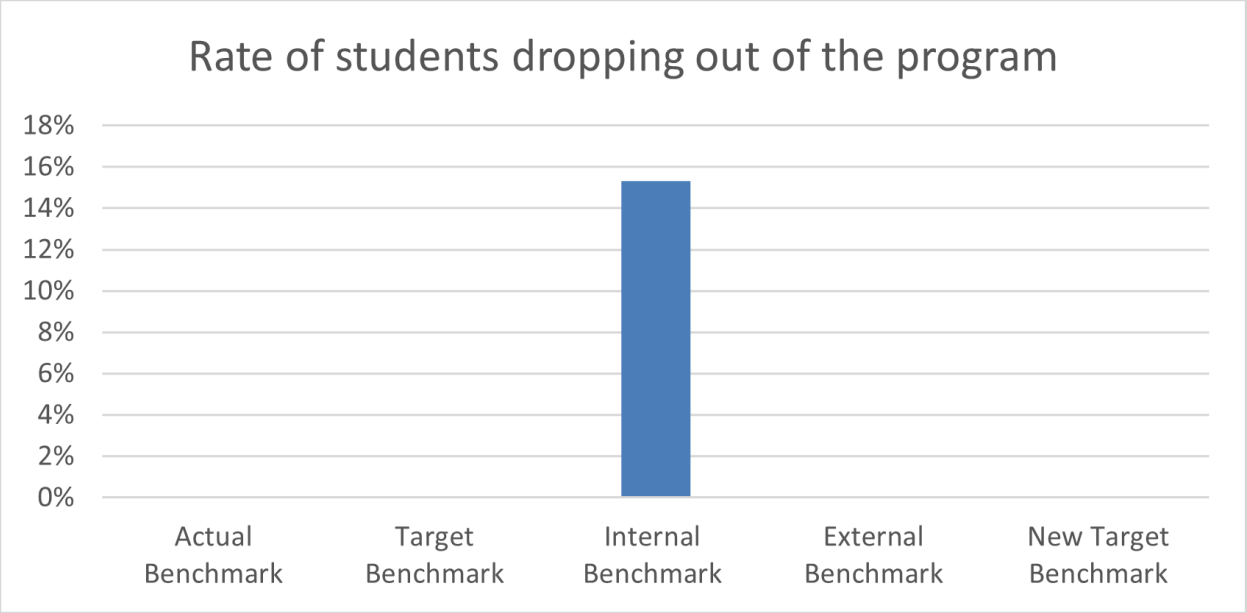

Figure 6: Rate of students dropping out of the program.

2-Analysis (strengths and recommendations): Based on the table above the actual benchmark is the same as the target benchmark and better than the internal benchmark. No external benchmark.

- Strengths:

• Rates of students dropping out of the program are conducted regularly and still achieved the target benchmark. No students dropped out of the program this semester.

- Recommendations:

• Continue the same strategies of teaching and learning.

*Explanation:

Name of the internal benchmark provider: The program has taken its own performance for the past year as an internal benchmark. In the academic year 2019-2020, this KPI was measured and there were 2 students out of 13 who dropped out of the program.

1. How was the benchmark calculated?

Percentage of students who did not complete the program to the total number of students in the same cohort.

**Explanation:

No external Benchmark

Table 7: KPI-PG-7: Graduates' employability.

NCAAA KPI Reference Number: KPI-PG-7: Graduates' employability				
Data Science Master Program KPI Reference Number: KPI-PG-7				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
73%	90%	NA	NA	90%

1-KPI Analysis of Graduates' employability

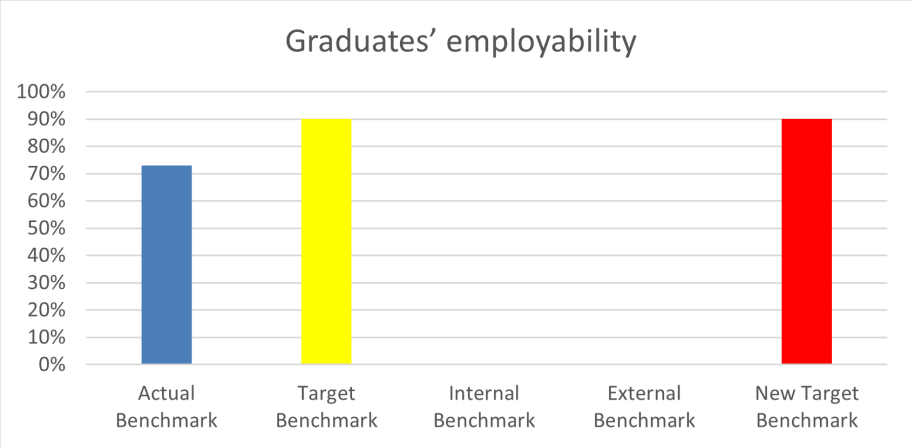

Figure 7: Graduates' employability.

2-Analysis (strengths and recommendations): Based on the table above, the actual benchmark is less than the target benchmark.

- Strengths:

• Rate of graduate students' employability surveys are conducted regularly which allows for consistent evaluation of the graduation student from Data Science Master.

- Recommendations:

• Continue the same strategies of teaching and learning.

• Focus should be given to the development of a graduate's abilities.

*Explanation:

Name of the internal benchmark provider; The program has taken its own performance for the past year as an internal benchmark. In the academic year 2019-2020, this KPI cannot be measured and the measurement time of this KPI should be one year after graduation time. Therefore, the internal benchmark of this KPI is not available for this academic year. It will be available through the next academic year 2021-2022.

1. How was the benchmark calculated?

The percentage of graduates from the program who within a year of graduation were employed to the total number of graduates in the same year.

**Explanation:

No external Benchmark

Table 8: KPI-PG-8: Employers' evaluation of the program graduates' competency.

NCAAA KPI Reference Number: KPI-PG-8: Employers' evaluation of the program graduates' competency				
Data Science Master Program KPI Reference Number: KPI-PG-8				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
4.9	3.75	4.9	NA	4.5

1-KPI Analysis of Employers' evaluation of the program graduates' competency

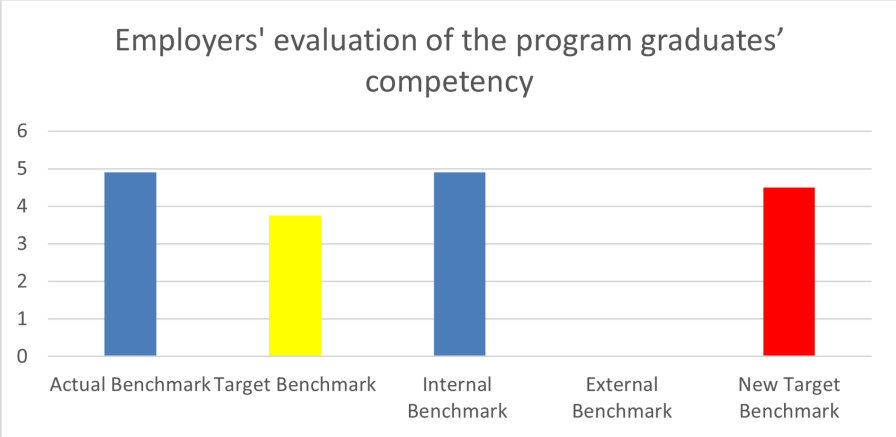

Figure 8: Employers' evaluation of the program graduates' competency.

2-Analysis (strengths and recommendations): Based on the table, the actual benchmark exceeds the target benchmark, and equal to the internal benchmark. This benchmark represents the strength of our program graduates' competency. No external benchmark.

- Strengths:

• Our students have exhibited a professional in their career.

• Employers' evaluation of the program graduates' proficiency is conducted regularly which allows for consistent evaluation of quality of Data Science Master Students.

- Recommendations:

• The teachers can motivate the students, so that the students prepare themselves to go for PhD studies with or outside the kingdom.

• Increase the number of participants from employers in the evaluation process for graduates of the program to identify deficiencies in the educational process.

• National and international external benchmarks are recommended to compare actual benchmarks to similar programs at local and international level.

*Explanation:

Name of the internal benchmark provider: The program has taken its own performance for the past year as an internal benchmark.

1. How was the benchmark calculated?

The average overall rating of employers for the competency of the program graduates on an all-point scale in an annual survey. Average of all question Survey of employers' opinion of male and female graduates

**Explanation:

No external Benchmark

Standard 4: STUDENTS

Table 9: KPI-PG-9: Students' satisfaction with the provided services.

NCAAA KPI Reference Number: KPI-PG-9: Students' satisfaction with the provided services				
Data Science Master Program KPI Reference Number: KPI-PG-9				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
4	3.75	NA	NA	4

1-KPI Analysis of Students' satisfaction with the provided services

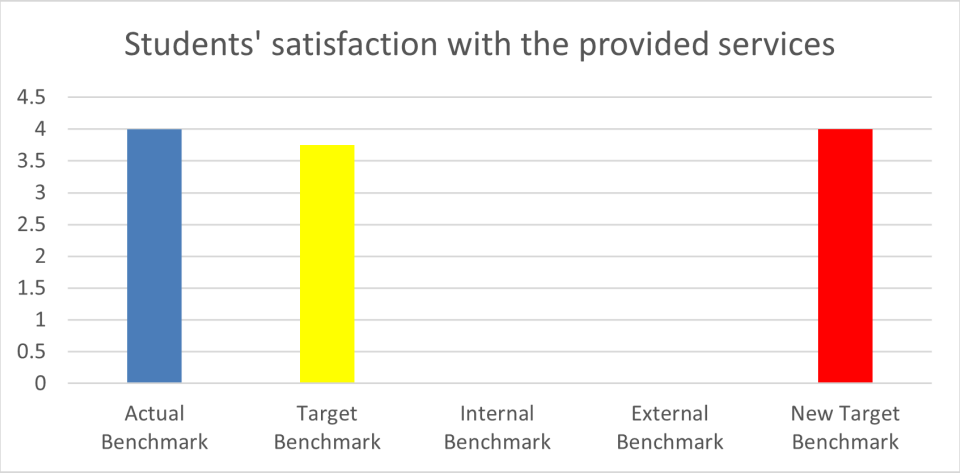

Figure 9: Students' satisfaction with the provided services.

2-Analysis (strengths and recommendations): The actual benchmark is more than the target benchmark . However, the internal benchmark is not available through the first academic year. No external benchmark.

-Strengths:

• The admission and registration processes are in accordance with the nature of the program.

• Active participation of the students in the student council.

• Relevant surveys are conducted regularly which allows for consistent evaluation of the facilities and equipment.

-Recommendations:

• An Alumni association should be formed.

• An appropriate strategy needs to be developed through focused group discussions with all the relevant stakeholders to improve the quality of facilities and equipment available to the program.

• Provide training courses for the students regarding using any Digital platforms.

*Explanation:

The internal Benchmark is not available, since the program has taken its own performance for the past year as an internal benchmark. In the academic year 2019-2020, this KPI cannot be measured and the measurement rate of this KPI should be conducted from the final year in the program through the annual report (Student Program Evaluation Survey). Therefore, the internal benchmark of this KPI is not available for this academic year. It will be available through the next academic year 2021-2022.

1. How was the benchmark calculated?

Average of students' satisfaction rate with the various services provided by the program (food, transportation, sport facilities, academic advising ...) on a five-point scale in an annual survey.

**Explanation:

No external Benchmark

Standard 5: FACULTY MEMBERS

Table 10: KPI-PG-10: Ratio of students to faculty members.

NCAAA KPI Reference Number: KPI-PG-10: Ratio of students to faculty members				
Data Science Master Program KPI Reference Number: KPI-PG-10				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
1:1	5:1	1:1	NA	5:1

1-KPI Analysis of Ratio of students to faculty members

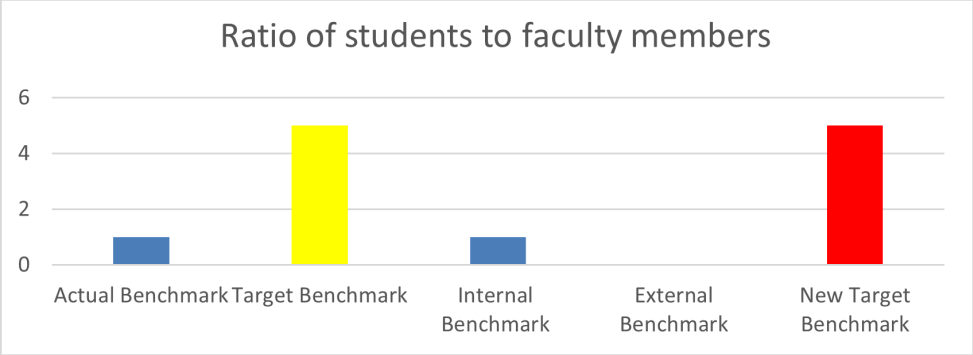

Figure 10: Ratio of students to faculty members.

2-Analysis (strengths and recommendations): Based on the table above the actual benchmark is less than the target benchmark, and equal to the internal benchmark. No external benchmark.

-Strength: None

-Recommendation:

- Increase the proportion of Associate and Full Professors in the Master of Data Science.

*Explanation:

Name of the internal benchmark provider: The program has taken its own performance for the past year as an internal benchmark. Using the data Science master program's own actual benchmark from the previous cycle (2019-2020) provides a good internal measure for program improvement from one cycle to the next.

1. How was the benchmark calculated?

Ratio of the total number of students to the total number of full-time and full-time equivalent faculty members participating in the program.

**Explanation:

No external Benchmark

Table 11: KPI-PG-11: Percentage of faculty members' distribution based on academic ranking.

NCAAA KPI Reference Number: KPI-PG-11: Percentage of faculty members' distribution based on academic ranking				
Data Science Master Program KPI Reference Number: KPI-PG-11				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
Prof: 0% Assoc.: 20% Assist: 80% Male: 60% Female: 40%	Prof: 22.9% Assoc.: 22.9% Assist: 54.1% Male: 66.7% Female: 33.3%	Prof: 0% Assoc.: 28.5% Assist: 71% Male: 71.4% Female: 28.5%	NA	Prof: 33.3% Assoc.: 33.3% Assist: 33.3% Male: 50% Female: 50%

1-KPI Analysis of Percentage of faculty members' distribution based on academic ranking

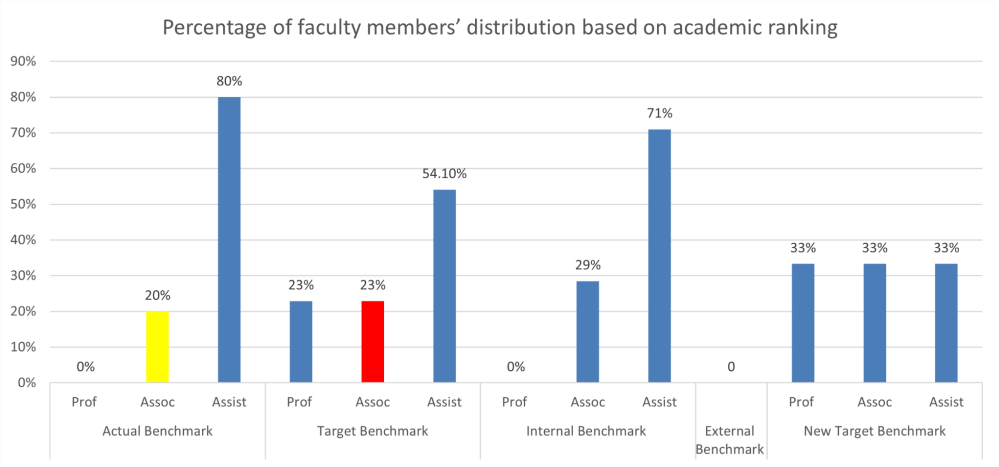

Figure 11: Percentage of faculty members' distribution based on academic ranking.

2-Analysis (strengths and recommendations): The actual benchmark is far behind the target benchmark. No external benchmark.

- Strengths:None

- Recommendations

• Most of the PhD teaching staff are Assistant Professors. There is a need to increase the proportion of Associate and Full Professors in the Master of Data Science.

• Recruit Full and associate professors.

• Encourage faculty to pursue higher education.

*Explanation:

Name of the internal benchmark provider. Data Science master. The program has taken its own performance for the past year as an internal benchmark

1. How was the benchmark calculated?

Percentage distribution of faculty members participating in the program based on academic ranking.

**Explanation:

No external Benchmark

Table 12: KPI-PG-12: Proportion of faculty members leaving the program.

NCAAA KPI Reference Number: KPI-PG-12: Proportion of faculty members leaving the program				
Data Science Master Program KPI Reference Number: KPI-PG-12				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
28.6%	0%	0%	NA	0%

1-KPI Analysis of Proportion of faculty members leaving the program

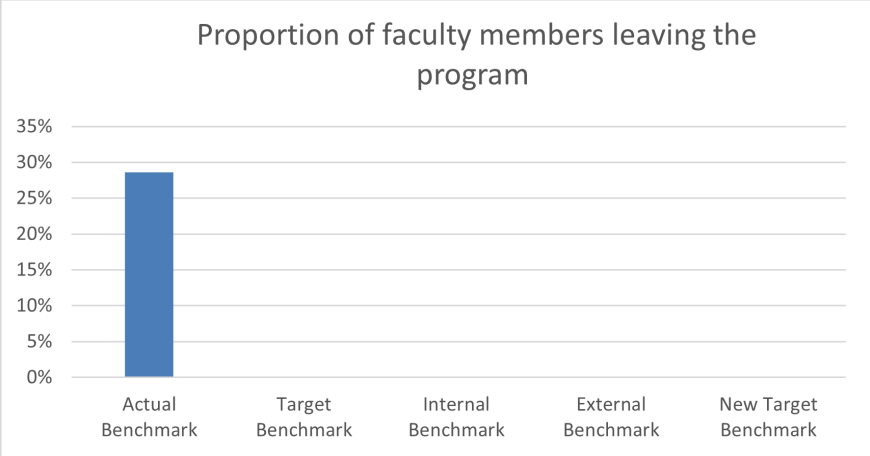

Figure 12: Proportion of faculty members leaving the program.

There is only one faculty member leaving the master program of data science in the actual benchmark. No external benchmark.

- Strengths:

• There is job satisfaction in the department, which leads to higher retention rates.

- Recommendations:

• It is recommended to continue the efforts to obtain feedback from the teaching staff regarding their job satisfaction in order to rectify their issues and promote a sense of ownership in the faculty members.

*Explanation:

Name of the internal benchmark provider. Data Science master. The program has taken its own performance for the past year as an internal benchmark

1. How was the benchmark calculated?

Proportion of faculty members leaving the program annually for reasons other than age retirement to the total number of faculty members.

**Explanation:

No external Benchmark

Standard 6: FACULTY MEMBERS

Table 13: KPI-PG-13: Satisfaction of beneficiaries with learning resources.

NCAAA KPI Reference Number: KPI-PG-13: Satisfaction of beneficiaries with learning resources				
Data Science Master Program KPI Reference Number: KPI-PG-13				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
2.3	3.75	NA	NA	3.75

1-KPI Analysis of Satisfaction of beneficiaries with learning resources

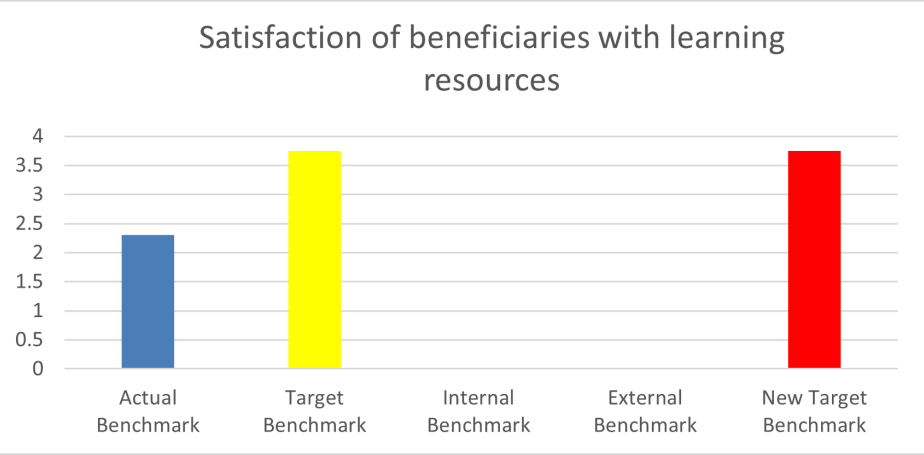

Figure 13: Satisfaction of beneficiaries with learning resources.

2-Analysis (strengths and recommendations): It has been observed from the table above that the actual benchmark is less than the target benchmark..

Strengths: None

Recommendations:

• Increase the availability of resources, equipment for the research.

• Provide the Digital library availability, accessibility, and adequacy of research resources for the faculty members.

• There is an urgent need to prepare the paper library with the necessary sources and references.

• Building cooperative relations between the library and other academic libraries.

• An appropriate strategy needs to be developed through focused group discussions with all the relevant stakeholders to improve the quality of digital library resources. In particular, the website needs to improve, as this aspect received a very low ranking.

*Explanation:

Name of the internal benchmark provider: The program has taken its own performance for the past year as an internal benchmark. In the academic year 2019-2020, this KPI cannot be measured. The measurement time of this KPI should be at the end of the final year of graduation through the program evaluation survey. Therefore, the internal benchmark of this KPI is not available for this academic year. It will be available through the next academic year 2021-2022.

1. How was the benchmark calculated?

Average of beneficiaries' satisfaction rate with learning resources on a five-point scale in an annual survey in terms of:

a. Their adequacy and diversity (references, journals, databases… etc.)

b. The support services provided for their utilization.

**Explanation:

No external Benchmark

Table 14: KPI-PG-14: Satisfaction of beneficiaries with research facilities and equipment.

NCAAA KPI Reference Number: KPI-PG-14: Satisfaction of beneficiaries with research facilities and equipment				
Data Science Master Program KPI Reference Number: KPI-PG-14				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
3	3.75	2.6	NA	4

1-KPI Analysis of Satisfaction of beneficiaries with research facilities and equipment

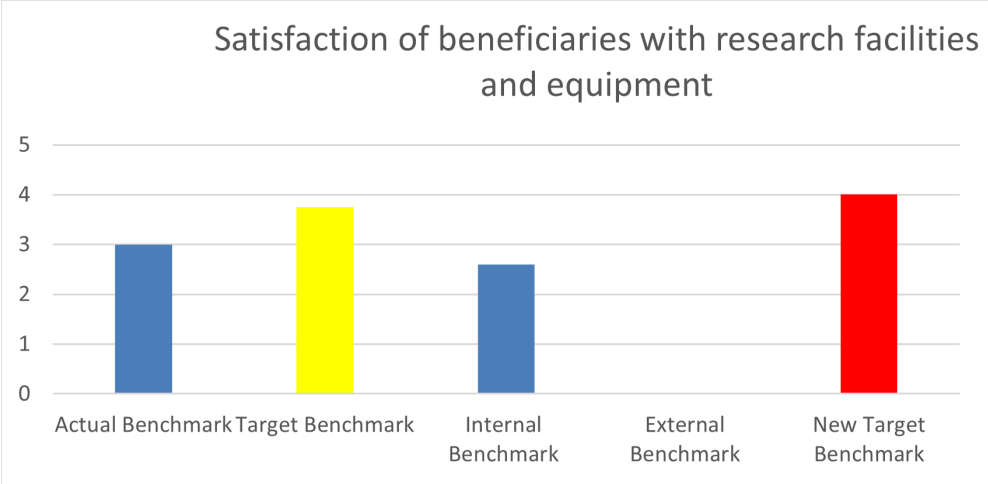

Figure 14: Satisfaction of beneficiaries with research facilities and equipment.

2-Analysis (strengths and recommendations): It has been observed from the table above that the actual benchmark is less than the target benchmark and better than the internal benchmark.

-Strengths: None

- Recommendations:

• Acquire new research labs.

• Provide the library's trustees with sufficient technical expertise

• Building cooperative relations between the library and other academic libraries.

• Further increasing the availability of resources, equipment

*Explanation:

Name of the internal benchmark provider: The Data Science program has taken its own performance for the past year as an internal benchmark. Using the data Science master program's own actual benchmark from the previous cycle (2019-2020) provides a good internal measure for program improvement from one cycle to the next.

1. How was the benchmark calculated?

Average of beneficiaries' satisfaction rate with research facilities and equipment (depending on the nature of the program) on a four-point scale in an annual survey.

**Explanation:

No external Benchmark

Standard 7: RESEARCH AND PROJECTS

Table 15: KPI-PG-15: Percentage of publications of faculty members.

NCAAA KPI Reference Number: KPI-PG-15: Percentage of publications of faculty members				
Data Science Master Program KPI Reference Number: KPI-PG-15				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
100%	75%	80%	NA	95%

1-KPI Analysis of Percentage of publications of faculty members

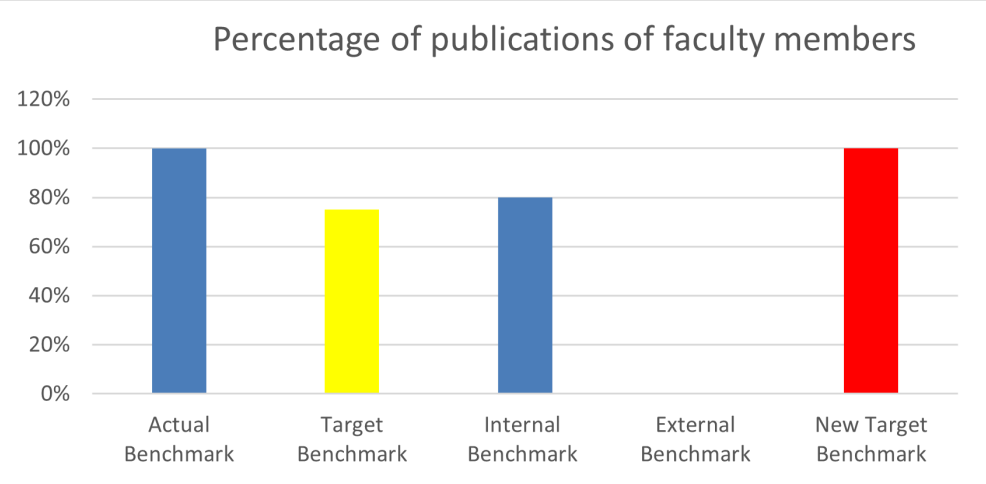

Figure 15: Percentage of publications of faculty members.

2-Analysis (strengths and recommendations): The data calculation showed that the number of publications is better than both the target and internal benchmarks. No external benchmark.

The data calculation showed that the number of publications (100%) is more than both the internal benchmark and target benchmark.

-Strengths:

• Most of the counted papers (all refereed) were published in ISI indexed journals

• The teaching staff is actively involved in research although they are busy with other tasks

• The department encouraged the staff to write and publish more publications.

-Recommendation:

• Encouraging formation of research groups within the department would help create a stronger culture of collaboration while also affecting the KPI positively.

• Efforts need to be made to ensure an even higher proportion of publications are in ISI indexed journals. The department must disseminate more actively the positive outcomes of Faculty Members'

*Explanation:

Name of the internal benchmark provider. Data Science master. The program has taken its own performance for the past year as an internal benchmark

1. How was the benchmark calculated?

Percentage of faculty members participating in the program with at least one research publication during the year to total faculty members in the program.

**Explanation:

No external Benchmark

Table 16: KPI-PG-16: Rate of published research per faculty member.

NCAAA KPI Reference Number: KPI-PG-16: Rate of published research per faculty member				
Data Science Master Program KPI Reference Number: KPI-PG-16				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
5:1	2:1	1.4:1	NA	3:1

1-KPI Analysis of Rate of published research per faculty member

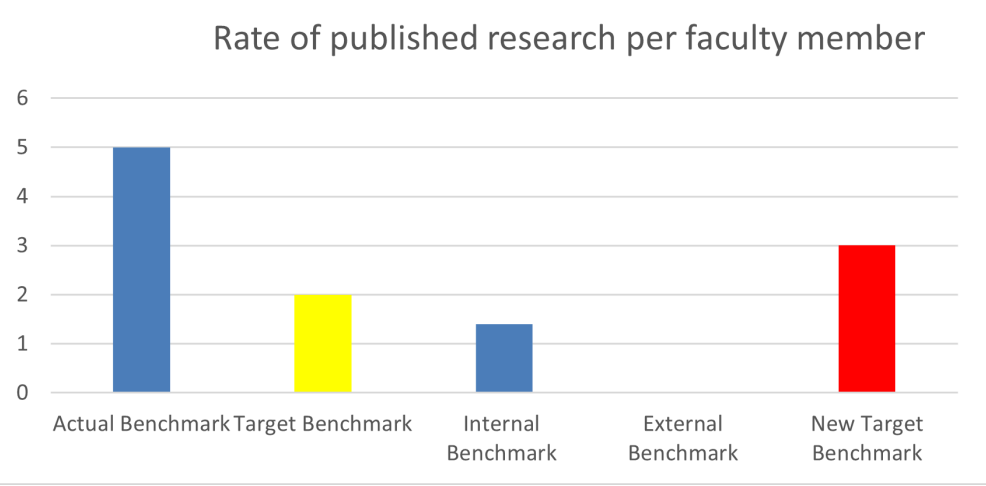

Figure 16: Rate of published research per faculty member.

2-Analysis (strengths and recommendations): The data calculation showed that the rate of publications is better than both the target and internal benchmarks.

- Strengths:

• The publishing rate is higher than the target; despite the members being very active in their research activities.

• More than 90% of the counted papers (all refereed) were published in ISI indexed journals

- Recommendations:

• The department must disseminate more actively the positive outcomes of program staffs' Research Performance Evaluation and its impact on their promotional activities.

*Explanation:

Name of the internal benchmark provider. Data Science master. The program has taken its own performance for the past year as an internal benchmark.

1. How was the benchmark calculated?

The average number of refereed and/or published research per each faculty member participating in the program during the year (total number of refereed and/or published research to the total number of faculty members during the year).

**Explanation:

No external Benchmark

Table 17: KPI-PG-17: Citations rate in refereed journals per faculty member.

NCAAA KPI Reference Number: KPI-PG-17: Citations rate in refereed journals per faculty member				
Data Science Master Program KPI Reference Number: KPI-PG-17				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
20:1	2:1	19.5:1	NA	5:1

1-KPI Analysis of Citations rate in refereed journals per faculty member

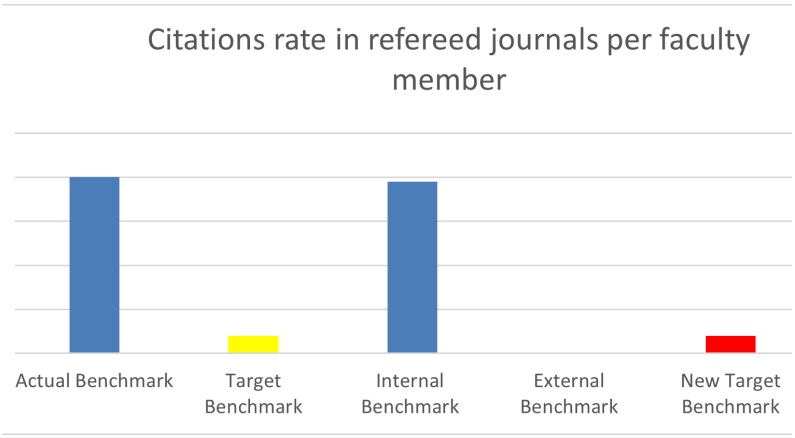

Figure 17: Citations rate in refereed journals per faculty member.

2-Analysis (strengths and recommendations): The data calculation showed that the rate of citation is more than the target benchmark as well as the internal benchmark.

- Strengths:

• Most of the papers were cited in ISI indexed journals.

• The faculties in the master program of data science have published many papers, therefore, they earned many citations.

- Recommendations:

• The department must disseminate more actively the positive outcomes of Faculty Members' Research Performance Evaluation and its impact on their promotional activities

*Explanation:

Name of the internal benchmark provider. Data Science master. The program has taken its own performance for the past year as an internal benchmark.

1. How was the benchmark calculated?

The average number of citations in refereed journals from published research (total number of citations in refereed journals from published research for faculty members to the total published research)

**Explanation: No external Benchmark

Table 18: KPI-PG-18: Percentage of students' publication.

NCAAA KPI Reference Number: KPI-PG-18: Percentage of students' publication				
Data Science Master Program KPI Reference Number: KPI-PG-18				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
45.4	10%	0%	NA	50%

1-KPI Analysis of Percentage of students' publication

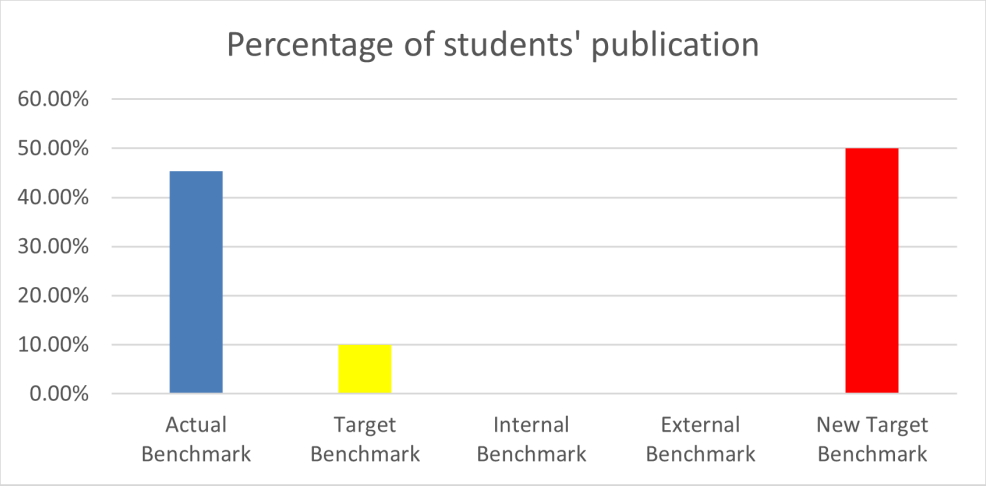

Figure 18: Percentage of students' publication.

2-Analysis (strengths and recommendations): The data calculation showed that the percentage of students' publication is more than the target benchmark, because students have started their capstone projects, written, and published their results in the indexed conferences and journals. No internal and external benchmark.

- Strengths:

•Most of the papers were cited in ISI indexed journals.

The students with their faculty's members in the master program of data science have published many papers in ISI indexed journals and conferences.

- Recommendations:

• The department must disseminate more actively the positive outcomes of Students and Faculty Members' Research Performance Evaluation and its impact on their promotional activities

- Recommendations: None

*Explanation:

Name of the internal benchmark provider. Data Science master. The program has taken its own performance for the past year as an internal benchmark.

1. How was the benchmark calculated?

Percentage of students who:

a. published their research in refereed journals.

b. presented papers in conferences to the total number of students in the program during the year.

**Explanation:

No external Benchmark

Table 19: KPI-PG-19: Number of patents, innovative products, and awards of excellence.

NCAAA KPI Reference Number: KPI-PG-19: Number of patents, innovative products, and awards of excellence				
Data Science Master Program KPI Reference Number: KPI-PG-19				
Actual Benchmark 2020-2021	Target Benchmark	Internal Benchmark 2020-2021	External Benchmark 2020-2021	New Target Benchmark
1	1	0	NA	1

1-KPI Analysis of Number of patents, innovative products, and awards of excellence

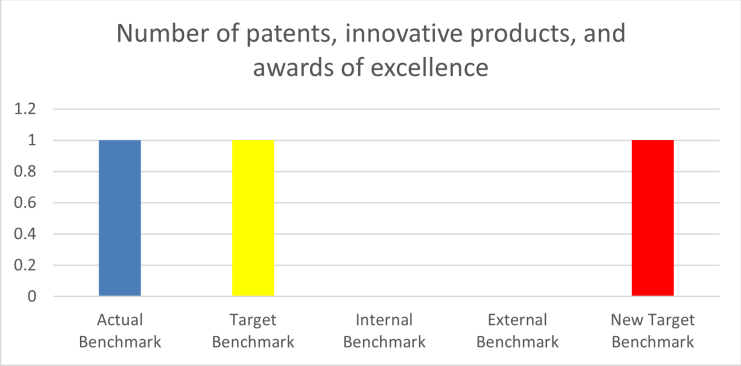

Figure 19: Number of patents, innovative products, and awards of excellence.

2-Analysis (strengths and recommendations): The data calculation showed that there is one award of excellence given by Data Science Master Students.

No external benchmark.

- Strengths

• Participation in the competition was conducted by students.

Example: Some students won First place winner on the "WiDSCompetition 2021"

- Recommendations:

• The department has to encourage the student and teaching staff to have patents, innovative products, and awards of excellence.

*Explanation:

Name of the internal benchmark provider. Data Science master. The program has taken its own performance for the past year as an internal benchmark.

1. How was the benchmark calculated?

Number of:

a. Patents and innovative products

b. National and international excellence awards obtained annually by the students and staff of the program.

**Explanation: No external Benchmark