Prince Musaid Bin Abdulrahman University

College of computing and informatics

Key Performance Indicators for
Master in cyber security

Submitted to the:

National Center for Academic Accreditation and evaluation (NCAAA)

Table of Contents

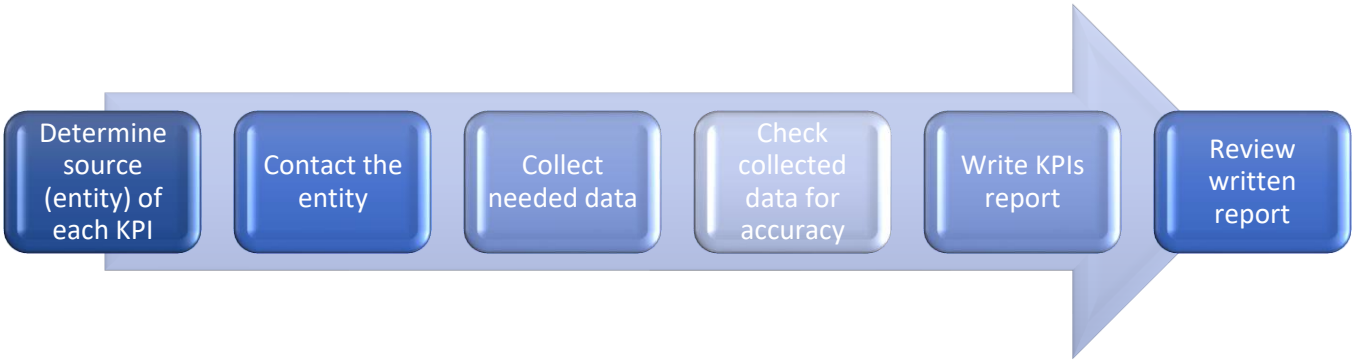
1. Introduction 1
2. Methodology used to Identify the Internal and External Benchmarking 1
A) KPIs' internal benchmarking: 1
B) KPI's external benchmarking: 1
3. Setting up the new KPIs' target values 2
4. Key Performance Indicators (KPIs) and Benchmarking 3
A. *KPI 1 Table: Percentage of achieved indicators of the program operational plan objectives.* 3
B. *KPI 2 Table: Students' Evaluation of quality of learning experience in the program.* 5
C. *KPI 3 Table: Students' evaluation of the quality of the courses.* 7
D. *KPI 4 Table: Students' evaluation of the quality of scientific supervision.* 10
E. *KPI 5 Table: Average time for students' graduation.* 12
F. *KPI 6 Table: Rate of students dropping out of the program.* 14
G. *KPI 7 Table: Graduates' employability.* 16
H. *KPI 8. Employers' evaluation of the program graduate's competency* 18
I. *KPI 9. Students' satisfaction with the provided services* 20
J. *KPI 10 Table: Ratio of students to faculty members.* 23
K. *KPI 11 Table: Percentage of faculty members' distribution based on academic ranking.* 26
L. *KPI 12 Table: Proportion of faculty members leaving the program.* 29
M. *KPI 13. Satisfaction of beneficiaries with the learning resources* 32
N. *KPI 14. Satisfaction of beneficiaries with research facilities and equipment* 34
O. *KPI 15 Table: Percentage of publications of faculty members.* 36
P. *KPI 16 Table: Rate of published research per faculty member.* 38
Q. *KPI 17. Citations rate in refereed journals per faculty member* 40
R. *KPI 18. Percentage of students' publication* 42
S. *KPI 19. Number of patents, innovative products, and awards of excellence* 44

1. Introduction

The Master in cyber security (MCS) has developed, based on its mission "Prepare qualified and skilled students to meet the needs of the labor market in the field of Cybersecurity", an ambitious and well-established strategic plan to achieve the mission and the strategic goals of the program, given a full consideration to the Saudi Vision 2030, the societal perspectives, and the accreditation requirements. For the success of the strategic plan, the performance of MCS program is assessed based on the trend of its KPIs values as they progress over the years to develop actions for continuous improvement and enhance productivity. In MCS program 19 KPIs are measured which identified by the NCAAA, based on the collected statistics, to present evidence that program meets the expected quality assurance level. The KPIs tables includes a description and analysis of the results of each indicator with identification of strengths and aspects that need improvement. This PKIs report presents the results of measuring MCS program performance according to the collecting numbers and evidence.

To measure the performance of MCS program, a committee of seven experienced faculty members was formed, to collect the relevant data from different sources and write the KPIs report. The aim of this committee was first to determine the data source of each KPI then contact the entity of the data source to collect the needed data for the KPIs' report. The committee met together and put a working plan. The methodology that the committee followed was as below:

2. Methodology used to Identify the Internal and External Benchmarking



A) KPIs' internal benchmarking:

For the internal benchmarks, different PMAU entities were contacted and requested to provide data for respective KPIs. The entity was chosen based on the data and statistics it maintains and updates. These comparable benchmarks represent the data results from previous years. For the KPIs related to the academic performance, the internal benchmarks used are the KPIs' values for the academic years 2019-2020 and 2020-2021.

B) KPI's external benchmarking:

For the KPIs' external benchmark, Master Of cyber security program in Taif University was selected to be used as sources for the external benchmarks.

The external benchmark is selected according to the following criteria:

1. The mode of study.
2. The accreditation and reputation of the program benchmark.

3. The benchmark university offers similar specialization for the MCS program (Master of cyber security).
4. The availability of benchmarking data.

According to the output of the above criteria, Taif University was selected as a benchmark university.

3. Setting up the new KPIs' target values

The new target has been set for each KPI based on the following criteria:

- The analysis of the historical data and statistics collected from the college and PMAU entities.
- The collected data from Taif University.

4. **Key Performance Indicators (KPIs) and Benchmarking**

A. KPI 1 Table: Percentage of achieved indicators of the program operational plan objectives.

KPI Information			
NCAAA KPI Reference Number	KPI-PG- 01	Program KPI Reference Number	KPI-PG- 01
KPI Name and Definition	**Percentage of achieved indicators of the institution strategic plan objectives:** Percentage of performance indicators of the strategic plan objectives of the institution that achieved the targeted annual level to the total number of indicators targeted for these objectives in the same year.		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
100%	**100%**	**100%**	**72.2%**	**100%**

Analysis (list strengths and recommendations):

Analysis:

The Prince Musaid Bin Abdulrahman University has a clear vision "Lead the utilization of technology in education to contribute to national development". Therefore, the MCS program has developed an ambitious and well-established strategic plan to achieve the vision and strategic goals of the university, given a full consideration to the Saudi Vision 2030, the societal perspectives, and the accreditation requirements. The mission of the MCS program is to Prepare qualified and skilled students to meet the needs of the labor market in the field of Cybersecurity. The MCS program mission is also about to create high quality education and research environments providing competencies in Cyber security fields competitive nationally with international impact. Based on the achievement of operational plan for the year 2019-2020, it was 100%. All suggested improvement plans for academic year 2018-2019 were achieved 100%. In 2020-2021, 100% of improvement action plans were achieved. The target is to still 100% achievement rate in 2021-2022 by achieving all suggested improvement plans in 2020-2021 annual report. By comparing the value of the MCS program with external benchmark value, the MCS program achieves better value. Figure 4.1 shows the percentage of achieved indicators of the program operational plan objectives for two years 2019-2020 and 2020-2022 as a column chart.

* Explain:



Figure 4.1: Percentage of achieved indicators of the program operational plan objectives

1. Why this internal benchmark provider was chosen?
The source of data for this KPI was the college of computing and informatics, which is responsible for providing the operational plan of programs and measuring the achievement rate for suggested improvement plans. In addition to that, the evaluation of improvement plan for MCS program can be measured by using this KPI.
2. How was the benchmark calculated?
The percentage of each achieved indicators of the program operational plan objectives were summed then divided over the number of objectives.
3. Name of the internal benchmark provider.
Operational plan for MCS program from The College of Computing and Informatics.
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

B. KPI 2 Table: Students' Evaluation of quality of learning experience in the program.

KPI Information			
NCAAA KPI Reference Number	KPI-PG-02	Program KPI Reference Number	KPI-PG-02
KPI Name and Definition	**Students' Evaluation of quality of learning experience in the program:** Average of overall rating of final year students for the quality of learning experience in the program on a five-point scale in an annual survey		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
3.5	4	3.86	4.15	4

Analysis (list strengths and recommendations):

Analysis:

The MCS program offers an equal quality level of education and support to all students, and therefore each student has the opportunity to succeed. In addition, the MCS program is striving to promote excellence in offering the services and resources to all students in all branches. It also adopts a flexible model of blended learning that meets the needs of learners in a knowledge age in a technological environment that utilizes ICTs, supports self and collaborative learning. Figure 4.2 shows the average students' evaluation about the quality of learning experience for 2020-2021. This survey is released for the final year students. The MCS program covers male and female students, and both male and female students receive equal educational opportunities and support. The above numbers (KPI Benchmarking) and Figure 4.2 show the average of overall rating of the final year students for the quality of learning experience in the program on a five-point scale in an annual survey. By comparing the value of the MCS program with external benchmark values, the MCS program achieves lower value than TU university. The IT department should conduct attempts to increase the value by providing sessions to the students with regards to the evaluation of the learning experience quality and improving the learning aspects that received low satisfaction rate from students.

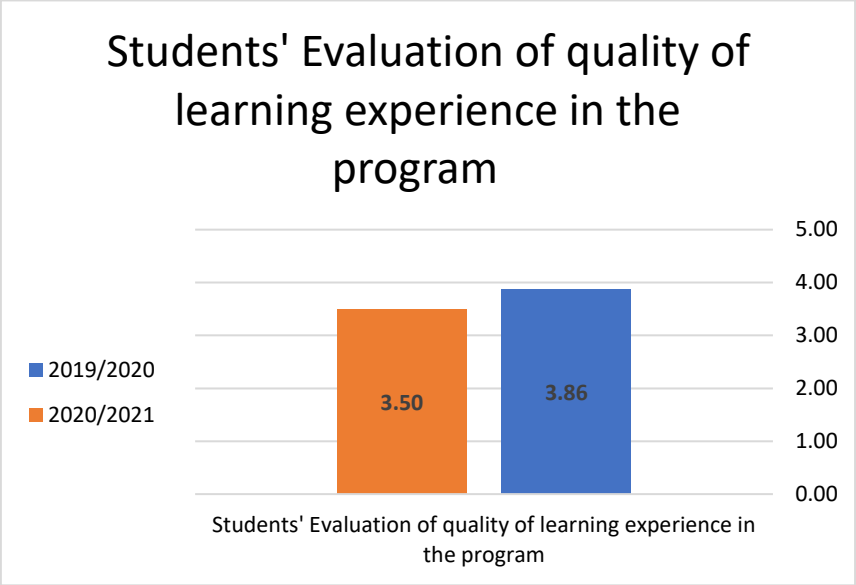


Figure 4.2: Average students' evaluation about the quality of learning experience

* Explain:
1. Why this internal benchmark provider was chosen?
The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was the Vice Presidency for Planning, Development and Quality, which maintains and release surveys for measuring the quality of program.
2. How was the benchmark calculated?
An evaluation survey on a five-point scale was conducted to gather the average of students' evaluation about the quality of learning experience. The evaluations of the final year students who filled the survey were collected and summed then divided over the number of participants to gain the satisfaction rate.
3. Name of the internal benchmark provider.
Vice Presidency for Planning, Development and Quality
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

C. KPI 3 Table: Students' evaluation of the quality of the courses.

KPI Information			
NCAAA KPI Reference Number	KPI-PG-03	Program KPI Reference Number	KPI-PG-03
KPI Name and Definition	**Students' evaluation of the quality of the courses:** Average students overall rating for the quality of courses on a five-point scale in an annual survey		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
4.1	**4.5**	**4.1**	**4.12**	**4.5**

Analysis (list strengths and recommendations):

Analysis:

To gather the average of students' evaluation about the quality of courses available in the program, an evaluation survey on a five-point scale was conducted across all courses in all semesters. It was reported that the actual average of students' evaluation about the quality of courses was 4.1 in both 2020-2021 and 2019-2020. The above numbers (KPI Benchmarking) and Figure 4.3 show the average students overall rating for the quality of courses on a five-point scale in an annual survey. Despite the value for 2020-2021 was not decrease, there is still room for improvement. The CCI department should conduct attempts to increase the average of students' evaluation and identify the reasons of the current evaluation rates. By comparing the value of the MCS program with the external benchmark values, the MCS program achieves slightly lower than value of the TU.

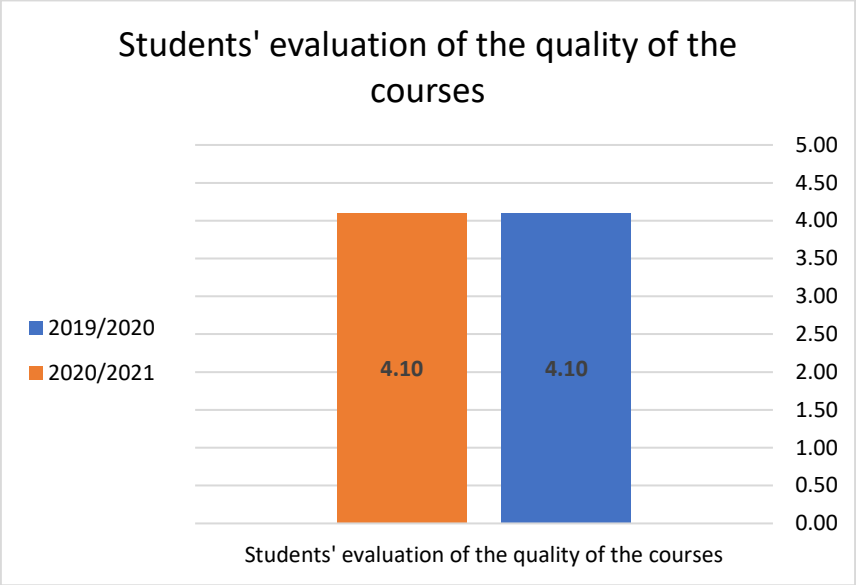


Figure4.3: Average Students' evaluation of the quality of the courses

* Explain:
1. Why this internal benchmark provider was chosen?
The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was the Vice Presidency for Planning, Development and Quality, which maintains and release surveys for measuring the quality of courses.
2. How was the benchmark calculated?
An evaluation survey on a five-point scale was conducted to gather the average of students' evaluation about the quality of the courses. The evaluations of program students who filled the survey were collected and summed then divided over the number of participants to gain the satisfaction rate.
3. Name of the internal benchmark provider.
Vice Presidency for Planning, Development and Quality.
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?

The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

D. KPI 4 Table: Students' evaluation of the quality of scientific supervision.

KPI Information			
NCAAA KPI Reference Number	**KPI-PG-04**	Program KPI Reference Number	**KPI-PG-04**
KPI Name and Definition	**Average students' overall rating of the quality of scientific supervision on a five-point scale in an annual survey.**		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
3.89	**4.5**	**4.28**	**4**	**4.5**

Analysis (list strengths and recommendations):

Analysis:

To gather the average of students' evaluation about the quality of scientific supervision available in the program, an evaluation survey on a five-point scale was conducted across Capstone project course all semesters. It was reported that the actual average of students' evaluation about the quality of scientific supervision courses was 3.89 in 2020-2021, while the value was 4.28 in 2019-2020. Figure 4.4 shows the average students' overall rating of the quality of scientific supervision for both years. By comparing the value of the MCS program with the external benchmark values, the MCS program achieves lower value than TU university. The MCS program has increased the concern of the scientific supervision to improve its quality by developing well-defined policies and procedures for the scientific supervision process (Ref.7.2, Ref.7.14), and monitoring the compliance of supervisors and students with the supervision policies. In addition, the program coordinator now listens to the students' complaints and works on resolving them, and the recommendations of supervisors and students are considered and applied if they are valid.

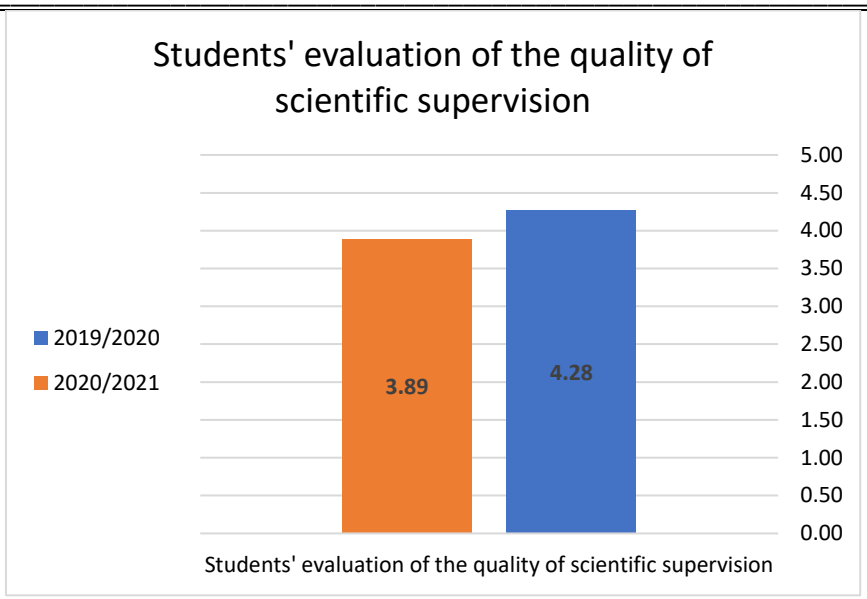


Figure 4.4 shows the average students' overall rating of the quality of scientific supervision

* Explain:

1. Why this internal benchmark provider was chosen?

The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was the Vice Presidency for Planning, Development and Quality, which maintains and release surveys for measuring the quality of capstone project course.

2. How was the benchmark calculated?

An evaluation survey on a five-point scale was conducted to gather the average of students' evaluation about the quality of capstone project course. The evaluations of capstone project students who filled the survey were collected and summed then divided over the number of participants to gain the satisfaction rate.

3. Name of the internal benchmark provider.

Vice Presidency for Planning, Development and Quality.

** Explain:

1. Names of external benchmark providers and the reasons for choosing each provider.

Taif University

The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.

2. How was the benchmark calculated?

The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

E. KPI 5 Table: Average time for students' graduation.

KPI Information			
NCAAA KPI Reference Number	**KPI-PG-05**	Program KPI Reference Number	**KPI-PG-05**
KPI Name and Definition	**Average time for students' graduation:** **Average time (in semesters) spent by students to graduate from the program.**		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
4	**4**	**4**	**4**	**4**

Analysis (list strengths and recommendations):

Analysis:

The average time spent by the student to graduate is 4 semesters. In the MCS program, most students pass in all courses every semester. Therefore, the average is 4 semesters. Figure 4.5 shows the average time spent by students to graduate from the program. By comparing the value of the MCS program with external benchmark values, the MCS program achieves the same value of TU university.

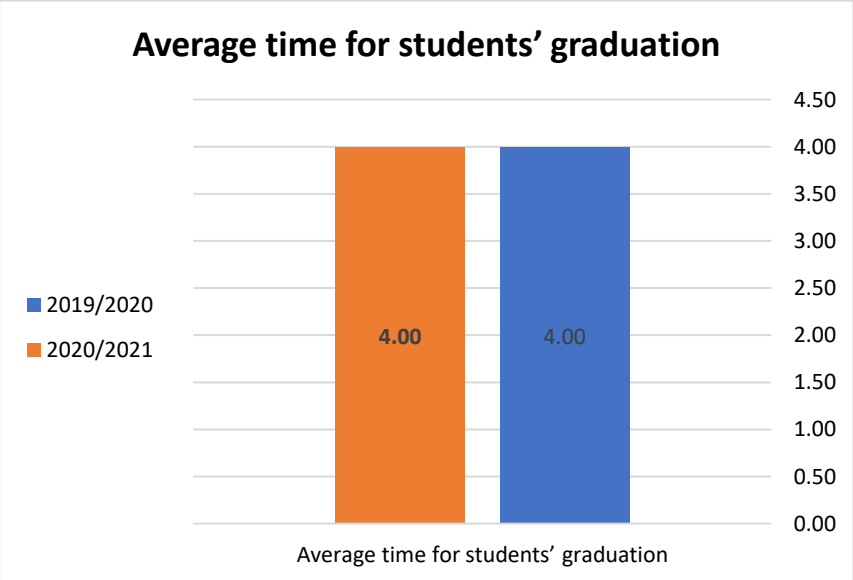


Figure 4.5: Average time (in semester) spent by students to graduate from the program.

* Explain:
1. Why this internal benchmark provider was chosen?
The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was CCI college by taking the statistic from banner system. The cohort table is provided by the college from banner system.
2. How was the benchmark calculated?
Based on the statistical data received from the registration department using the banner system, the Average time for students' graduation is calculated as the following: calculate the number of semesters for each graduated student and divide it by the number of graduate students.
3. Name of the internal benchmark provider.
The cohort table is provided by CCI college from banner system.
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

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

KPI Information			
NCAAA KPI Reference Number	KPI-PG-06	Program KPI Reference Number	KPI-PG-06
KPI Name and Definition	**Rate of students dropping out of the program:** Percentage of students who did not complete the program to the total number of students in the same cohort.		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
8.3%	**10%**	**21.9%**	**0%**	**5%**

Analysis (list strengths and recommendations):

Analysis:

The percentage of students who dropped the course was 21.9% in 2019-2020, while in 2020-2021 the value decreased to 8.3%, which is a great improvement. By comparing the value of the MCS program with external benchmark values, the MCS program achieves higher value than TU university. The MCS program should study the cases of students dropping out of the program and find improvement plan to decrease this value. For example, provide the students with plans to the right path toward earning their degrees, listen to their concerns, and consider giving loans or scholarships if the fees are issues to them. Figure 4.6 shows the rate of students dropping out of the program for the last two years.

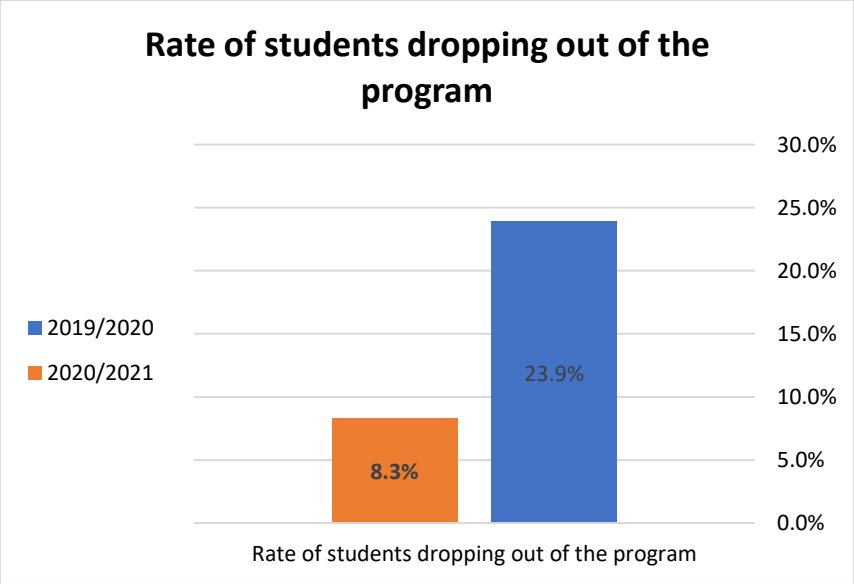


Figure 4.6: Percentage of students who did not complete the program for two years
* Explain:
1. Why this internal benchmark provider was chosen?
The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was CCI college by taking the statistic from banner system. The cohort table is provided by the college from banner system.
2. How was the benchmark calculated?
Based on the statistical data received from the registration department using the banner system, the Rate of students dropping out of the program is calculated as the following: calculate the number of students who did not complete the program to the total number of students in the same cohort.
3. Name of the internal benchmark provider.
The cohort table is provided by CCI college from banner system.
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

G. KPI 7 Table: Graduates' employability.

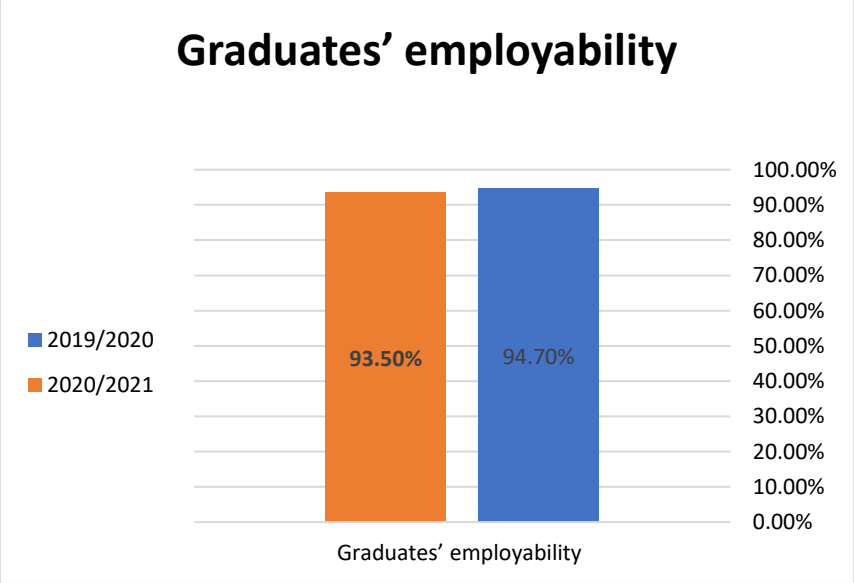
KPI Information			
NCAAA KPI Reference Number	**KPI-PG-07**	Program KPI Reference Number	**KPI-PG-07**
KPI Name and Definition	**Graduates' employability** Percentage of graduates from the program who within a year of graduation were employed to the total number of graduates in the same year.		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
94.7%	**94%**	93.5%	**50%**	**95%**

Analysis (list strengths and recommendations):

Analysis:

The results of this KPI show that the graduates' employability has been increased in 2020-2021. The below figure illustrates the results for both 2019-2020 and 2020-2021 academic years. In addition, by comparing the values of the MCS program with the external benchmark value, the MCS program performs better than TU university.



* Explain:

1. Why this internal benchmark provider was chosen?

The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was university Alumni unit
2. How was the benchmark calculated?
Based on statistical data received from alumni unit, the following calculations are done: a. The total number of employed graduates within a year from graduation is divided by the total number of graduate students multiplied by 100.
3. Name of the internal benchmark provider.
Alumni unit
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

H. KPI 8. Employers' evaluation of the program graduate's competency

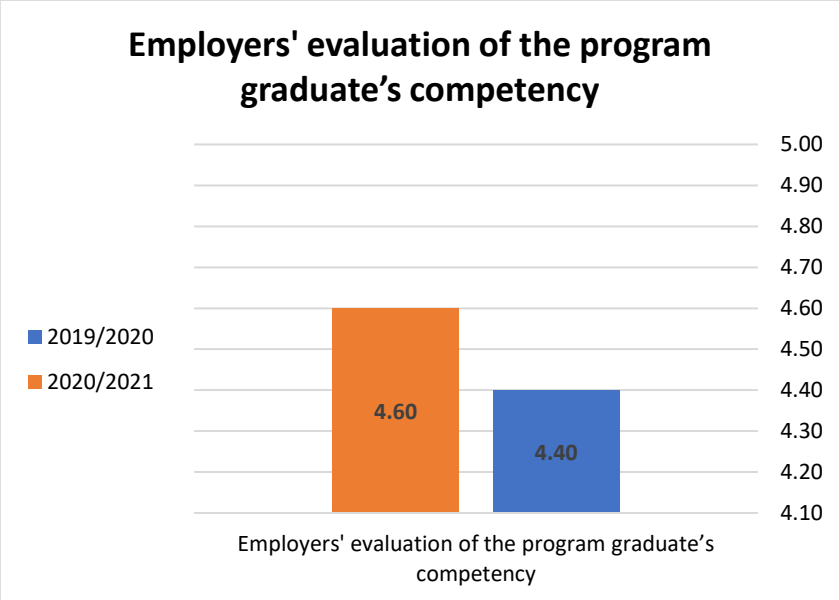
KPI Information			
NCAAA KPI Reference Number	KPI-PG-08	Program KPI Reference Number	KPI-PG-08
KPI Name and Definition	**Employers' evaluation of the program graduate's competency** Average of overall rating of employers for the competency of the program graduates on a five-point scale in an annual survey		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
4.6	**4.5**	**4.4**	**3.15**	**4.7**

Analysis (list strengths and recommendations):

Analysis:

The MCS program offers an educational system that qualifies graduates and provides them with cognitive skills to achieve competitiveness in the labor market. Therefore, the MCS program assesses its performance to develop actions for continuous improvement and enhance productivity. To gather the average of employers' evaluation of the MCS program graduates' proficiency, an evaluation survey on a five-point scale was conducted. The average value for 2020-2021 was 4.6, where it was 4.4 in 2019-2020.



* Explain:

1. Why this internal benchmark provider was chosen?
The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was the Vice Presidency for Planning, Development and Quality, which maintains and release the survey to employers.
2. How was the benchmark calculated?
An evaluation survey on a five-point scale was conducted to gather the employers' evaluation of the MCS program graduates' competency. The evaluations of all employers who filled the evaluation survey were collected and summed then divided over the number of participants to gain the average of the evaluation.
3. Name of the internal benchmark provider.
Survey released by the Vice Presidency for Planning, Development and Quality.
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

I. KPI 9. Students' satisfaction with the provided services

KPI Information			
NCAAA KPI Reference Number	**KPI- PG-9**	**Program KPI Reference Number**	**KPI- PG-9**
KPI Name and Definition	**Students' satisfaction with the provided services** **Average of students' satisfaction rate with the various services provided by the program (food, transportation, sport facilities, academic advising, ...) on a five points scale in an annual survey.**		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
2.5	**3.5**	**3.0**	**4.15**	**3.5**

Analysis (list strengths and recommendations):

Analysis:

The MCS program arranged for many alternative connections between the advisor and the students. The Chair office and the dean office are always opened for the students. The university established a very effective system to serve the students based on offline and online services. Almost all services are automated. Also, most of the students try to be neutral in their responses for such questions. Figure 4.7 shows Students' satisfaction with the provided services for 2020-2021 academic year. The result shows 2.5 out of five in 2020-2021, while in 2019-2020 was 3. By comparing the value of the MCS program with external benchmark values, the MCS program achieves lower value than TU university. The CCI college need to concern more on offered service for student by creating improvement plan to enhance the offered service. For example, The IT department should conduct attempts to increase the students' awareness about the provided services.



Figure 4.7: Students' satisfaction with the provided services

* Explain:

1. Why this internal benchmark provider was chosen?

The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was the Vice Presidency for Planning, Development and Quality, which maintains and release surveys for measuring the Students' satisfaction with the provided services.

2. How was the benchmark calculated?

An evaluation survey on a five-point scale was conducted to gather the average of students' evaluation about the quality of the courses. The evaluations of program students who filled the survey were collected and summed then divided over the number of participants to gain the satisfaction rate. The sum of rate of all provided services divided by number of services with rate of each service = number of satisfied students /number of all students.

3. Name of the internal benchmark provider.

Vice Presidency for Planning, Development and Quality

** Explain:

1. Names of external benchmark providers and the reasons for choosing each provider.

Taif University

The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.

2. How was the benchmark calculated?

The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

J. KPI 10 Table: Ratio of students to faculty members.

KPI Information			
NCAAA KPI Reference Number	**KPI-PG-10**	**Program KPI Reference Number**	**KPI-PG-10**
KPI Name and Definition	**Ratio of students to faculty members.** Ratio of the total number of students to the total number of full-time and full-time equivalent faculty members in the program.		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
Male: 5.7 Female :5	Male: less than 25 Female: less than 25	Male: 6.2 Female: 3.3	Male: 0.64 Girls:1.8	Male: less than 25 Female: less than 25

Analysis (list strengths and recommendations):

Analysis:

The ration number is acceptable for both years 2019-2020 and 2020-2021, because it is less than 25. The MCS program try to be less than 25 students per each faculty member for both male and female. Figure 4.8 shows the ratio of students to teaching staff for two years. By comparing the value of the MCS program with external benchmark values, both values are acceptable because they are less than 25.

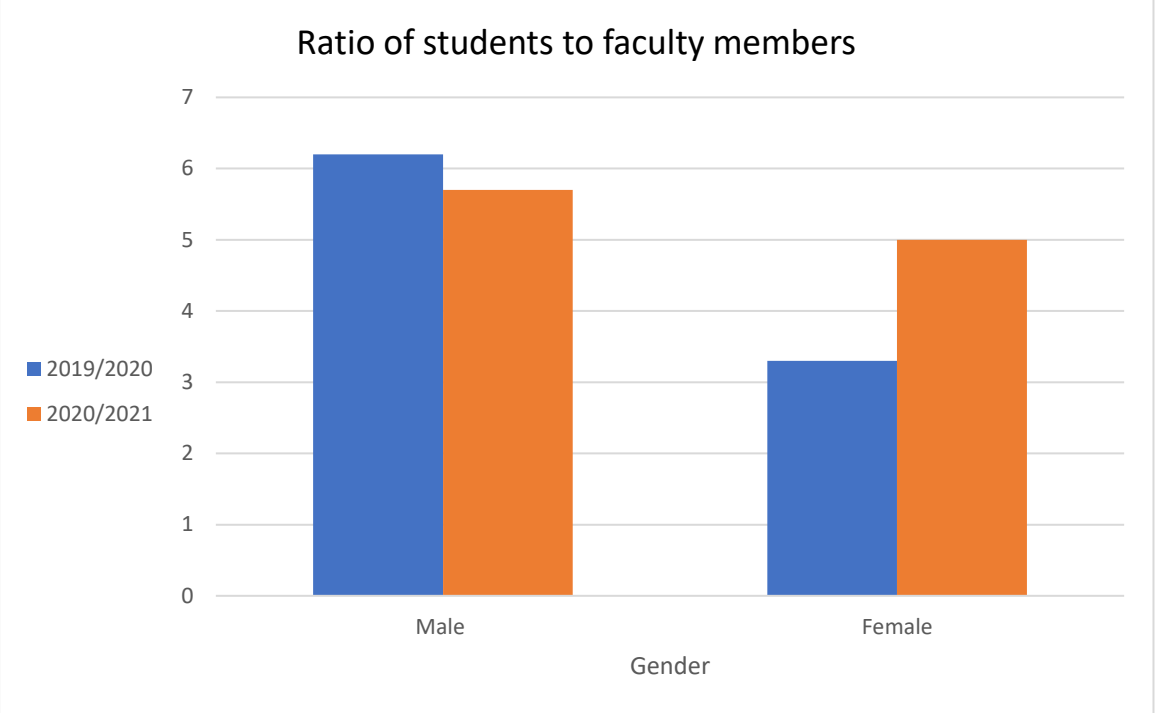


Figure 4.8: Ratio of students to teaching staff for two years

* Explain:
1. Why this internal benchmark provider was chosen?
The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was CCI college by taking the statistic from banner system. The ratio number of students to faculty members is provided by the college from banner system and add it in the program's annual report.
2. How was the benchmark calculated?
Based on statistical data received from the college, Ratio of students to teaching staff is the total number of students divided by the total number of full-time and full- time equivalent faculty members in the program.
3. Name of the internal benchmark provider.
Ratio of students to faculty members is provided by CCI college from banner system and add it in the program's annual report.
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University

The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

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

<table>
<tr><th colspan="10">KPI Information</th></tr>
<tr><td>NCAAA KPI Reference Number</td><td colspan="3">KPI-PG-11</td><td>Program KPI Reference Number</td><td colspan="4">KPI-PG-11</td></tr>
<tr><td>KPI Name and Definition</td><td colspan="8">Percentage of faculty members' distribution based on academic ranking
Percentage distribution of faculty members participating in the program based on academic ranking.</td></tr>
<tr><th colspan="10">KPI Benchmarking</th></tr>
<tr><td colspan="4">Actual Benchmark</td><td>Target Benchmark</td><td colspan="4">Internal Benchmark*</td><td>External Benchmark**</td><td>New Target Benchmark</td></tr>
<tr><td colspan="4">2020-2021</td><td>2020-2021</td><td colspan="4">2019-2020</td><td>2020-2021</td><td>2021-2022</td></tr>
<tr><td rowspan="2">Assoc. Prof</td><td>F</td><td>0</td><td rowspan="2">23.8 %</td><td rowspan="3">Assoc. Pro. = 25%
Assist. Pro. = 70%
Full Prof 5%</td><td rowspan="2">Assoc Prof</td><td>F</td><td>0</td><td rowspan="2">26.7 %</td><td rowspan="3">Female: 17.2%
Male: 82.8%
Full Prof: 6.9%
Assoc. Pro.: 51.7%
Assist. Pro: 41.4%</td><td rowspan="3">Assoc. Pro. = 30%
Assist. Pro. = 65%
Full Prof 5%</td></tr>
<tr><td>M</td><td>33.3 %</td><td>M</td><td>33.3 %</td></tr>
<tr><td rowspan="2">Assist. Prof</td><td>F</td><td>100 %</td><td rowspan="2">71.4 %</td><td rowspan="2">Assist Prof</td><td>F</td><td>100 %</td><td rowspan="2">73.3 %</td></tr>
<tr><td>M</td><td>60%</td><td>M</td><td>66.7 %</td></tr>
<tr><td>Full-Prof</td><td>M</td><td>6.7 %</td><td>4.8 %</td><td colspan="5"></td></tr>
<tr><td colspan="10">Analysis (list strengths and recommendations):</td></tr>
<tr><td colspan="10">Analysis:
The percentage of faculty members distribution was calculated based on gender branch and academic ranking for both years 2019-2020 and 2020-2021. One of the main goals of the program is to deliver a high-quality teaching. The proportion of faculty members with associate professor ranking was decreased to 23.8% in 2020-2021, the percentage of faculty members with Full professor academic ranking was increased to 4.8% in 2020-2021, since there was no full professor in 2019-2020. The distribution of faculty members is well distributed, and it is expected that more faculty members with will join the program. Figure 4.9 shows the distribution of faculty members based on academic ranking. By comparing the values of the MCS program with external benchmark values, the values of TU are higher than the values of the MCS program.</td></tr>
</table>

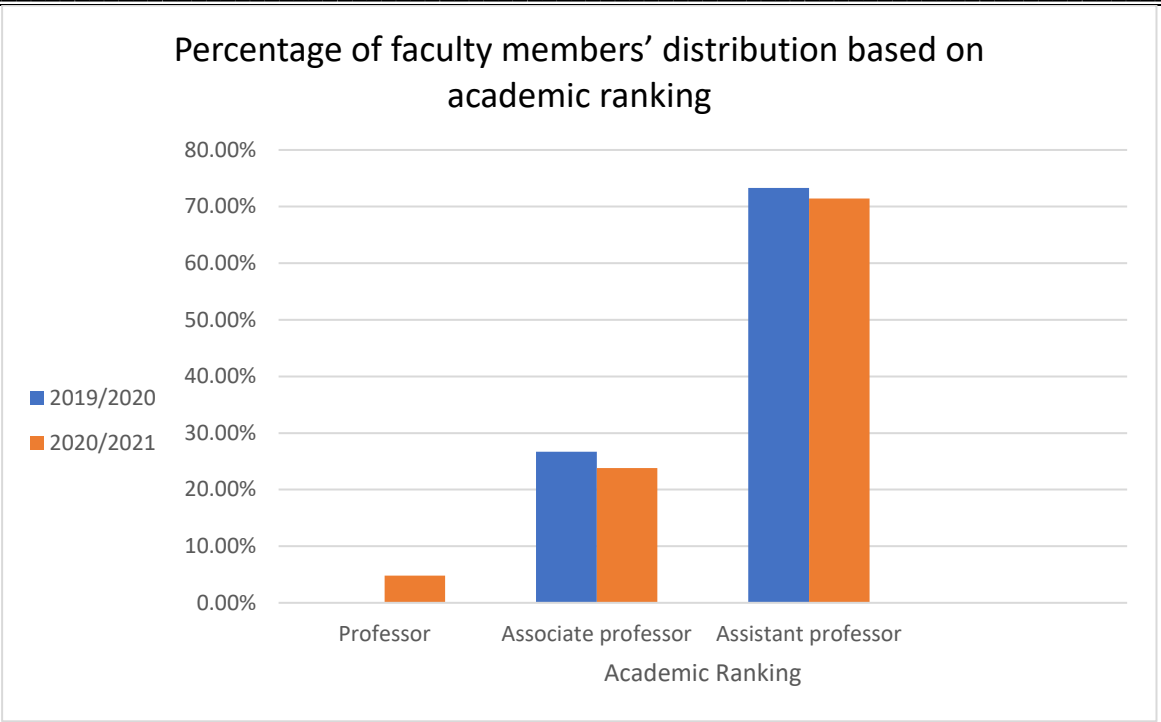


Figure 4.9 shows the distribution of faculty members based on academic ranking

* Explain:

1. Why this internal benchmark provider was chosen?

The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was the Vice Presidency for Academic Affairs, which maintains and updates the data and statistics related to all teaching staff at the institutional level.

2. How was the benchmark calculated?

- The percentage of male faculty members is the number of male faculty members divided by the total number of faculty members.

- The Percentage of female teaching staff is the number of women faculty members divided by the total number of faculty members.

-The Percentage of full professor teaching staff is the total number of full professors divided by the total number of faculty members.

-The Percentage of associated professor is the number of assistant professors divided by the total number of faculty members.

The Percentage of assistant professor is the number of assistant professors divided by the total number of faculty members.

3. Name of the internal benchmark provider.

The source of data for this KPI was the Vice Presidency for Academic Affairs, which maintains and updates the data and statistics related to all faculty members at the institutional level.
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

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

<table>
<tr><th colspan="9">KPI Information</th></tr>
<tr><td colspan="2">NCAAA KPI Reference Number</td><td colspan="3">KPI-PG-12</td><td colspan="2">Program KPI Reference Number</td><td colspan="2">KPI-PG-12</td></tr>
<tr><td colspan="2">KPI Name and Definition</td><td colspan="7">Proportion of faculty members leaving the program.
Proportion of faculty members leaving the program annually for reasons other than age retirement to the total number of faculty members.</td></tr>
<tr><th colspan="9">KPI Benchmarking</th></tr>
<tr><td colspan="3">Actual Benchmark</td><td>Target Benchmark</td><td colspan="3">Internal Benchmark*</td><td>External Benchmark**</td><td>New Target Benchmark</td></tr>
<tr><td colspan="3">2020-2021</td><td>2020-2021</td><td colspan="3">2019-2020</td><td>2020-2021</td><td>2021-2022</td></tr>
<tr><td>M</td><td>0</td><td rowspan="2">4.8 %</td><td rowspan="2">1%</td><td>M</td><td>0</td><td rowspan="2">0%</td><td rowspan="2">Male: 4%
Female:0%
All:3.4%</td><td rowspan="2">1%</td></tr>
<tr><td>F</td><td>16.7%</td><td>F</td><td>0</td></tr>
<tr><td colspan="9">Analysis (list strengths and recommendations):</td></tr>
<tr><td colspan="9">Analysis:

Some faculties find better job offers in private sectors and foreign faculties decided to return to their countries. However, the percentage is low, and the environment of the work is suitable and encourage many faculty members to join the CCI college. Figure 4.10 shows the proportion of faculty members leaving the program. By comparing the values of the MCS program with external benchmark values, the percentage of TU is slightly lower. The IT department should provide attractive research opportunities and establish an open policy for performance-based evaluation, including annual raises, additional educational opportunities, and career development activities.</td></tr>
</table>

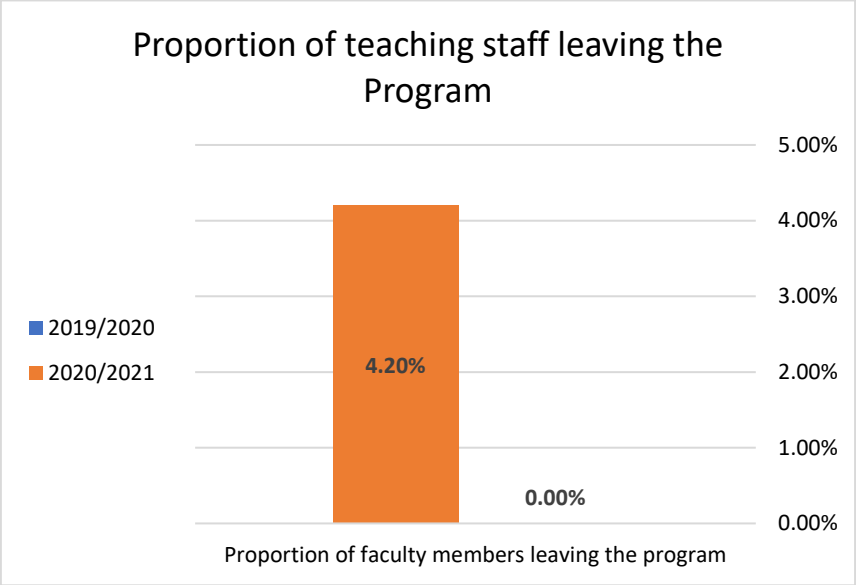


Figure 4.10: Proportion of faculty members leaving the program.

* Explain:

1. Why this internal benchmark provider was chosen?

The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was the Vice Presidency for Academic Affairs, which maintains and updates the data and statistics related to all faculty members at the institutional level.

2. How was the benchmark calculated?

Based on statistical data received from the Vice Presidency for Academic Affairs, the proportion of faculty members leaving the program is calculated as the following: the total number of faculty members leaving the program annually for reasons other than age retirement is divided by the total number of faculty members then multiplied by 100.

3. Name of the internal benchmark provider.

The source of data for this KPI was the Vice Presidency for Academic Affairs, which maintains and updates the data and statistics related to all faculty members at the institutional level.

** Explain:

1. Names of external benchmark providers and the reasons for choosing each provider.

Taif University

The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.

2. How was the benchmark calculated?

The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

M. KPI 13. Satisfaction of beneficiaries with the learning resources

KPI Information			
NCAAA KPI Reference Number	KPI- PG-13	**Program KPI Reference Number**	KPI- PG-13
KPI Name and Definition	**Satisfaction of beneficiaries with the learning resources:** Average of beneficiaries' satisfaction rate with the adequacy and diversity of learning resources (references, journals, databases… etc.) on a five- point scale in an annual survey.		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
3.9	**4**	**4.5**	**N/A**	**4.5**

Analysis (list strengths and recommendations):

Analysis:

The above numbers (KPI Benchmarking) and Figure 4.11 shows the Average of beneficiaries' satisfaction rate with the adequacy and diversity of learning resources of courses on a five-point scale in an annual survey. Figure 4.11 shows the satisfaction of beneficiaries with the learning resources as a column chart for two years 2019-2020 and 2020-2021. Unfortunately, in 2021-2021 the value decreased to 3.9. There was a 0.6 decrement compared to 2019/2020. While the value 3.9 (out of 5) is still acceptable, the MCS program should put plans to increase it. The external benchmark value is not available for TU university.

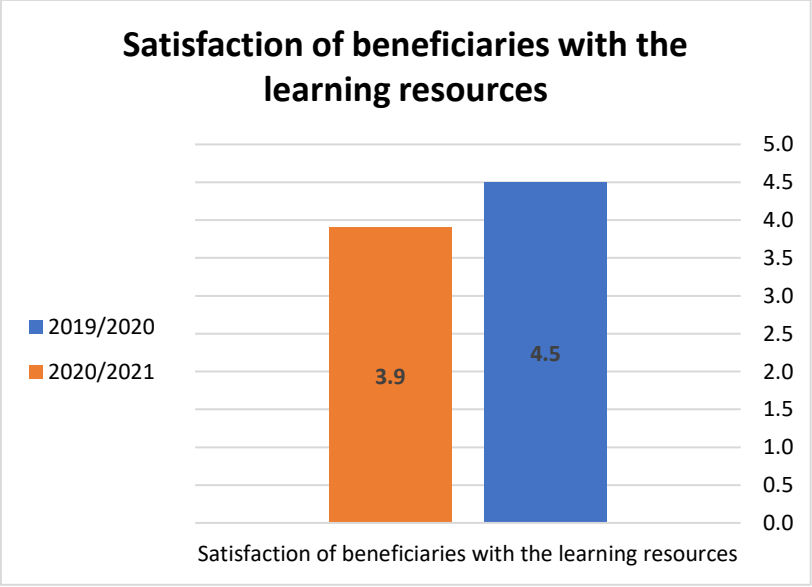


Figure 4.11: Satisfaction of beneficiaries with the learning resources
* Explain:
1. Why this internal benchmark provider was chosen?
The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was the Vice Presidency for Planning, Development and Quality, which maintains and release surveys for measuring the quality of program.
2. How was the benchmark calculated?
An evaluation survey on a five-point scale was conducted to gather the average of students' and faculty members evaluation about the satisfaction on learning resources. The evaluations of beneficiaries who filled the survey were collected and summed then divided over the number of participants to gain the satisfaction rate.
3. Name of the internal benchmark provider.
Vice Presidency for Planning, Development and Quality.
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

N. KPI 14. Satisfaction of beneficiaries with research facilities and equipment

KPI Information			
NCAAA KPI Reference Number	KPI- PG-14	**Program KPI Reference Number**	KPI- PG-14
KPI Name and Definition	**Satisfaction of beneficiaries with research facilities and equipment:** Average of beneficiaries' satisfaction rate with research facilities and equipment (depending on the nature of the program) on a five-point scale in an annual survey.		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
4.4	**4.8**	**4.7**	**4.15**	**4.8**

Analysis (list strengths and recommendations):

Analysis:

The above numbers indicate the satisfaction of beneficiaries with research facilities and equipment on a five-point scale in an annual survey. Figure 4.12 shows the satisfaction of beneficiaries with research facilities and equipment as a column chart for two years 2019-2020 and 2020-2021. Unfortunately, in 2021-2021 the value decreases to be 4.4. The MCS program should concern more on research facilities and equipment by creating improvement plan to enhance the value. By comparing the value of the MCS program with external benchmark values, the MCS program achieves higher value than TU university.

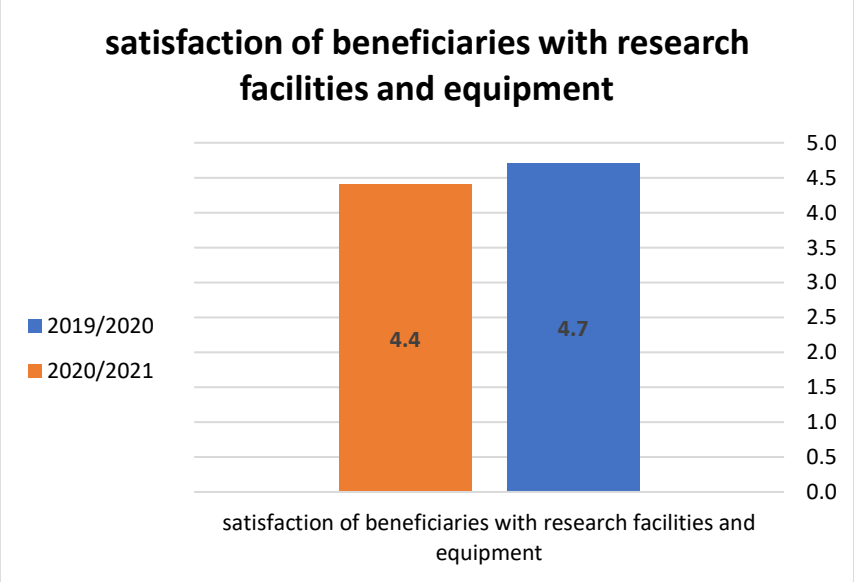


Figure 4.12: satisfaction of beneficiaries with research facilities and equipment
* Explain:
1. Why this internal benchmark provider was chosen?
The university assesses its performance based on the trend of its KPIs values as they progress over the years in order to develop actions for continuous improvement and enhance productivity. The source of data for this KPI was the Vice Presidency for Planning, Development and Quality, which maintains and release surveys for measuring the quality of program.
2. How was the benchmark calculated?
An evaluation survey on a five-point scale was conducted to gather the average of students' and faculty members evaluation about the satisfaction on learning resources. The evaluations of beneficiaries who filled the survey were collected and summed then divided over the number of participants to gain the satisfaction rate.
3. Name of the internal benchmark provider.
Vice Presidency for Planning, Development and Quality.
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

O. KPI 15 Table: Percentage of publications of faculty members.

KPI Information			
NCAAA KPI Reference Number	**KPI-PG-15**	**Program KPI Reference Number**	**KPI-PG-15**
KPI Name and Definition	**Percentage of publications of faculty members:** Percentage of full-time faculty members who published at least one research during the year to total faculty members in the program.		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
66.67%	**90%**	**86.6%**	**83%**	**90%**

Analysis (list strengths and recommendations):

The results of the publications of faculty members are promising. This is due to the PMAU and the college strategies in encouraging and enabling research and publications. However, the result decreased in the 2020-2021 because that new faculty members joined the program in 2020-2021. Figure 4.13 shows the percentage of publications of faculty members. By comparing the value of the MCS program with external benchmark values, the MCS program achieves lower value than TU university. The MCS program should increase the budget for research and put plans to increase the improve the percentage of publications such as the continuous encouragement and reducing the academic load of the faculty members and, in return, engaging them in research projects.

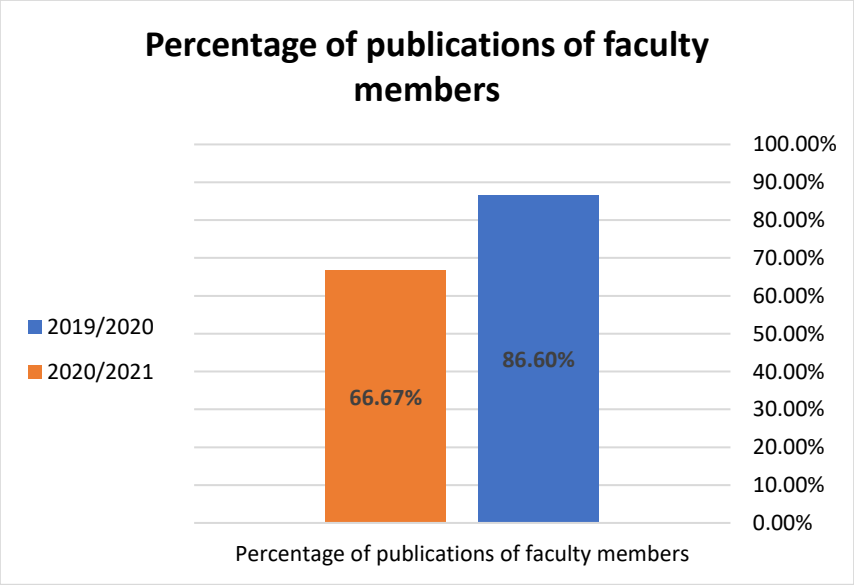


Figure 4.13: Percentage of publications of faculty members
* Explain:
1. Why this internal benchmark provider was chosen?
Deanship of scientific research is responsible for keeping the tracks of all the publications for the university faculties
2. How was the benchmark calculated?
Based on statistical data received from the deanship of scientific research. The percentage is calculated as the following: Number of full-time faculty members who published at least one research during the year is divided by the total faculty members in the program multiplied by 100
3. Name of the internal benchmark provider.
Deanship of scientific research
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

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

KPI Information			
NCAAA KPI Reference Number	**KPI- PG-16**	**Program KPI Reference Number**	**KPI- PG-16**
KPI Name and Definition	**Rate of published research per faculty member:** The average number of refereed and/or published research per each faculty member during the year (total number of refereed and/or published research to the total number of full time or equivalent faculty members during the year)		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
3:1	**3:1**	**2.9:1**	**6.5:1**	**4:1**

Analysis (list strengths and recommendations):

The publication rate was slightly increased in 2020-2021. Figure 4.14 shows the rate of publication per faculty member for two years 2019-2020 and 2020-2021. By comparing the value of the MCS program with external benchmark values, the MCS program achieves lower value than TU university. The PMAU and MCS program should increase the budget for research and put improvement plan to increase the publication rate.

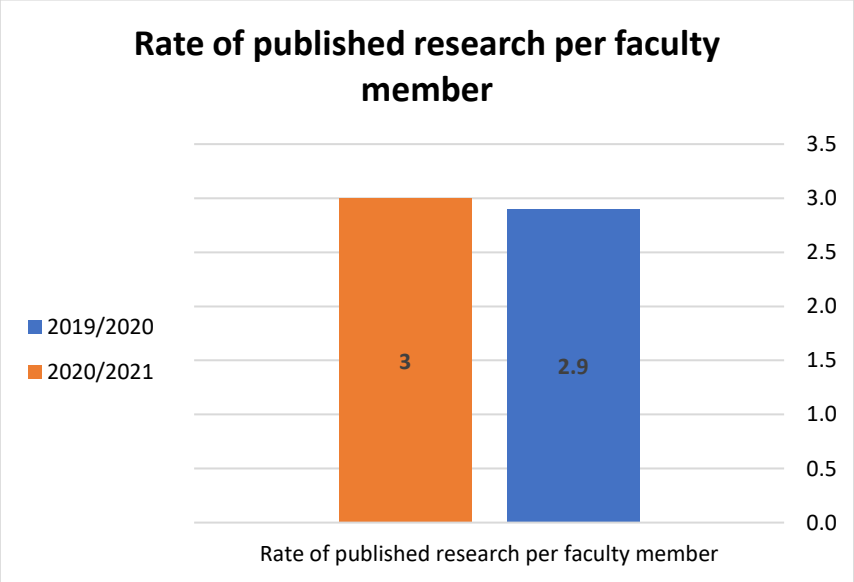


Figure 4.14: Rate of publication per faculty members

* Explain:

1. Why this internal benchmark provider was chosen?

Deanship of scientific research is responsible for keeping the tracks of all the publications for the university faculties
2. How was the benchmark calculated?
Based on statistical data received from the deanship of scientific research, the rate of published research per faculty member is calculated as the following: The total number of refereed and/or published research is divided by the total number of full time or equivalent faculty members during the year.
3. Name of the internal benchmark provider.
Deanship of scientific research
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

Q. KPI 17. Citations rate in refereed journals per faculty member

KPI Information			
NCAAA KPI Reference Number	KPI- PG-17	**Program KPI Reference Number**	KPI- PG-17
KPI Name and Definition	**Citations rate in refereed journals per faculty member**: The average number of citations in refereed journals from published research per faculty member in the program (total number of citations in refereed journals from published research for full-time or equivalent faculty members to the total research published).		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
10.8:1	**12:1**	**11.9:1**	**14:1**	**12:1**

Analysis (list strengths and recommendations):

Analysis:

The rates of citation for both years 2019-2020 and 2020-2021 were higher than 10:1. This is due to the encourage and motivation of the faculty members to participate in conducting research and publication. Most of the professors tried to publish in ISI or SCOUPS journals with free access. This caused a high rate of citation. Figure 4.15 shows citations rate in refereed journals per faculty member for two years 2019-2020 and 2020-2021. By comparing the value of the MCS program with external benchmark values, the MCS program achieves lower value than TU university. The CCI college should encourage faculty members to publish more research.

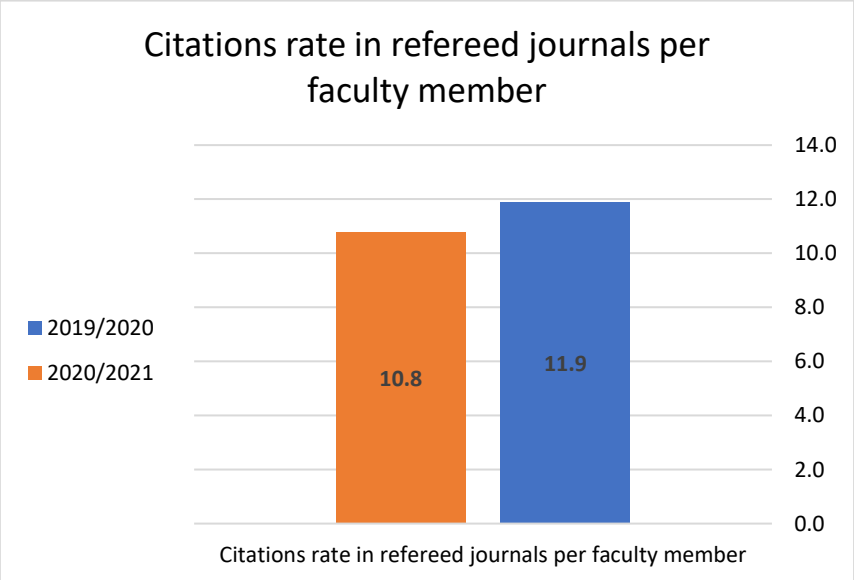


Figure 4.15: Citations rate in refereed journals per faculty member for two years
* Explain:
1. Why this internal benchmark provider was chosen?
Deanship of scientific research is responsible for keeping the tracks of all the publications for the university faculties
2. How was the benchmark calculated?
Based on statistical data received from the deanship of scientific research, the citations rate in refereed journals per faculty member is calculated as the following: total number of citations in refereed journals from published research for full-time or equivalent faculty members to the total research published
3. Name of the internal benchmark provider.
Deanship of scientific research
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

R. KPI 18. Percentage of students' publication

KPI Information			
NCAAA KPI Reference Number	KPI- PG-18	**Program KPI Reference Number**	KPI- PG-18
KPI Name and Definition	**Percentage of students' publication:** 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.		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
Journals: 3.4% **Conference:0%**	**Journals: 5%** **Conference:5%**	**Journals: 0%** **Conference:4.8%**	**N/A**	**Journals: 5%** **Conference:5%**

Analysis (list strengths and recommendations):

Analysis:

Based on the above results, the percentage of students' publications in journals increased in the 2020-2021 to 3.4% instead of 0% in 2019-2020. However, publishing conference papers was decreased to 0% in 2020-2021. Figure 4.16 shows the percentage of publications of students. The PMAU and the MCS program should increase the budget for students' research and put improvement plans, such as offering a number of courses related to research that can further enrich research experiences of all students and faculty.

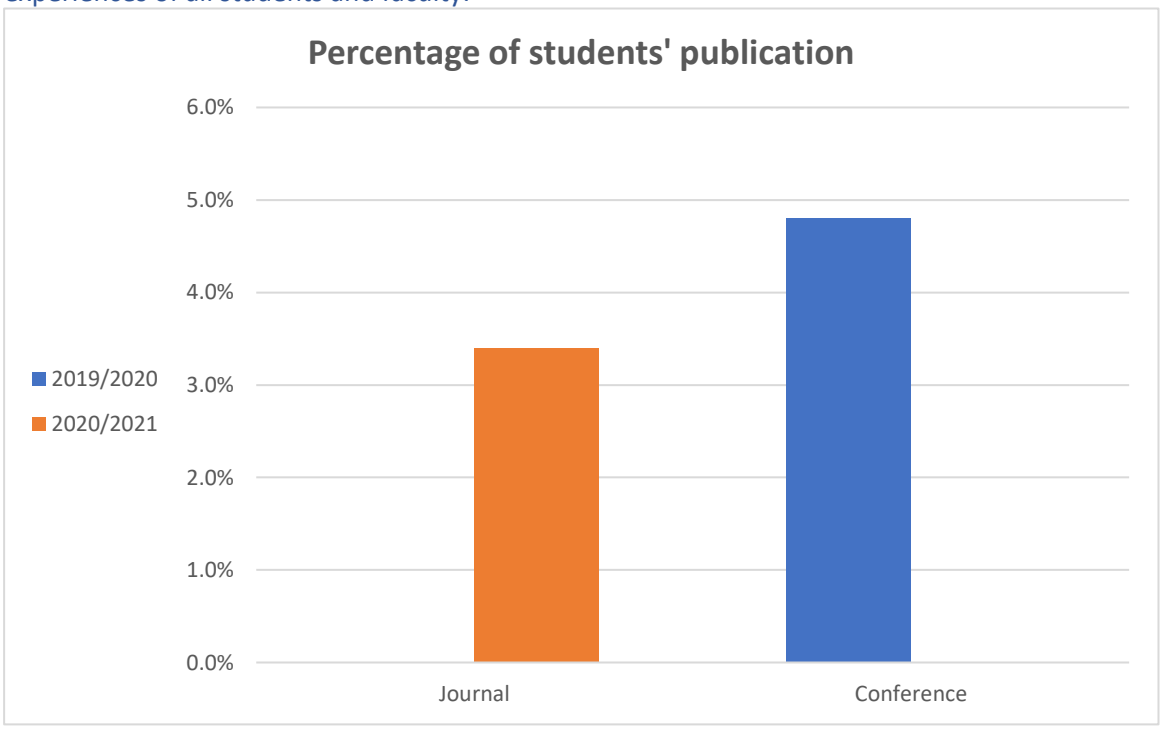


Figure 4.16: Percentage of publications of student
* Explain:
1. Why this internal benchmark provider was chosen?
Deanship of scientific research is responsible for keeping the tracks of all the publications for the students
2. How was the benchmark calculated?
Based on statistical data received from the deanship of scientific research. The percentage is calculated as the following: a-Number of students who published in journals during the year is divided by the total student members in the program multiplied by 100 b-Number of students who published in conference during the year is divided by the total student members in the program multiplied by 100
3. Name of the internal benchmark provider.
Deanship of scientific research
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.

S. KPI 19. Number of patents, innovative products, and awards of excellence

KPI Information			
NCAAA KPI Reference Number	KPI- PG-18	**Program KPI Reference Number**	KPI- PG-18
KPI Name and Definition	**Number of patents, innovative products, and awards of excellence** Number of: a. Patents and innovative products b. National and international excellence awards obtained annually by the students and staff of the program.		

KPI Benchmarking				
Actual Benchmark	Target Benchmark	Internal Benchmark*	External Benchmark**	New Target Benchmark
2020-2021	2020-2021	2019-2020	2020-2021	2021-2022
No. Patent: 4 **No. awards:0**	**No. Patent: 5** **No. awards:5**	**No. Patent: 0** **No. awards:0**	**N/A**	**No. Patent: 5** **No. awards:5**

Analysis (list strengths and recommendations):

Analysis:

The results are promising since the percentage of registered patents increased in the 2020-2021 to 4 instead of zero in 2019-2020. However, there are not any national and international awards. Figure 4.17 shows the number of patents in 2020-2021. The IT department should allocate more funds for research, pay closer attention to excellence awards, focus on the research groups, and reduce the academic load of the faculty members.

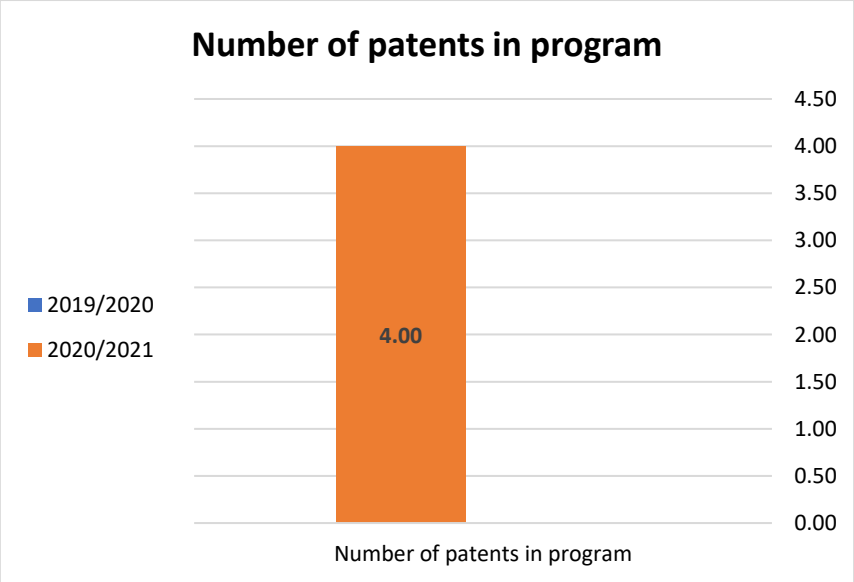


Figure 4.16: Number of patents in program

* Explain:
1. Why this internal benchmark provider was chosen?
Deanship of scientific research is responsible for keeping the tracks of all the publications for the students
2. How was the benchmark calculated?
Based on statistical data received from the deanship of scientific research. The percentage is calculated as the following: a-Number of students and faculty members who registered patents during the year. b-Number of students faculty members who got National and international excellence awards.
3. Name of the internal benchmark provider.
Deanship of scientific research
** Explain:
1. Names of external benchmark providers and the reasons for choosing each provider.
Taif University **The IT department console has selected MCS program in Taif University as an external benchmark according to the criteria given in the Introduction of this report.**
2. How was the benchmark calculated?
The MCS program in TU university is used NCAAA KPI's, Therefore the data is used directly. The achievement of this KPI by MCS program was compared with the same factor of the external benchmark of TU.