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The Report of
Key Performance indicators of the Program quality standards with comparison of their Internal, Target and External Benchmarks

Computer Science (CS) Program

Academic Year
(2019-2020 G / 1440-1441 H)

Najran University
College of Computer Science and Information Systems

September 2020

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1. Introduction

Towards assessing the quality of CS program, Key Performance Indicators (KPIs) have been adopted by the Information System department. All these KPIs evaluation are based on NCAAA's 6 standards and its corresponding target benchmarks. These KPIs, which plan to be assessed every year and used on a comparative basis, apply to colleges, academic and administrative units are commonly accepted and quantifiable. Additionally, an open set will be also employed whereby units can define their own KPIs which are relevant to and representative of the unique nature of their own operations.

The DQU identified its sets of KPIs that is and benchmarks used for quality assessment of any program of the College of Computer Science and Information Systems. All the KPIs that are program-based and benchmarks are approved by college council and program council as a part of activity of DQU. There are 17 approved KPIs categorized under the six NCAAA standards out of which one KPI numbered KPI-P-06 under the standard-3 is not applicable to the CS program. The CS Program has also adopted one additional KPI numbered KPI-P-I-1 under the standard-2 and that makes a total of 17 KPIs that are applicable and are used to evaluate the program. These KPIs are planned to be assessed every year by which the level of performance of the program units can be determined.

As a part of the requirement of the program accreditation, the purpose of this report is to provide an overall analysis of the Key Performance Indicators used by the program in order to assess its performance with respect to the standards set by NCAAA.

2. Key Performance Indicators:

The following table 2.1 shows the list of Key Performance Indicators (KPIs) that are adopted by the CS Program for the academic year 2019-2020.

Table 2.1 List of Key Performance Indicators adopted by the CS program (2019-2020)

Standard	KPIs Code	Key Performance Indicators	Description
1 – Mission and Goals	KPI-P-01	Percentage of achieved indicators of the program operational plan objectives	Percentage of performance indicators of the operational plan objectives of the program that achieved the targeted annual level to the total number of indicators

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			targeted for these objectives in the same year
3– Teaching and Learning	KPI-P-02	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-P-03	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-P-04	Completion Rate	Proportion of undergraduate students who completed the program in minimum time in each cohort
	KPI-P-05	First-year students retention rate	Percentage of first-year undergraduate students who continue at the program next year to the total number of first-year students in the same year
	KPI-P-07	Graduates' employability and enrolment in postgraduate programs	Percentage of graduates from the program who within a year of graduation were a. employed b. enrolled in postgraduate programs during the first year of their graduation to the total number of graduates in the same year
	KPI-P-08	Average number of students in the class	Average number of students per class (in each teaching session/activity: lecture, small group, tutorial, laboratory or clinical session)
	KPI-P-09	Employers' evaluation of the program graduate's proficiency	Average of overall rating of employers for the proficiency of the program graduates on a five-point scale in an annual survey
4 – Students	KPI-P-10	Students' satisfaction with the offered services	Average of students' satisfaction rate with the various services offered by the program (restaurants, transportation, sports facilities, academic advising, ...) on a five-point scale in an annual survey
5 – Teaching Staff	KPI-P-11	Ratio of students to teaching staff	Ratio of the total number of students to the total number of full-time and full-time equivalent teaching staff in the program

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	KPI-P-12	Percentage of teaching staff distribution	Percentage of teaching staff distribution based on: a. Gender b. Branches c. Academic Ranking
	KPI-P-13	Proportion of teaching staff leaving the program	Proportion of teaching staff leaving the program annually for reasons other than age retirement to the total number of teaching staff.
	KPI-P-14	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-P-15	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-P-16	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)
6 - Learning Resources, Facilities, and Equipment	KPI-P-17	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.
2 – Program Management and Quality Assurance (Additional KPI)	KPI-P-I-1	Proportion of full-time teaching and other staff actively engaged in community service activities	Ratio of the total number of faculty members to the total number of community service activities in the program

3. Data sources

The NCAAA standard committees of the DQU of CCSIS collected the data required to assess the KPI of their respective standards. The soft copy of the overall analysis of the KPIs is available in the link given below:

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https://nejranuniversity-
my.sharepoint.com/:f:/g/personal/sbrasool_nu_edu_sa/EtMsheqtDkBFvK7h3syjxzYB0_
nvwBRMOQa0BbMQpaEZBA?e=nMYcTh

In addition, the soft copy of the individual standards' KPI Analysis is available with the standards' committees as well.

4. Analysis:

The quality standard committee of the CSIS measures the key performance indicators with benchmarking using the appropriate tools, such as Surveys, Statistical data, etc. according to the nature and objective of each performance indicators. The quality standard committee prepares the survey, or the questionnaire based on the indicator to be measured. The survey or questionnaire will be approved by the college / program council through the DQU of CSIS.

The quality standard committee also collects statistical (either from the Head of the Department or from Central system of the university through the college registrar) that are needed to process their respective KPIs.

All related KPIs were assessed to verify present quality status of the program those would ultimately help to improve and assure quality structure of the program in future. The evaluations of KPIs ensure a very consistent and reliable improvement plan to improve the quality of the program.

Method:

During the academic year 2019-2020, the NCAAA standard committee/ unit collected the statistical data and conducted surveys that are needed to analyze the Program based Key Performance Indicators of their respective NCAAA standards. Each standard committee then sent their KPI analysis to the DQU in order to prepare the overall KPI analysis that in turn is used to monitor the program's performance.

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Result:

The table 1.2 given below shows the assessment of the approved program KPI

assessment

Table 4.1: Approved Program KPI assessment

KPI #	Program Key Performance Indicators	Actual Performance Level for the year 2019/ 2020	KPI Target Bench mark	KPI Internal Bench mark (2019/2020-IS Program)	KPI External Bench mark (Hail University)	KPI External Bench mark (King Faisal University)	New Target Benchmark for the year 2020 / 2021
KPI-P-01	Percentage of achieved indicators of the program operational plan objectives	89.51%	85%	88.92%	82.7%	Not Available	90%
KPI-P-02	Students' evaluation of quality of learning experience in the program	69.51% ≈ 3.48(on five point scale)	75%≈ 3.75 (on five point scale)	65%≈ 3.25 (on five point scale)	48.5%	3.5	75%≈ 3.75 (on five point scale)
KPI-P-03	Students evaluation on the quality of the courses	79.24% ≈ 3.96(on five point scale)	85%≈ 4.25(on five point scale)	83.45% ≈ 4.17 (on five point scale)	73.98%	78.2% = 3.91 (on a 5-point scale)	80%≈ 4.0(on five point scale)
KPI-P-04	Completion Rate	61.19%	75%	50%	23%	47.4%	75%
KPI-P-05	First year students retention rate	90%	60%	87.46%	95.79%	100%	90%
KPI-P-06	Students' performance in the professional and/or national examinations	N/A	N/A	N/A	N/A	N/A	N/A
KPI-P-07	Graduates' employability and enrolment in postgraduate programs	a) 22.5% b) 6.5%	a) 30% b) 10%	a) 14.29 % b) 0%	60%	Not Calculated	a) 30% b) 10%
KPI-P-08	Average number of students in the class	12	12	11	16	13	15
KPI-P-09	Employers' evaluation of the	88%	85%	87.98%	74.28%	Not Calculated	90%

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	program graduates proficiency						
KPI-P-10	Students' satisfaction with the offered services	81.5% (4.08on a 5-point scale)	70%(3.5 on a 5-point scale)	81% (4 on a 5-point scale)	3.52	70%(3.5 on a 5-point scale)	85%(4.25 on a 5-point scale)
KPI-P-11	Ratio of students to teaching staff	1:10	1:20	1:4	1:20	1:12	1:20
KPI-P-12	Percentage of teaching staff distribution	40%	70%	50%	72%	60%	70%
KPI-P-13	Proportion of teaching staff leaving the program	7%	≤ 10%	10%	35%	0%	≤ 10%
KPI-P-14	Percentage of publications of faculty members	40%	40%	70%	42%	50%	50%
KPI-P-15	Rate of published research per faculty member	1:1	2:1	2:1	1.09:1	1:2	2:1
KPI-P-16	Citations rate in referred journals per faculty member	1:5.7	1:4	1:5.3	1:0.96	Not Available	1:6
KPI-P-17	Satisfaction of beneficiaries with the learning resources	55.89% = 2.79(on 5-point scale)	70%= 3.5 (on 5-point scale)	54.04% = 2.7 (on 5-point scale)	4.13	73.75% = 3.69(on 5-point scale)	70%= 3.5 (on 5-point scale)
KPI-P-I-1	Proportion of full-time teaching and other staff actively engaged in community service activities.	1:3	1:2	2:1	N/A	N/A	1:2

Analysis of Individual KPIs:

This section shows the analysis results of the individual KPIs in each standard.

KPI-P-01:

The following figure shows the analysis result of the KPI-P-01. It can be noted from the figure that the actual benchmark is 89.51% that exceeds the target and hence target benchmark is achieved. The external benchmarking is available for Hail University and not for King Faisal University.
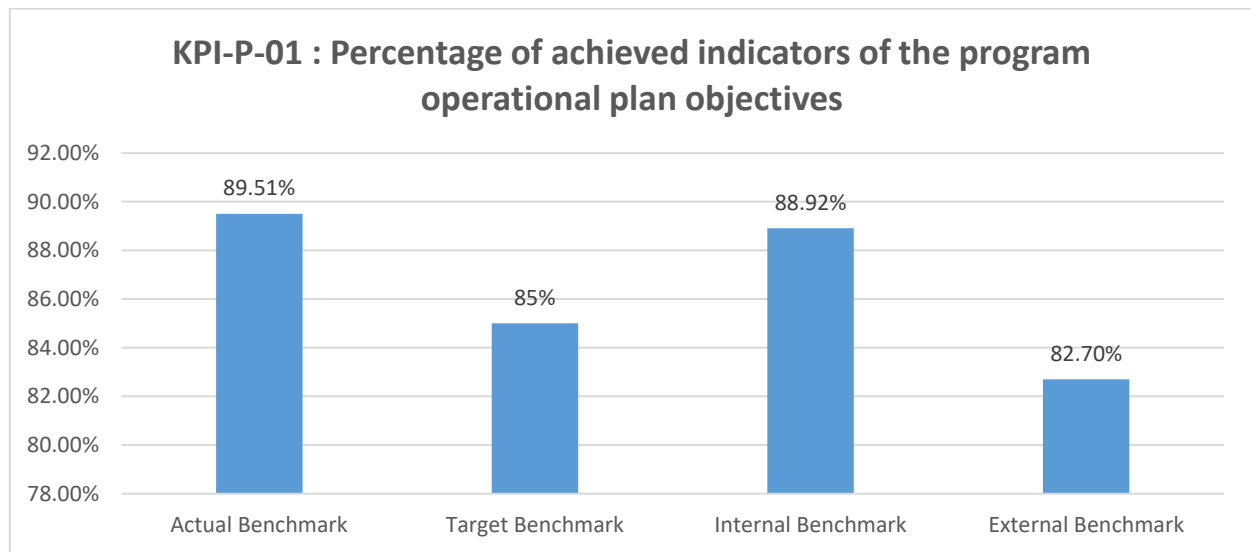
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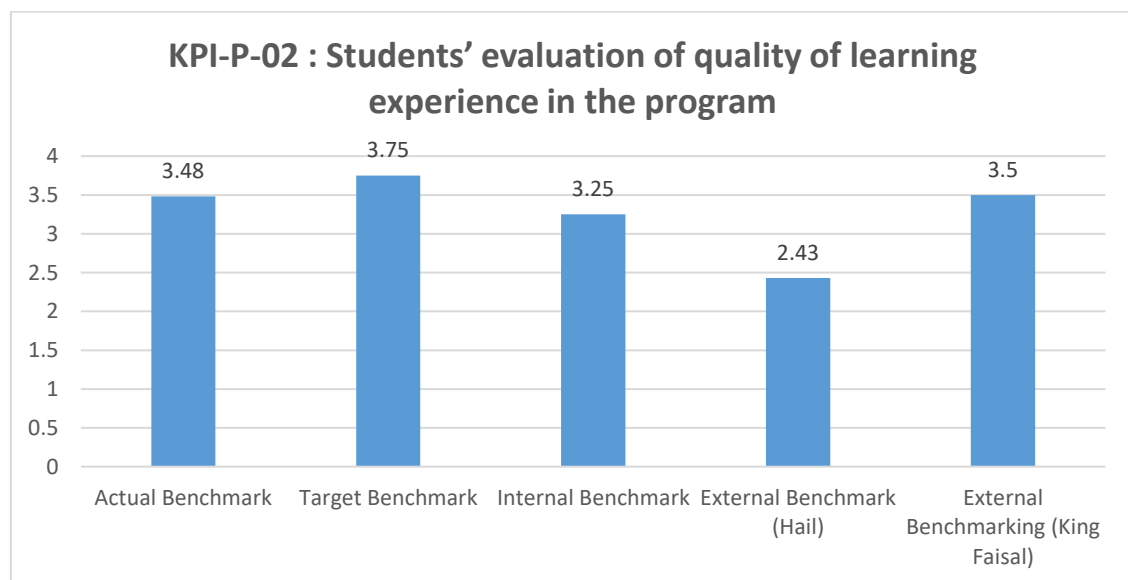المعلومات

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Figure 4.1: Analysis Result of KPI-P-01

KPI-P-02:

The following figure shows the analysis result of the KPI-P-02 on a five-point scale. It can be noted from the figure that the actual benchmark is 3.48 which is just below the target and hence target benchmark is not achieved.

Figure 4.2: Analysis Result of KPI-P-02

KPI-P-03:

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The following figure shows the analysis result of the KPI-P-03 on a five-point scale. It can be noted from the figure that the actual benchmark is 3.96 which is below the target and hence the KPI is not achieved.
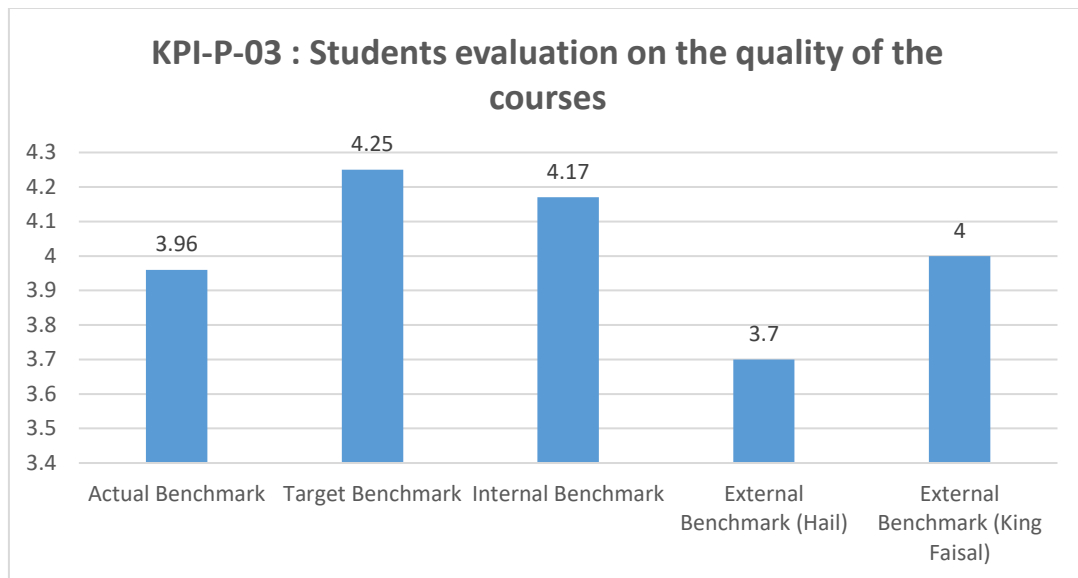

Figure 4.3: Analysis Result of KPI-P-03

KPI-P-04:

The following figure shows the analysis result of the KPI-P-04. It can be noted from the figure that the actual benchmark is 61.19% which is below the target which is 75% and hence target benchmark is not achieved.
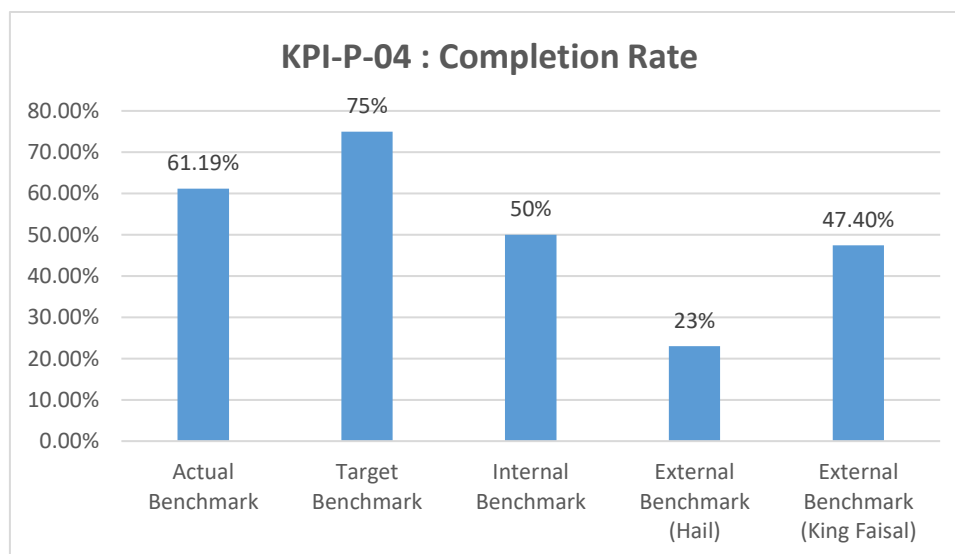

Figure 4.4: Analysis Result of KPI-P-04

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KPI-P-05:

The following figure shows the analysis result of the KPI-P-05. It can be noted from the figure that the actual benchmark is 90% that is more than the target value and hence target benchmark is achieved.
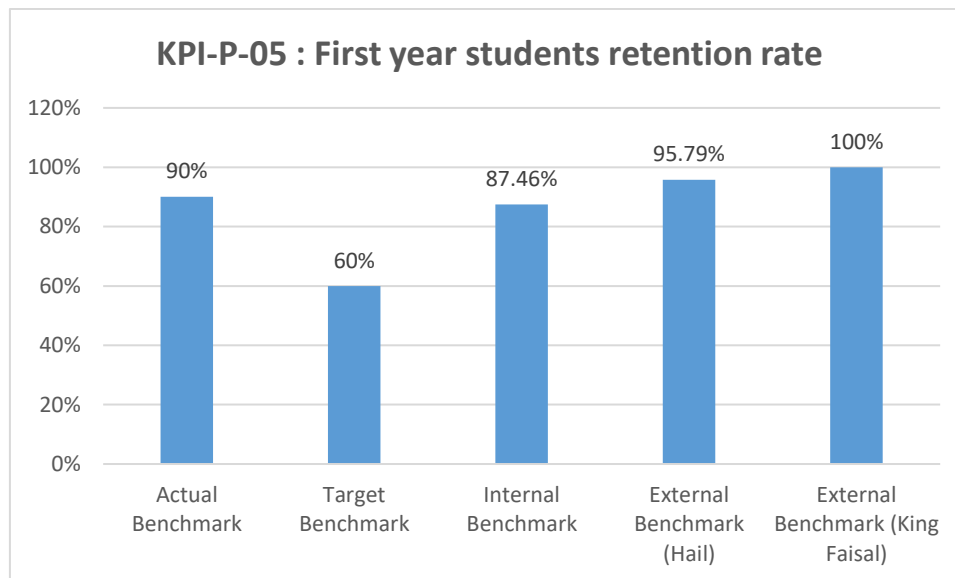
Figure 4.5: Analysis Result of KPI-P-05

KPI-P-06:

KPI-P-06 is not applicable as there are no such activity of students' participation in national or professional examination in the CS Program.

KPI-P-07:

The following figure shows the analysis result of the KPI-P-07. It can be noted from the figure that the actual benchmark is less than the target value and hence target benchmark is not achieved. The external benchmarking is available for Hail University and not for King Faisal University.
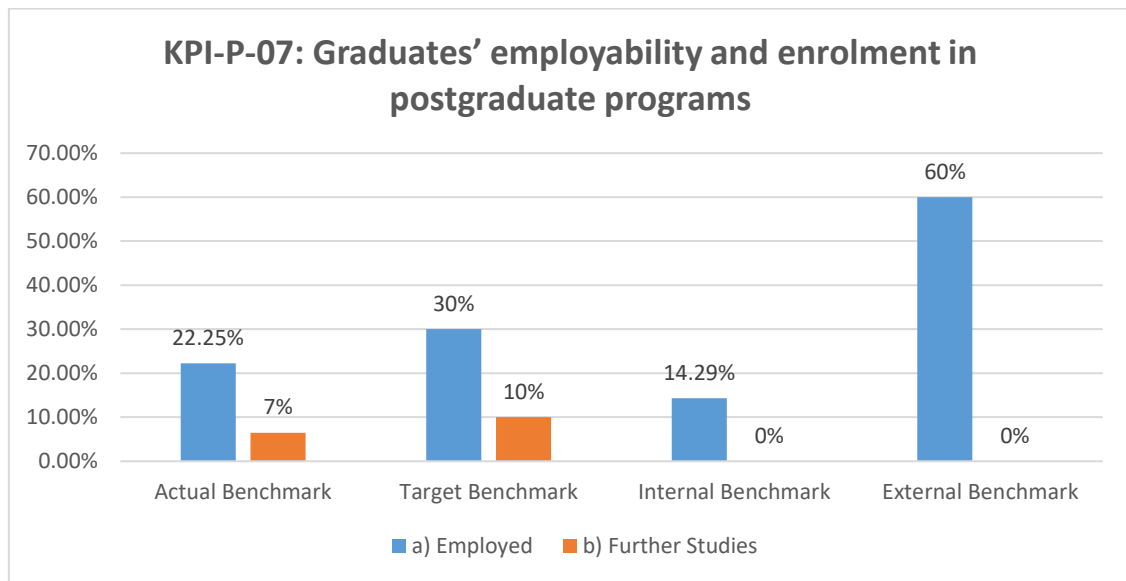
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Figure 4.6: Analysis Result of KPI-P-07

KPI-P-08:

The following figure shows the analysis result of the KPI-P-08. It can be noted from the figure that the actual benchmark is same as the target value and hence target benchmark is achieved.
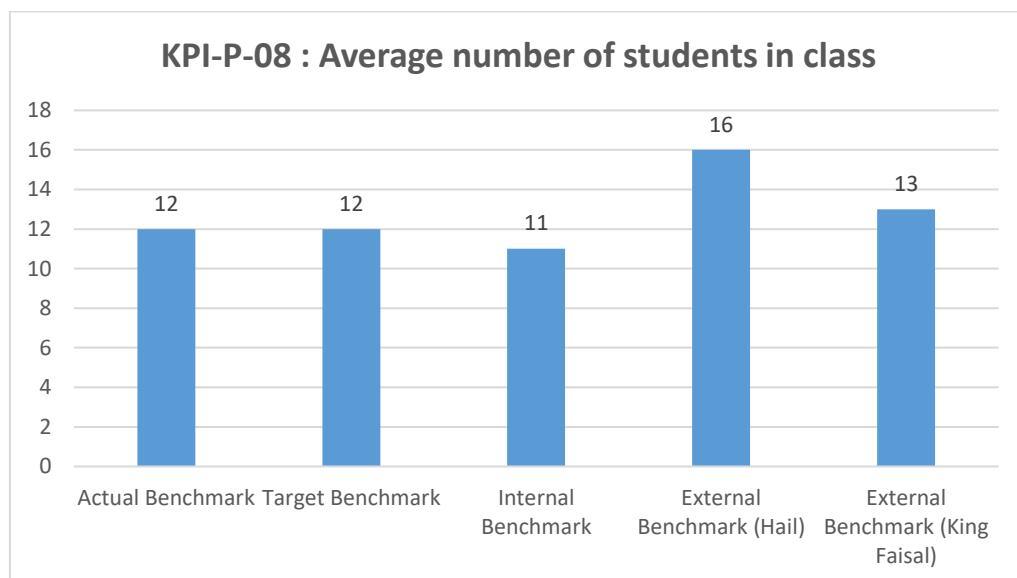

Figure 4.7: Analysis Result of KPI-P-08

KPI-P-09:

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The following figure shows the analysis result of the KPI-P-09. It can be noted from the figure that the actual benchmark is more than the target value and hence target benchmark is achieved. The external benchmarking is available for Hail University and not for King Faisal University.
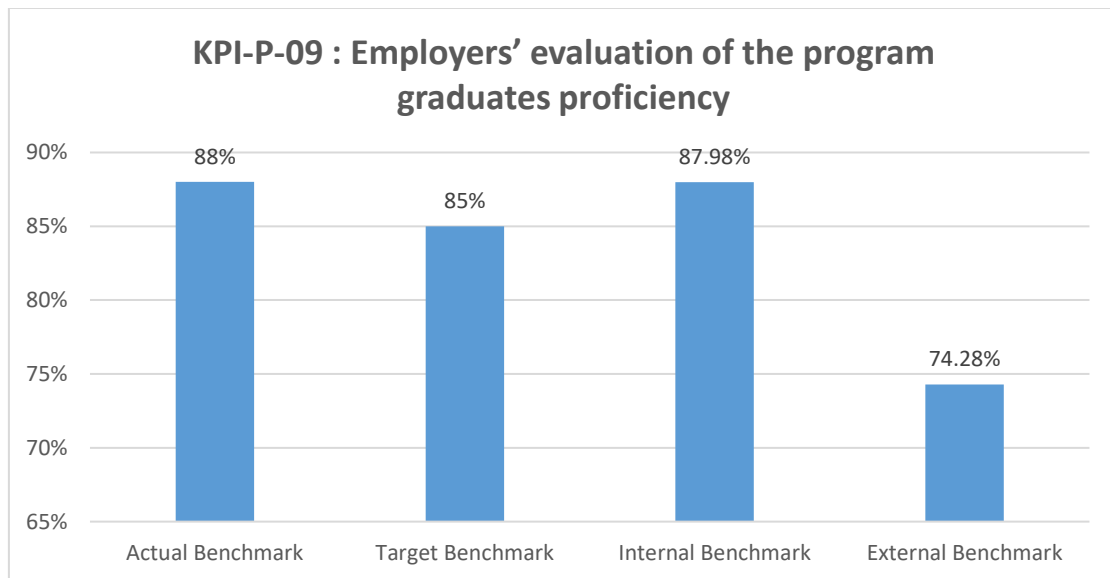

Figure 4.8: Analysis Result of KPI-P-09

KPI-P-10:

The following figure shows the analysis result of the KPI-P-10 on a five-point scale. It can be noted from the figure that the actual benchmark is more than the target value and hence target benchmark is achieved.
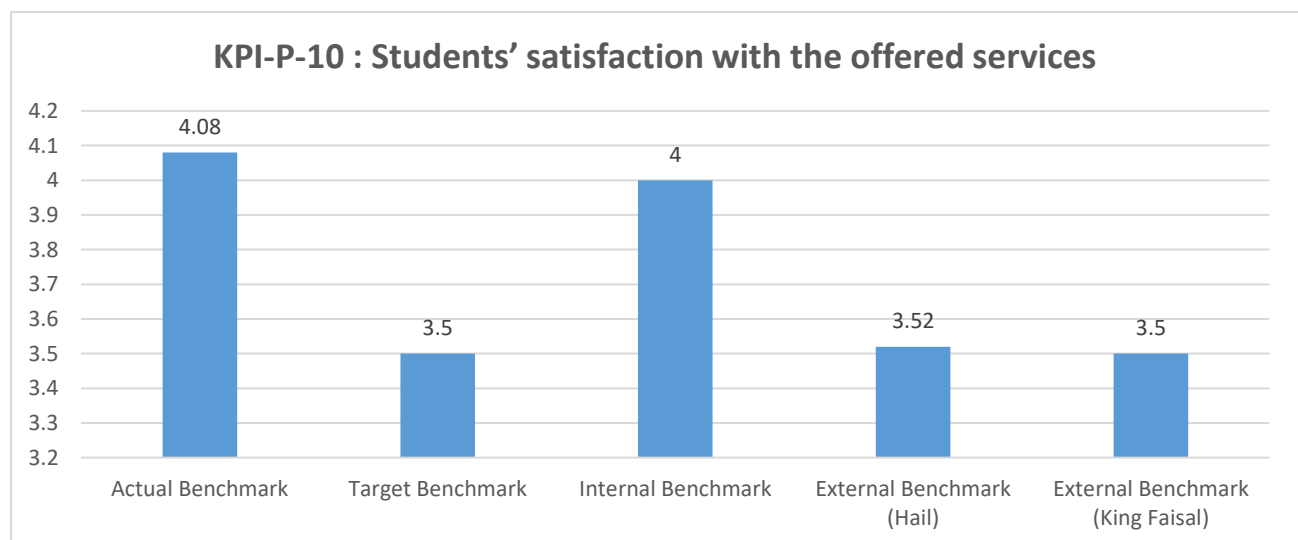

Figure 4.9: Analysis Result of KPI-P-10

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KPI-P-11:

The following figure shows the analysis result of the KPI-P-11. It can be noted from the figure that the actual benchmark ratio 1 teacher for 10 students and hence target benchmark is achieved.
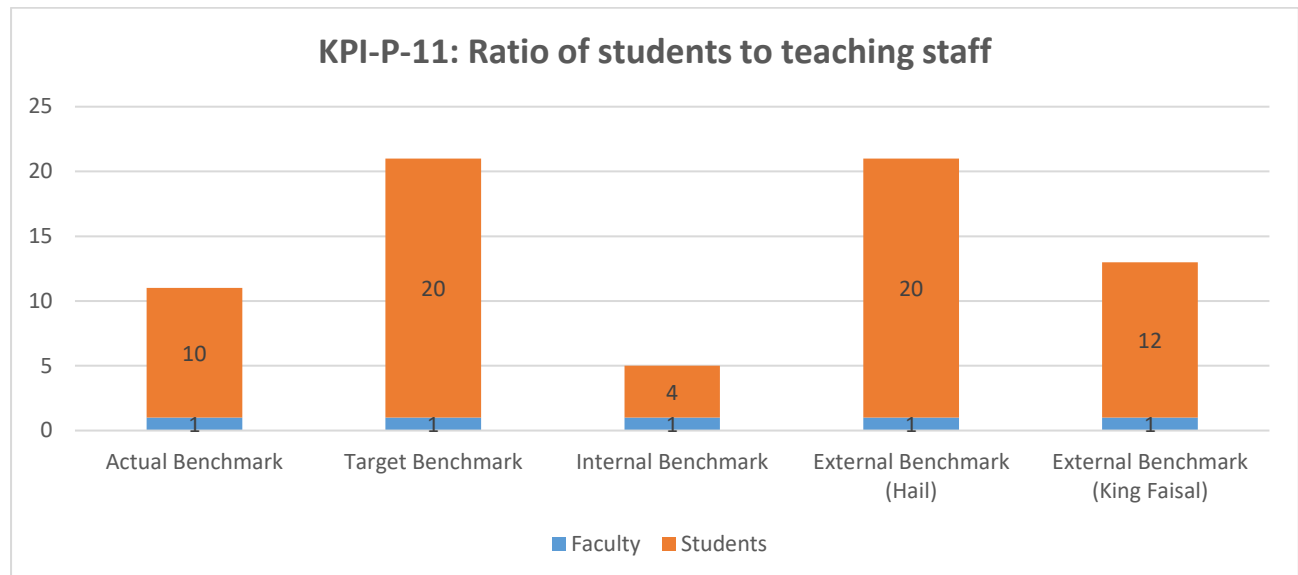

Figure 4.10: Analysis Result of KPI-P-11

KPI-P-12:

The following figure shows the analysis result of the KPI-P-12. It can be noted from the figure that the actual benchmark is less than the target value and hence target benchmark is not achieved.
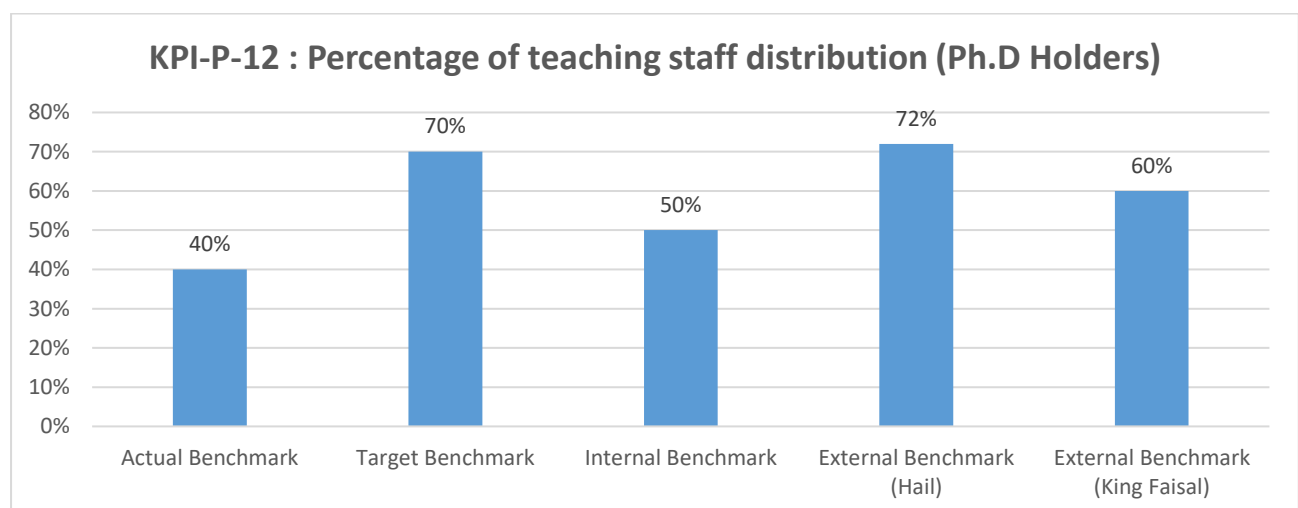

Figure 4.11: Analysis Result of KPI-P-12

KPI-P-13:

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The following figure shows the analysis result of the KPI-P-13. It can be noted from the figure actual benchmark is 7%, the target benchmark is less or equal to 10%, and hence target benchmark is achieved.
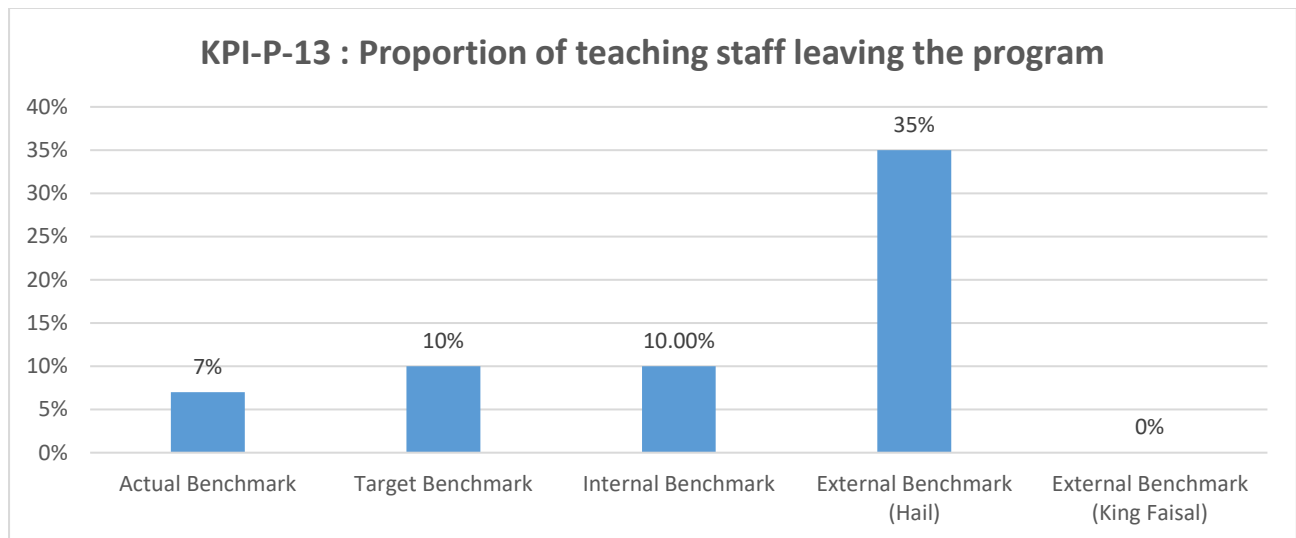

Figure 4.12: Analysis Result of KPI-P-13

KPI-P-14:

The following figure shows the analysis result of the KPI-P-14. It can be noted from the figure that the actual benchmark equals the target value and hence target benchmark is achieved.
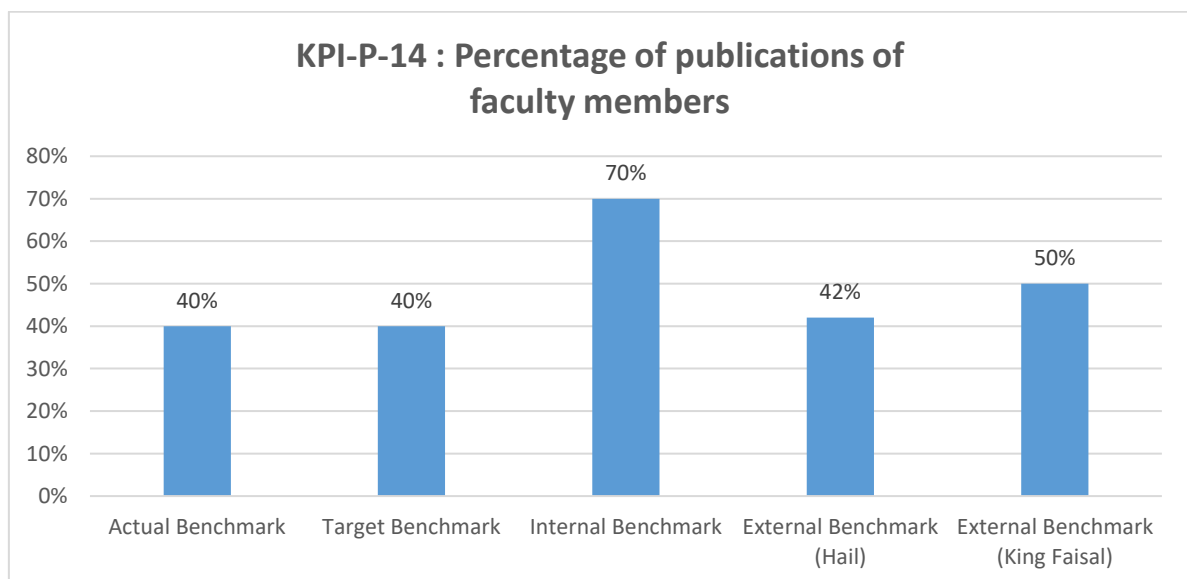

Figure 4.13: Analysis Result of KPI-P-14

KPI-P-15:

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The following figure shows the analysis result of the KPI-P-15. It can be noted from the figure that the actual benchmark less than the target value and hence target benchmark is not achieved.
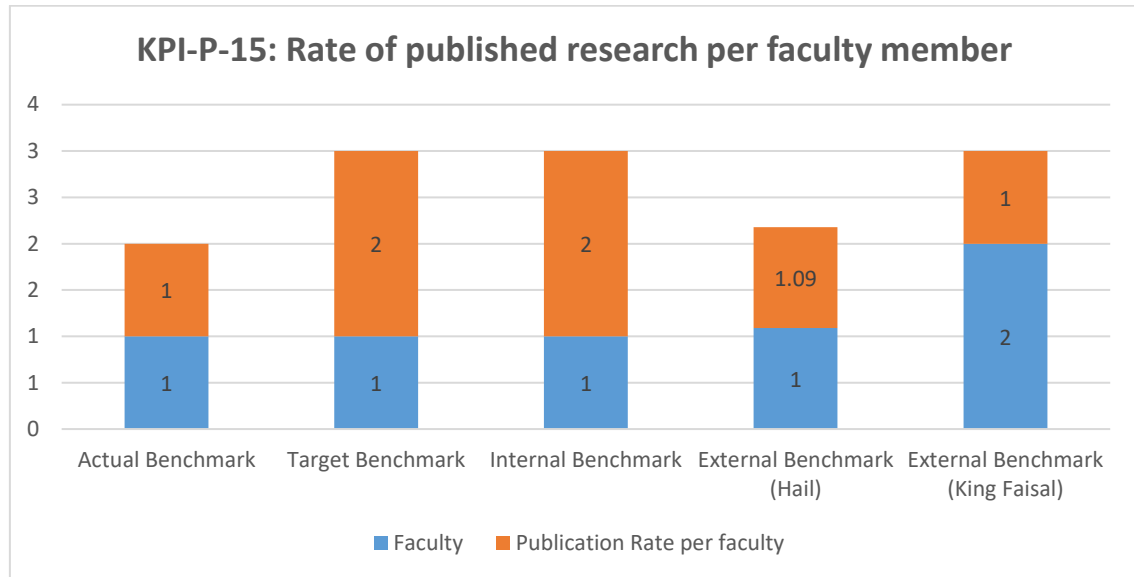

Figure 4.14: Analysis Result of KPI-P-15

KPI-P-16:

The following figure shows the analysis result of the KPI-P-16. It can be noted from the figure that the actual benchmark exceeds the target value and hence target benchmark is achieved. The external benchmarking is available for Hail University and not for King Faisal University
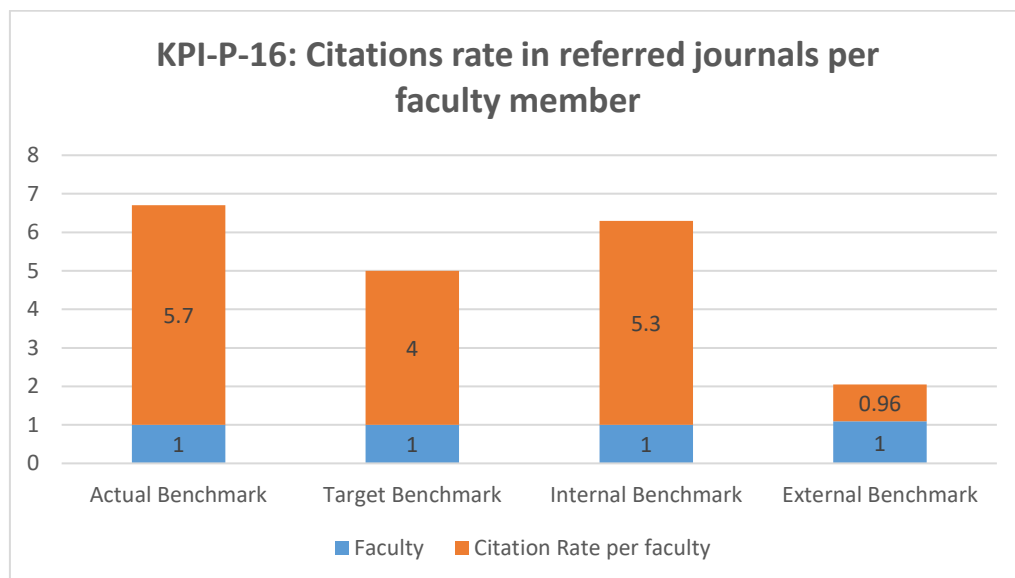

Figure 4.15: Analysis Result of KPI-P-16

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KPI-P-17:

The following figure shows the analysis result of the KPI-P-17 on a five point scale. It can be noted from the figure that the actual benchmark is less than the target value and hence target benchmark is not achieved.
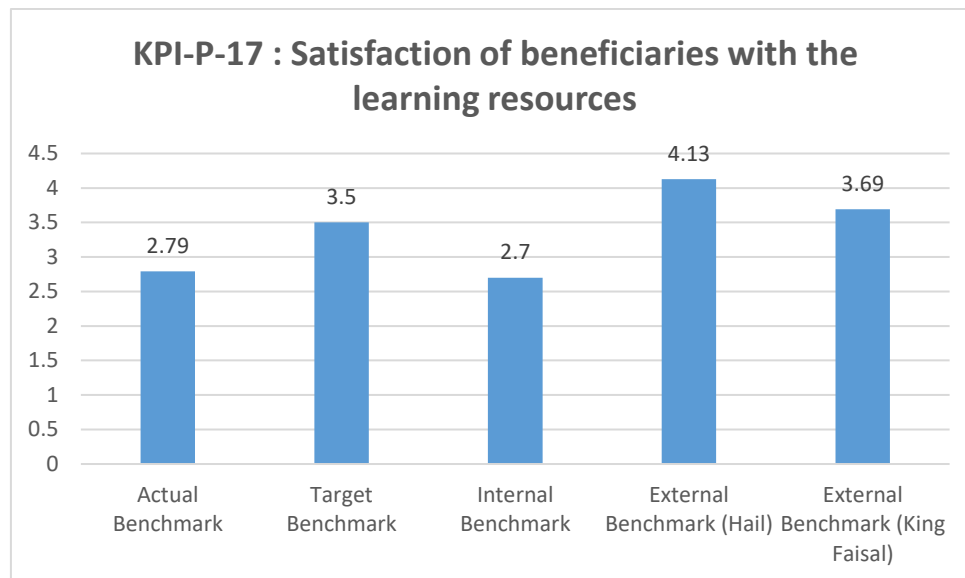

Figure 4.16: Analysis Result of KPI-P-17

KPI-P-I-1:

The following figure shows the analysis result of the KPI-P-I-1. This is the additional KPI that falls under the standard-2. It can be noted from the figure that the actual benchmark below the target value and hence target benchmark is not achieved. Since this is the additional KPI used by the CS Program, external benchmarking is not applicable.
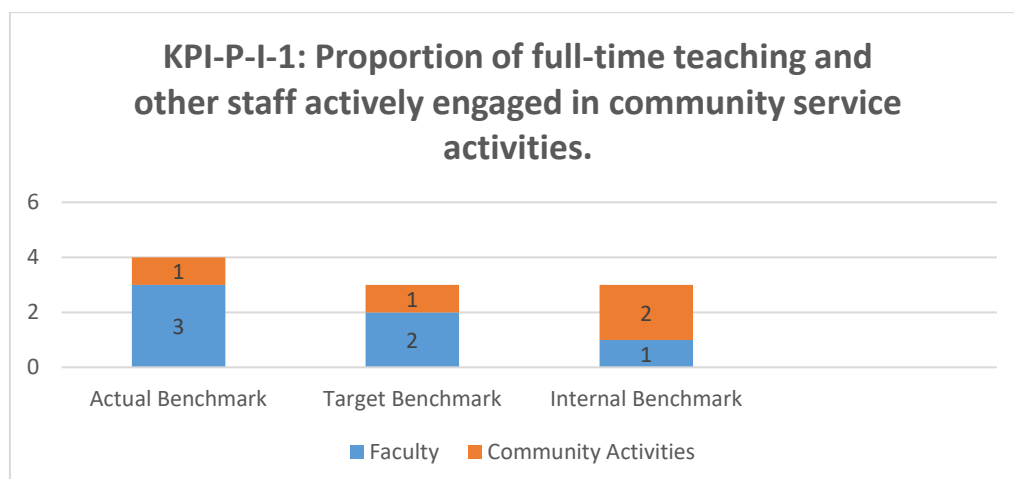
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Figure 4.17: Analysis Result of KPI-P-I-1

Analysis of Overall KPIs:

The following table 4.2 shows the summary of KPI achievements.

Table 4.2: Summary of KPI achievements

Total number of approved Program KPIs	Number of approved KPIs that achieved the target benchmark	Number of approved KPIs that did not achieved the target benchmark	Overall KPI Achievement Rate
17	9	8	53%

Figure 4.18 shows that out of 17 KPIs that are assessed by the program, 9 KPIs have been achieved, which means that 53% of the assessed approved program KPIs are achieved.
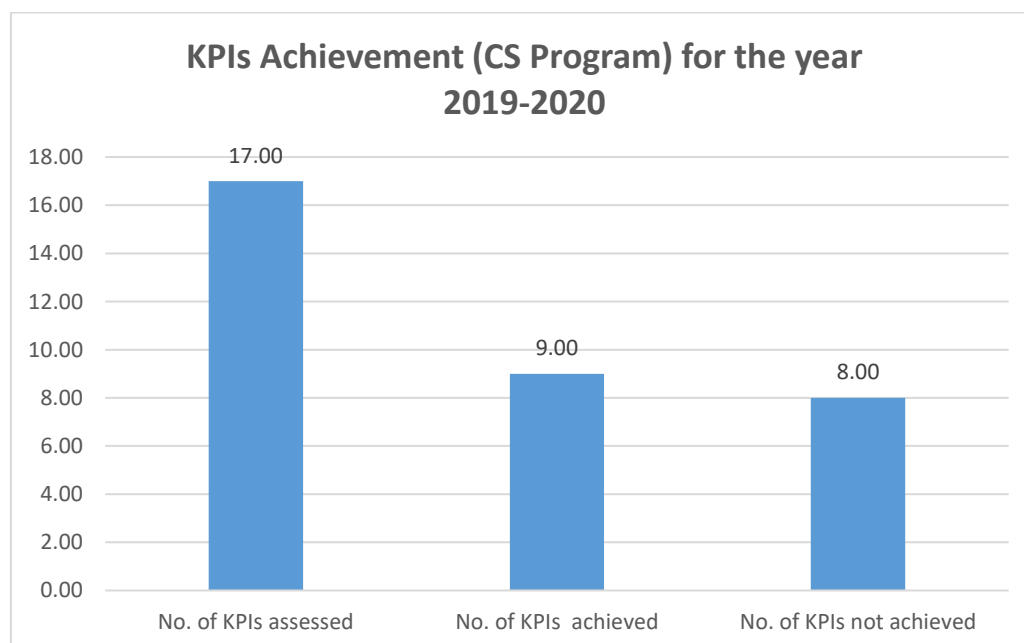

Figure: 4.18: Overall KPIs Achievement Rate

External Benchmarking:

The external benchmarking is applied for the CS program for the KPI analysis. The external benchmarking data is obtained from the Hail University and King Faisal University.

The following table 4.3 shows the summary of KPI assessments in comparison with external benchmarking.

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Table 4.3: Summary of KPI assessments in comparison with external benchmarking

Total number of approved NCAAA Program KPIs with external benchmarking		Number of approved KPIs of CS Program that outperformed the external benchmarking (Hail University)	Number of approved KPIs of CS Program that outperformed the external benchmarking (King Faisal University)
Hail	King Faisal		
16	12 (results of 4 KPIs not available)	8	5

Figure 4.19 shows that out of 17 KPIs that are assessed by the program, the actual benchmark of 8 KPIs are better than the external benchmarking of the Hail University.

In comparison with the external benchmarking data obtained from the King Faisal University, only 12 KPIs are used for comparison as the data for the other 4 KPIs are not available for external benchmarks. It can be noted that out of 12 KPIs, CS Program has outperformed in 5 KPIs.
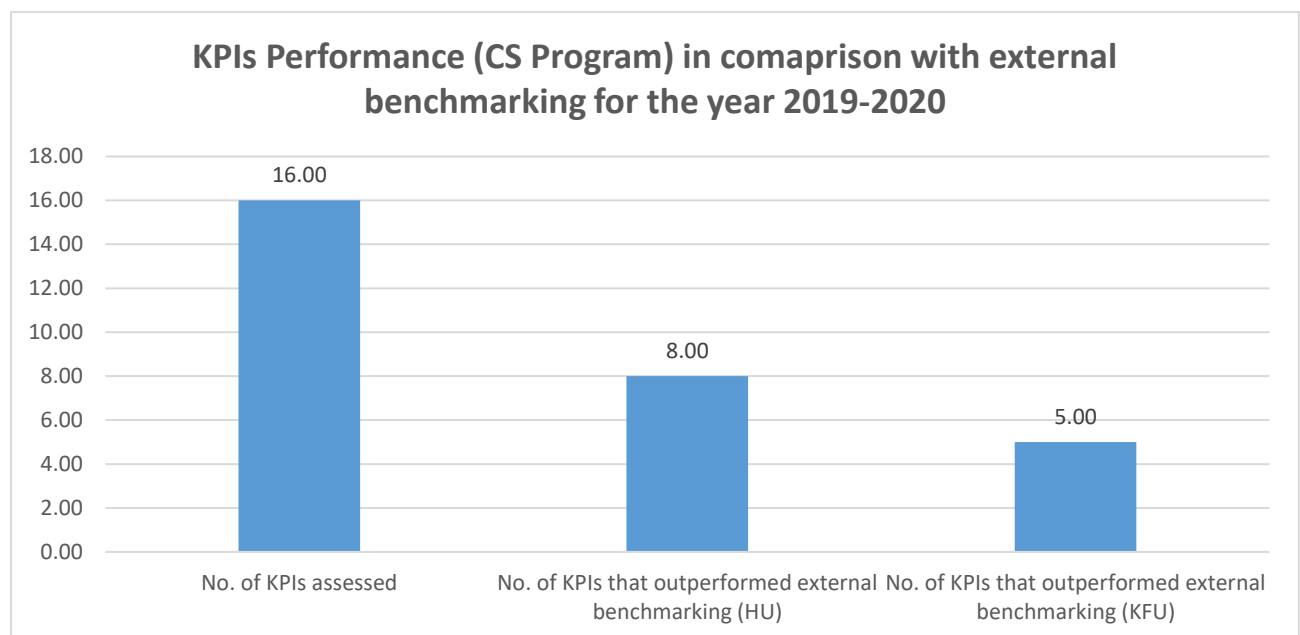

Figure: 4.19: KPIs Performance with external benchmarking

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In comparison with the external benchmarking with Hail University, CS program needs improvement in terms of the first year students' retention rate, graduates employability and enrolment rate in postgraduate programs, average number of students in the class, number of Ph.D. holders in the faculty, number of publications per faculty members, satisfaction of beneficiaries with the learning resources.

In comparison with the external benchmarking with King Faisal University, CS program needs improvement in terms of the first year students' retention rate, average number of students in the class, number of Ph.D. holders in the faculty, satisfaction of beneficiaries with the learning resources.
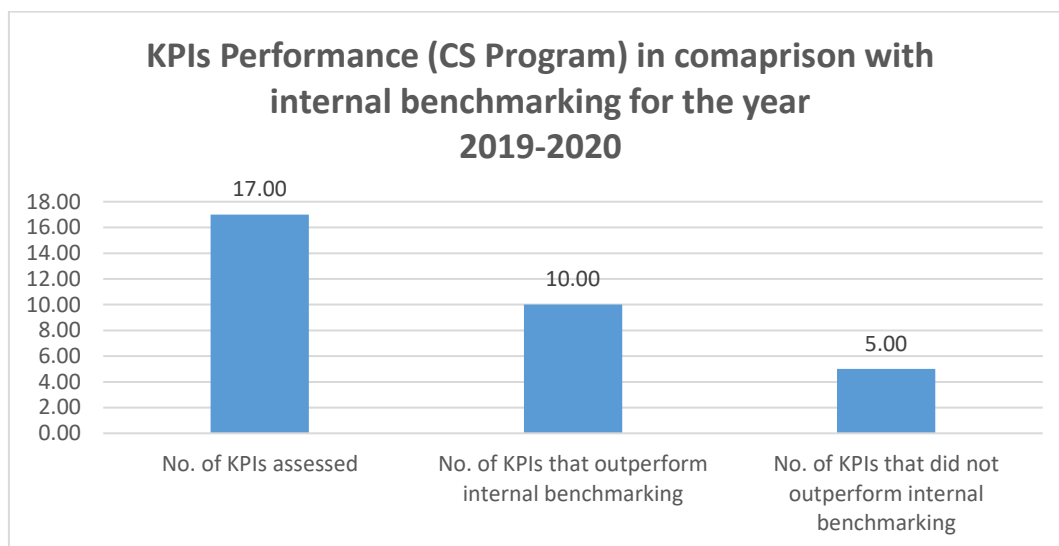
Internal Benchmarks:

Out of 17 KPIs, all the 17 KPIs are also assessed with the internal benchmarks. The actual benchmark of the academic year 2019-2020 of the Information System (IS) program is used as the internal benchmark for the CS Program for the academic year 2019-2020.
The following table 4.4 shows the summary of KPI performance in comparison with internal benchmarking (with the IS program).

Table 4.4: Summary of KPI achievements

Total number of approved NCAAA Program KPIs that are applicable to both CS & IS Programs	Number of approved KPIs of CS Program that has value as internal benchmarking (IS Program)	Number of approved KPIs of CS Program that outperformed the internal benchmarking (IS Program)	Number of approved KPIs of CS Program that did not outperformed the internal benchmarking (IS Program)	Overall KPI Rate of CS Program that outperformed internal benchmarking (IS Program)
17	2	10	5	59%

Figure 4.20 shows that out of 17 KPIs that are assessed by the program, the actual benchmark of 10 KPIs are better than the internal benchmarking, which means that 59% of the assessed approved program KPIs outperformed internal benchmarking.

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Figure: 4.20: KPIs Performance with internal benchmarking

In comparison with the internal benchmarking, CS program needs improvement in terms of the faculty contribution towards the community service activities, in terms of number of researches published from the faculty members, in terms of number of Ph.D holders.

Comparison of the KPI assessment based on the gender (Male & Female):

The following table 4.3 shows the actual benchmark of the KPIs according to the gender (male and female sections)

Table 4.3 KPI Assessment Results (Male & Female Section)

Standard	KPI #	Program Key Performance Indicators	Actual Performance Level for the year 2019/ 2020			KPI Target Bench mark
			Male	**Female**	**Overall**	
Standard 1 Mission &Goals	KPI-P-01	Percentage of achieved indicators of the program operational plan objectives	89.51%	89.51%	89.51%	85%
	KPI-P-02	Students' evaluation of quality of learning experience in the program	69.75% ≈ 3.5(on five point scale)	69.26%≈ 3.46(on five point scale)	69.51% ≈ 3.48(on five point scale)	75%≈ 3.75 (on five point scale)
	KPI-P-03	Students evaluation on the quality of the courses	81.77% = 4.09(on five point scale)	76.7% ≈3.84 (on five-	79.24% ≈ 3.96(on five point scale)	85%≈ 4.25(on five point scale)

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				point scale)		
Standard 3: Learning and Teaching	KPI-P-04	Completion Rate	28.57%	93.8%	61.19%	75%
	KPI-P-05	First year students retention rate	88%	92%	90%	60%
	KPI-P-06	Students' performance in the professional and/or national examinations	N/A	N/A	N/A	N/A
	KPI-P-07	Graduates' employability and enrolment in postgraduate programs	a)38% b)13%	a)7% b)0%	a)22.5% b)6.5%	a)30% b)10%
	KPI-P-08	Average number of students in the class	11	13	12	12
	KPI-P-09	Employers' evaluation of the program graduates proficiency	88%	88%	88%	85%
Standard 4 : Students	KPI-P-10	Students' satisfaction with the offered services	80.63% (4.03on a 5-point scale)	82.63% (4.13on a 5-point scale)	81.5% (4.08on a 5-point scale)	70%(3.5 on a 5-point scale)
Standard 5: Teaching Staff	KPI-P-11	Ratio of students to teaching staff	1:6	1:15	1:10	1:20
	KPI-P-12	Percentage of teaching staff distribution	67%	13%	40%	70%
	KPI-P-13	Proportion of teaching staff leaving the program	13%	0%	7%	≤ 10%
	KPI-P-14	Percentage of publications of faculty members	66.67%	13%	40%	40%
	KPI-P-15	Rate of published research per faculty member	2:1	2:5	1:1	2:1
	KPI-P-16	Citations rate in referred journals per faculty member	1:11.5	15:0	1:5.7	1:4
Standard 6:Learning Resources, Facilities and Equipment	KPI-P-17	Satisfaction of beneficiaries with the learning resources	60% = 3 (on 5-point scale)	51.78% = 2.59 (on 5-point scale)	55.89% = 2.79(on 5-point scale)	70%= 3.5 (on 5-point scale)
Standard 2 : Program Management and Quality Assurance	KPI-P-I-1	Proportion of full-time teaching and other staff actively engaged in community service activities.	1:3	1:3	1:3	1:2

Comparison of the Analysis of KPI achievement based on the gender (Male & Female section):

The following table 1.5 shows the summary of KPI achievements in the male section and in the female section.
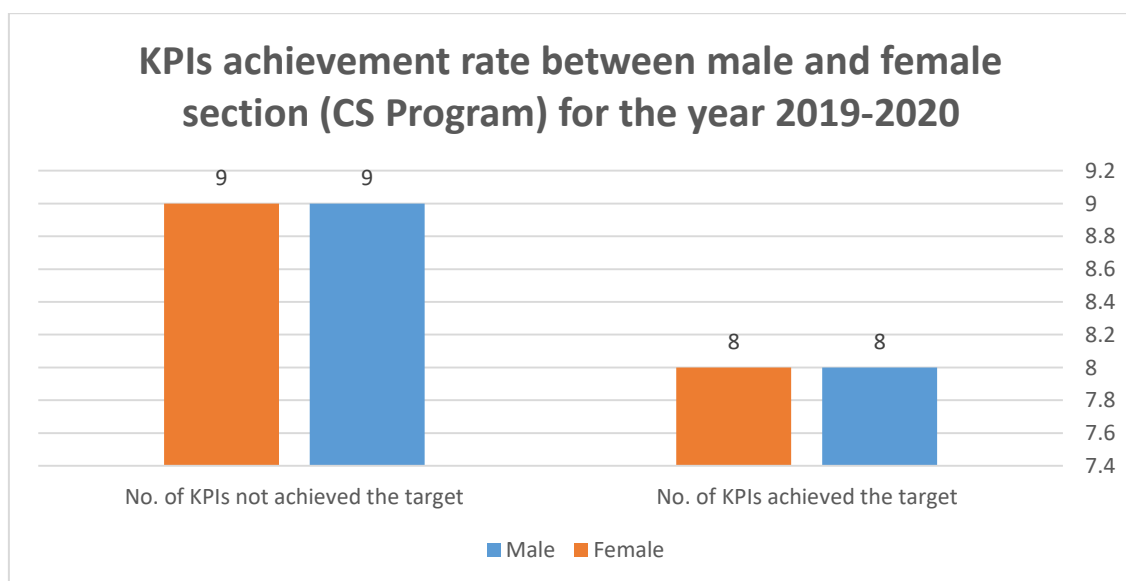
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Table 1.5: Summary of KPI achievements (Male & Female Section)

Total number of approved Program KPIs that are assessed	Number of approved KPIs that achieved the target benchmark		Number of approved KPIs that did not achieved the target benchmark		Percentage of KPIs achievement (ratio of number of KPIs achieved and total KPIs used)	
	Male	Female	Male	Female	Male	Female
17	8	8	9	9	47%	47%

More number of students enrolled in the female section than in the male section. More number of students who started the program, continued the program in the next year in the female section.

More number of research publications and Ph.D holders in the faculty can be found in the male section.

Figure 4.20 shows that in the male section 47% of the assessed approved program KPIs are achieved. In the female section 47% of the assessed approved program KPIs are achieved. This shows that the male section and the female section achieved the same number of KPIs achieved rate.

Figure: 4.20: Overall KPIs Achievement Rate (Male & Female Sections)

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5. **Conclusion:**

The KPI Analysis of the NCAAA standards that are used to assess the performance of the program is performed. According to the KPI evaluation, the strengths, weakness and the priorities for improvement have been framed out.

Strengths:

- ✓ Most of the tasks in CS operational plan has 100% achievement
- ✓ The overall percentage of students entering programs who successfully complete the first year is high.
- ✓ Employers' overall evaluation considering all the criteria of the survey of the program graduates proficiency is very good.
- ✓ The students were comfortable and satisfied with the various services offered by the program especially academic advising provided to them.

Weakness:

- ✓ The students' satisfaction level is less in terms of supportive learning resources.
- ✓ The students' satisfaction level is less in terms of the quality of learning experience in the program.
- ✓ The graduates' employability rate and the enrolment rate in the postgraduate programs is very less.
- ✓ The completion rate of the students who enter the program and complete the program in minimum time is less.
- ✓ There are more Non-Ph.D holders than the Ph.D holders in the faculty section of the department.
- ✓ The publication rate of research by the faculty members should be more.
- ✓ The number of community service contributions from the faculty members should be more.

Priorities for improvement:

- ✓ Improve the supportive learning resources.
- ✓ Industrial Visits and Field Trips should be organized for the students. Career Counselling should be provided for the students

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- ✓ Arrange career days and inviting national and multinational companies so that students get benefitted for their future career
- ✓ Identifying the difficulties by conducting meetings and seminars with the students in each level. Finding the reasons of students' failing, dropping and withdrawing of their courses by meeting, seminars, and academic advising.
- ✓ Increase the percentage of Professors and Associate Professors by recruiting them. Encourage and support teaching staff to complete their higher studies.
- ✓ Encourage the faculty members to publish more research papers. Support teaching staff to attend scientific conferences.
- ✓ Motivate the faculty members to indulge in projects that can address the community needs in all sectors.