

Fig. 1. Awareness level of operational improvement initiatives in Malaysia

Figure 2 shows the implementation status of seven main operational improvement initiatives in Malaysia. The first ranking is Quality Management System with the percentage of ‘Yes’ 85% and the second rank is Improvement Team (82%). It is followed by Lean (74%), Organizational Assessment based on Business Excellence Model (70%), Outsourcing (66%), Business Continuity Management (57%) and Six Sigma (50%). As shown in Figure 1 and 2, Quality Management System has been ranked first for awareness and implementation. The implementation status usually follows the same trend as awareness. Organizations tend to implement initiative that they are aware and understand [4].

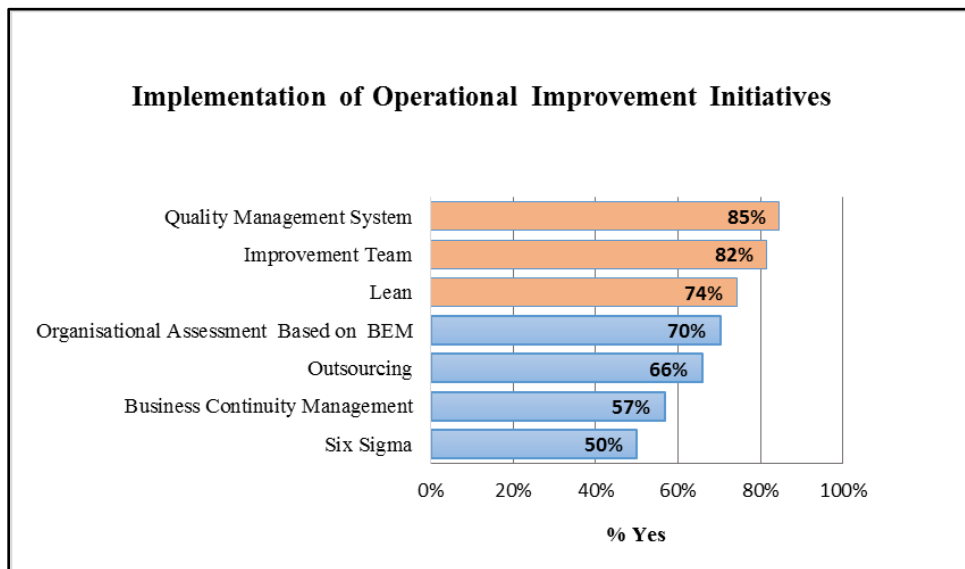


Fig. 2. Implementation status of operational improvement initiatives in Malaysia

Figure 3 shows the perceived effectiveness of seven main operational improvement initiatives. The first rank is dominated by Lean with the mean score 3.81. It is followed by Quality Management System (3.71), Improvement Team (3.63), Six Sigma

(3.20), Organizational Assessment based on Business Excellence Model (3.16), Outsourcing (3.03), and Business Continuity Management (2.79).

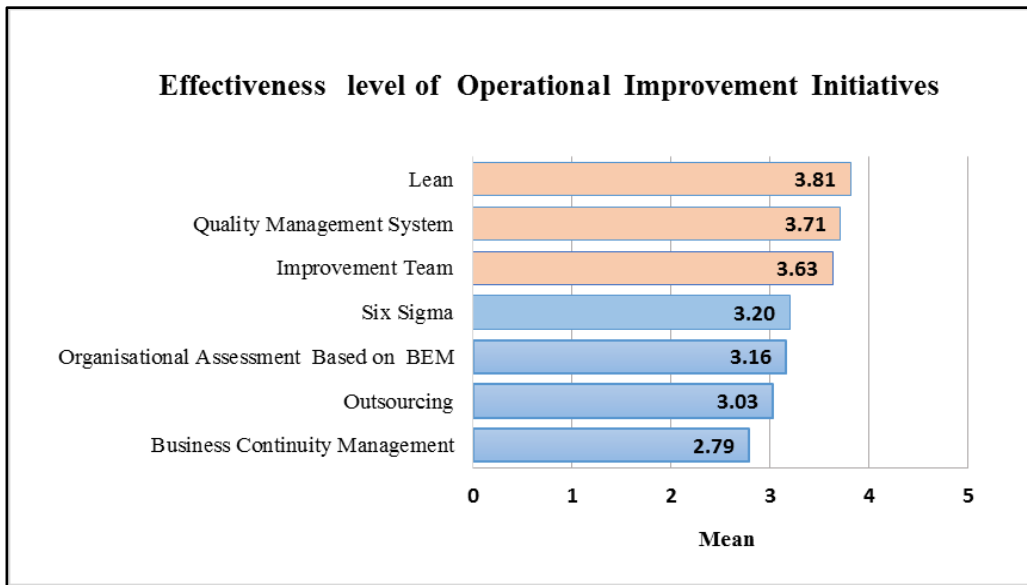


Fig. 3. Effectiveness level of operational improvement initiatives in Malaysia

Figure 4 shows the most wanted initiative for future adoption is Improvement Team with the percentage of 'Yes' 97%. It is followed by Quality Management System and Lean (92% respectively), Organizational Assessment based on Business Excellence Model (91%), Business Continuity Management (82%), Outsourcing (77%), and Six Sigma (69%).

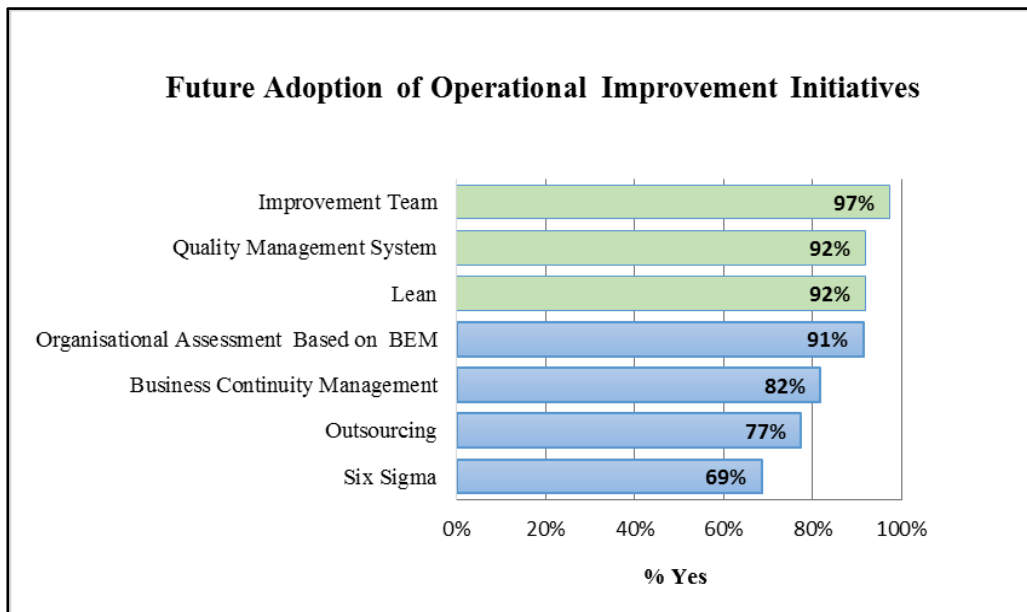


Fig. 4. Potential future adoption of operational improvement initiatives in Malaysia

C. Comparisons of Awareness, Implementation, Effectiveness and Future Adoption between Manufacturing and Service Organizations

This study has employed two different tests to compare the awareness, implementation, perceived effectiveness and potential future adoption of operational improvement initiatives between manufacturing and service organizations. The statistics tests involved are Mann-Whitney test for the Likert Scale and Chi-Square test for the multiple choices. Mann-Whitney test explores the differences between manufacturing and service organizations in terms of their awareness and effectiveness of the operational improvement initiatives. The respondents were asked to rate their level of awareness and perceived effectiveness for operational improvement initiatives on a scale of don't know (0), very low (1), low (2), moderate (3), high (4) and very high (5). The results of Mann-Whitney are shown in Table III for the level of awareness and Table IV for the perceived effectiveness of the operational improvement initiatives.

The results shown in Table III indicated that there are no significant differences between both organizations ($P > 0.05$). Based on the mean value, service organizations are more aware on the operational improvement initiatives such as Business Continuity Management, Six Sigma, and Improvement Team. Meanwhile, the manufacturing organizations show high level of awareness on Lean, Quality Management System and Outsourcing. This result is concurrent with Tickle, Adebajo, Mann and Ojadi [5] which stated that manufacturing sector is more aware about Lean and Quality Management System due to a number of reasons, such as these improvement initiatives being introduced into manufacturing sector first and the customers are demanding the use of these initiatives to improve their operations and products.

TABLE III. RESULTS OF MANN-WHITNEY U TEST ON AWARENESS OF THE OPERATIONAL IMPROVEMENT INITIATIVES BETWEEN MANUFACTURING AND SERVICE ORGANIZATIONS

Improvement Initiatives	Manufacturing		Service		Significance P
	N	Mean rank	N	Mean rank	
Lean	17	<u>20.09</u>	22	19.93	.964
Organizational Assessment Based On BEM	15	18.50	21	18.50	1.000
Quality Management System	16	<u>21.38</u>	23	19.04	.507
Improvement Team	16	19.38	23	<u>20.43</u>	.765
Outsourcing	16	<u>19.75</u>	23	20.17	.906
Business Continuity Management	15	16.17	23	<u>21.67</u>	.112
Six Sigma	17	18.18	21	<u>20.57</u>	.494

* $P < 0.05$ -significant / * $P > 0.05$ -insignificant

Table IV shows the results of a Mann-Whitney U test between manufacturing and service organizations in terms of effectiveness of the operational improvement initiatives. The results show that there are no significant differences ($P > 0.05$) between both organizations. Quality Management System, Improvement Team and Outsourcing are more effective for manufacturing organizations as compared to the service organizations. Meanwhile, the Organizational Assessment based on BEM is more effective in the service organizations. Quality Management System indicated higher mean for manufacturing organizations probably due to the nature of manufacturing processes that tend to have more repetitive processes that can be standardized as compared to service organizations.

TABLE IV. RESULTS OF MANN-WHITNEY U TEST ON EFFECTIVENESS OF THE OPERATIONAL IMPROVEMENT INITIATIVES BETWEEN MANUFACTURING AND SERVICE ORGANIZATIONS

Improvement Initiatives	Manufacturing		Service		Significance P
	N	Mean rank	N	Mean rank	
Lean	13	17.88	18	14.64	.279
Organizational Assessment Based On BEM	12	14.83	19	<u>16.74</u>	.544
Quality Management System	13	<u>19.96</u>	21	<u>15.98</u>	.221
Improvement Team	12	<u>18.46</u>	20	15.33	.319
Outsourcing	11	<u>18.41</u>	20	14.68	.248
Business Continuity Management	9	13.39	19	15.03	.606
Six Sigma	9	13.72	16	12.59	.703

* $P < 0.05$ -significant / * $P > 0.05$ -insignificant

The Chi-Square test has been used to determine the level of the implementation and potential future adoption of the operational improvement initiatives based on Malaysia context. Respondents were asked to answer Yes or No to whether or not they were currently implementing the improvement initiatives and/or thinking of using it in the future. The results in Table V show the implementation and results in Table VI show the potential future adoption of the improvement initiatives.

Results in Table V indicated that there are no significant differences ($P > 0.05$) between manufacturing and service organizations in term of implementation of operational improvement initiatives. The results also show that manufacturing organizations are more likely to implement Quality Management System, Lean and Organizational Assessment based on BEM, while service organizations are more likely to implement Improvement Team, Quality Management System and Lean.

TABLE V. RESULTS OF CHI-SQUARE TEST ON IMPLEMENTATION OF OPERATIONAL IMPROVEMENT INITIATIVES BETWEEN MANUFACTURING AND SERVICE ORGANIZATIONS

Improvement Initiatives	Manufacturing		Services		Significance P
	Count Yes	% Yes	Count Yes	% Yes	
Lean	13	<u>76.50</u>	17	<u>77.30</u>	1.000
Organizational Assessment Based On BEM	12	<u>75.00</u>	14	66.70	.723
Quality Management System	15	<u>93.80</u>	18	<u>78.30</u>	.370
Improvement Team	11	73.30	20	<u>87.00</u>	.401
Outsourcing	10	66.70	15	65.20	1.000
Business Continuity Management	8	57.10	14	60.90	1.000
Six Sigma	7	43.80	11	55.00	.738

* $P < 0.05$ -significant / * $P > 0.05$ -insignificant

Finally, Table VI displays the results of a Chi-Square test exploring the differences on whether or not an organization intends to use the operational improvement initiatives in the future. The results show that there are also no significant differences ($P > 0.05$) between both organizations. For manufacturing organizations, Quality Management System, Improvement Team, Business Continuity Management, and Six Sigma have higher percentage, which show that the respondents intend to use these improvement initiatives in the future. Meanwhile in the service organizations, Improvement Teams, Organizational Assessment based on BEM and Quality Management System have the higher percentage for the future adoption.

TABLE VI. RESULTS OF CHI-SQUARE TEST ON POTENTIAL FUTURE ADOPTION OF OPERATIONAL IMPROVEMENT INITIATIVES BETWEEN MANUFACTURING AND SERVICE ORGANIZATIONS

Improvement Initiatives	Manufacturing		Services		Significance P
	Count Yes	% Yes	Count Yes	% Yes	
Lean	15	88.2	17	85.0	1.000
Organizational Assessment Based On BEM	14	87.5	18	<u>94.7</u>	.582
Quality Management System	16	<u>100</u>	18	<u>85.7</u>	.243
Improvement Team	14	<u>93.3</u>	22	<u>100</u>	.405
Outsourcing	9	64.3	15	71.4	.721
Business Continuity Management	12	<u>92.3</u>	15	75.0	.364
Six Sigma	12	<u>92.3</u>	12	66.7	.194

* $P < 0.05$ -significant / * $P > 0.05$ -insignificant

V. CONCLUSION

This study has identified the level of awareness, implementation, perceived effectiveness and potential future adoption of the seven operational improvement initiatives in Malaysia. Based on analysis, it can be concluded that the top three initiatives in term of awareness are: (1) Quality Management System, (2) Lean, and (3) Improvement Team. Top three initiatives in term of implementation are: (1) Quality Management System, (2) Improvement Team, and (3) Lean. In relation to perceived effectiveness, top three initiatives are: (1) Lean, (2) Quality Management System, and (3) Improvement Team. Meanwhile, top three initiatives in term of potential future adoption are: (1) Improvement Team, (2) Quality Management System, and (3) Lean. This study has also compared the awareness, implementation, perceived effectiveness and potential future adoption between manufacturing and service organizations in Malaysia. In overall, there are no significant differences between manufacturing and service organizations with regard to the awareness, implementation, perceived effectiveness, and potential future adoption for the majority of improvement initiatives. This research finding is similar to the global study reported by Tickle, Adebajo, Mann and Ojadi [5], which contradict the conventional perception that improvement initiatives are more dominantly being implemented by manufacturing organizations.

The findings of this study have several important practical and academic implications. For managers, executives, consultants and academicians, it is important for them to know the current status of awareness, implementation, perceived effectiveness, and potential future adoption of operational improvement initiatives in Malaysia so that they can make an informed decision when selecting and implementing appropriate operational improvement initiatives. They also need to ensure all the related staff aware and understand the initiatives, as the findings of this study and Tickle, Adebajo, Mann and Ojadi [5] indicated that initiatives that had higher levels of awareness were more likely to be implemented. This study is probably one of first in Malaysia that focuses on the current status of awareness, implementation, perceived effectiveness, and potential future adoption of seven operational improvement initiatives, as well as compares the differences between manufacturing and service organizations.

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