Assessing the Level of Maturity of Operational Excellence in Morocco: A Comparative Study between SMEs and LEs

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Received: 5 December 2023 | Revised: 17 December 2023 | Accepted: 20 December 2023

 DOI: /https://doi.org/10.48084/etasr.6707

ABSTRACT

Nowadays, excellence is the ultimate goal for every company wishing to improve and lead the market. The focus is on ensuring that any product or service meets certain criteria, leading to total perfection. This article aims to shed light on operational excellence in Morocco. A form was distributed to 40 firms operating in different sectors in Morocco, to assess the level of maturity of Operational Excellence (OpEx) dimensions. A comparative study was carried out between Small-Medium (SMEs) and Large (LEs) Enterprises. For each company size, a specific result can be distinguished. This assessment of OpEx maturity levels gives a general idea of the level of perfection of these firms operating in Morocco. The results differ according to size, and each dimension of OpEx was a subject of study.

Keywords-excellence; operational excellence; assessment; dimensions

I. INTRODUCTION AND LITERATURE REVIEW

An excellent company is one that aims to achieve the highest level of performance with the tools it possesses. An excellent company today cannot generally remain on the path to excellence without a real vision of the future and a prior knowledge of the competitive challenges faced by different companies operating in the same sector or implementing the same tools and enabling them to perfect a given product or service. The term Operational Excellence (OpEx) is a very topical one, and leads us to ask ourselves what means we really have to achieve industrial excellence. A first definition of this purely industrial term leads us to focus on optimizing the four criteria of excellence to the maximum: cost, quality, lead time, and service. Sometimes, it is essential to think about the cost of production as a major criterion, or as a requirement of a particular customer. Often, the question is whether we can ensure the right delivery of a particular product at the right time. The term OpEx comes into play here, and brings the four criteria together with a view to optimizing them as far as possible in the short term. We always check whether we can use the right means to achieve our goal, because the criteria for excellence change as customer requirements change. The aim of this article is to shed some light on the term operational excellence. We are more interested in assessing the level of maturity of OpEx in Morocco. We want to know whether the companies in Morocco have what it takes to improve and lead the market.

Regarding OpEx in terms of performance, authors in [1] were interested in improving the performance of a Microstrip Antenna by adding a slot into different patch designs. Authors in [2] evaluated the performance of the BLDC motor using nonlinear model predictive control. The aim in [3] was to revisit the performance of spectral clustering algorithms for water distribution networks. Authors in [4] clearly defined the term OpEx as having a deep focus on embedding efficiency in the company. We achieve this by optimizing processes, reducing overhead costs, eliminating steps, etc. Authors in [5] provided a comprehensive review of OpEx. Authors in [6] aimed to provide a comprehensive approach to measuring OpEx. Authors in [7] presented the most critical reasons for failure of OpEx initiatives. Within Nepalese industries, the sustainability of firms that complete OpEx in their own way was verified in [8]. Authors in [9] gaved an OpEx framework. In order to achieve OpEx, we must first reach a high level of maturity in every of its dimensions.

Considering the cost as a major criterion for achieving OpEx, authors in [10] discussed an evaluation of cost optimization strategies for BRT projects in Pakistan. Authors in [11] considered blockchain technology and its major role in ensuring OpEx sustainability for a perishable food supply chain. Turning to service firms in Jordan, authors in [12]

proposed a series of critical factors that affect OpEx. Authors in [13] were interested in giving the methods needed to integrate sustainable OpEx into any industrial firm. The work in [14] was based on two case studies, one in Brazil and another in Scotland, that were always looking to improve the performance of sustainable supply chains through new approaches of OpEx. Authors in [15] developed an OpEx framework. Authors in [16] showed the factors influencing OpEx of SMEs in Malaysia. Authors in [17] discussed the factors that can affect OpEx in the service sector and proposed a theoretical framework for this need. In [18], a survey was distributed to 106 experts in various countries implementing OpEx. The aim was to draw out the reasons for failure to achieve sustainable OpEx within these organizations. Authors in [19] discussed the CSFs leading to successful OpEx implementation in a manufacturing environment. Authors in [20] showed us the relationship between OpEx and management in the Malaysian context. The 8 elements of the OpEx program reported in [21] can be seen in Table I.

TABLE I. ELEMENTS OF THE OPEX PROGRAM [21]

Elemet	Meaning
Results	Expected results
Leadership	Ensuring a better working relationship
Requirements	Quality requirements as an example
Program definition	The steps to be taken from this program are followed
Supporting practices and procedures	Any practice or procedure that leads straight to the goal
Working culture	Smooth teamwork
Information management	Smooth information management
Follow-up	For a continuous improvement

To well-explain that, every requirement must be met to obtain the best possible end results. When it comes to production schedules, it is best to think in terms of daily, weekly, or even monthly schedules, to ensure that production flows smoothly within a given company. It is also essential to anticipate the expected result, which we must well define from the outset. We need also to master the right production tools. When it comes to a work culture that conforms to standards, we need to think about training our work teams, just as we need to respect well-defined work regulations from the outset. Having a work culture at the outset will improve the company's production output by reducing conflicts between staff and making teamwork more enjoyable. We must also ensure a smooth flow of information, facilitating access to information at all times. Periodic monitoring of production performance is just as important as financial monitoring, which is required at all times. The purpose can play a fundamental role in an OpEx approach. Ideally, we need to know the nature of the customer's request, and we need to think carefully about who needs to be involved in the follow-up of this approach. A process that transforms inputs into outputs should itself be of interest. Preserving gains and ultimately promoting the project as a whole are two points that we must essentially take into account when getting involved in this approach. Neglecting one of the 8 elements of OpEx can have undesired effect. That is why, when we embark on an OpEx approach, we need to take into account each of those elements.

II. METHODOLOGY

A. Sampling Technique

For our quantitative research, we designed a form and collected the data via the internet, using the LinkedIn network. According to [22] four major modes of data administration are often used: (a) Administration by post, (b) administration via the internet, (c) face to face, and (d) administration by phone. Our research methodology is based first and foremost on the development of a measurement scale for the culture of OpEx. We put 24 questions to measure the level of OpEx maturity. The main objective was to identify the real maturity level of OpEx. Eight sub-components of Opex were considered, according to the elements of Table I [21].

B. Maturity Level of OpEx

Each concept or component was considered as the mean result of its sub-components [23].

$$\text{OpEx} = (\text{Results}+\text{Leadership}+\text{Requirements} +\text{Program definition}+\text{Supporting practices and procedures} +\text{Working culture}+\text{Information management}+\text{Follow-up})/8 \quad (1)$$

C. OpEx Dimensions

TABLE II. OPEX TOOLS

Dimension	Wording	Items
Results	RES1	We always anticipate expected results
	RES2	An expected result is well defined at the outset
	RES3	We generally master the right means to achieve an expected result
Leadership	LDP1	We have full control over the direction of production turnover
	LDP2	Management is well aware of its duties and commitments towards customers
Requirements	REQ1	Product quality requirements are strictly adhered
	REQ2	Customer requirements are strictly met
	REQ3	A document clarifying all requirements is always present in the company
Program definition	PRD1	A daily production schedule is well defined within the company
	PRD2	A weekly production schedule is well defined at the outset
	PRD3	A monthly production schedule is well defined at the outset
Supporting practices and procedures	SPC1	We always use the right production tools
	SPC2	Innovation in support practices and procedures is fundamental to the company
Working culture	WCL1	We often train work teams
	WCL2	Work regulations are well respected
	WCL3	We work together in the right environment
	WCL4	We help each other with no strings attached
	WCL5	Absences and disputes at work are intolerable at some level
Information management	IFM1	Information management is well mastered from the outset
	IFM2	Easy access to information at all times
	IFM3	All information management facilitates the smooth running of tasks
Follow-up	FLU1	The production sequence is continued periodically
	FLU2	We demand financial monitoring at all times
	FLU3	Periodic monitoring of production output is required

III. RESULTS AND DISCUSSION

We looked at the number of employees within companies. We found that 20 were large, 4 medium-sized, and 16 small.

TABLE III. NUMBER OF EMPLOYEES

		Frequency	%	Valid %	Cumulative %
Large	250 or more	20	50.0	50.0	50.0
Medium	50-249	4	10.0	10.0	60.0
Small	Less than 50	16	40.0	40.0	100.0
	Total	40	100.0	100.0	

A. Assessment of OpEx Maturity Level at SMEs

The maturity level results regarding Small and Medium Enterprises (SMEs) can be seen in Table IV.

TABLE IV. ASSESSMENT OF OPEX MATURITY LEVEL OF SMEs BY DIMENSION

Dimension	Maturity Level	Expected Maturity	Gap
Results	2.7	3.00	-0.3
Leadership	3.25	3.00	+0.25
Requirements	3.43	3.00	+0.43
Program definition	3.32	3.00	+0.32
Supporting practices and procedures	3.37	3.00	+0.37
Working culture	3.11	3.00	+0.11
Information management	3.1	3.00	+0.1
Follow-up	2.42	3.00	-0.58

Six results (leadership, requirements, program definition, supporting practices and procedures, working culture and information management) show that the maturity level of the OpEx dimensions is above average. These results confirm with certainty that an optimal level of OpEx is achieved for the six OpEx dimensions mentioned above. To better visualize the results, we have designed the graphical radar of Figure 1.

Fig. 1. Opex maturity level and expected maturity at SMEs.

B. Assessment of OpEx maturity level at Les

The maturity level results regarding Large Enterprises (SMEs) can be seen in Table IV. These data show an above average level of maturity for all the 8 dimensions of OpEx. The maximum maturity level is 4 for requirements and the minimum is 3.3 for follow-up. To better visualize the results, we have designed the graphical radar of Figure 2.

TABLE V. ASSESSMENT OF OPEX MATURITY LEVEL OF LEs BY DIMENSION

Dimension	Maturity Level	Expected Maturity	Gap
Results	3.75	3.00	+0.75
Leadership	3.7	3.00	+0.7
Requirements	4	3.00	+1.00
Program definition	3.78	3.00	+0.78
Supporting practices and procedures	3.52	3.00	+0.52
Working culture	3.65	3.00	+0.65
Information management	3.62	3.00	+0.62
Follow-up	3.3	3.00	+0.3

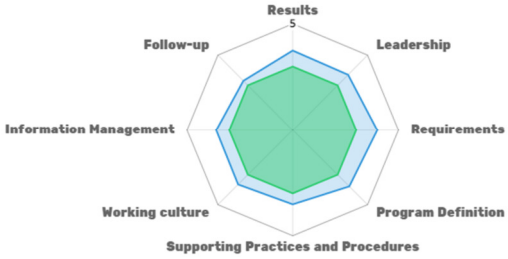

Fig. 2. Opex maturity level and expected maturity of LEs

C. Comparison of OpEx Maturity Levels between SMEs and LEs

The results show an above-average level of maturity of all OpEx dimensions for LEs. In the case of SMEs, only two OpEx dimensions have a maturity level below the average. The table below compares the OpEx maturity levels of SMe and Le.

TABLE VI. OPEX MATURITY LEVEL COMPARISON

Dimension	SMEs maturity level	LEs maturity level	Gap
Results	2.7	3.75	+1.05
Leadership	3.25	3.7	+0.45
Requirements	3.43	4	+0.57
Program definition	3.32	3.78	+0.46
Supporting practices and procedures	3.37	3.52	+0.15
Working culture	3.11	3.65	+0.54
Information management	3.1	3.62	+0.52
Follow-up	2.42	3.3	+0.88

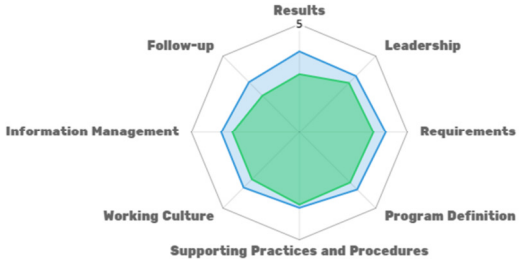

Fig. 3. Comparison of OpEx maturity levels between SMEs and LEs.

A comparison of the maturity levels of SMEs and LEs in Morocco reveals a number of points. A positive difference in the results of the 8 OpEx dimensions is obtained, with a

maximum value of 1.05 for results and a minimum of 0.15 for supporting practices and procedures. The results show that LEs have a higher level of maturity than SMEs. The difference can even be seen on the graphic radar of Figure 3.

IV. CONCLUSION

This study makes investigated the maturity level of operational excellence (OpEx) dimensions in Moroccan companies. The findings provide empirical evidence that the size has a significant impact on determining the maturity level of key OpEx dimensions like results, leadership, requirements, and procedures. The results were found to be in the same direction with the previous research. However, the limitations of a small localized sample affect the generalizability of the findings. Future studies can build on this work by incorporating larger and more diverse samples of Moroccan manufacturers. Comparative research between different developing economies may also offer valuable cross-cultural insights. Regarding the limitations of our research methodology, future research may raise questions other than those related to our research form. Overall, this study represents an early empirical effort to elucidate the maturity level of OpEx, providing a useful foundation for further research on this important issue. As we have already concluded, the first step is to know or highlight all the sub-dimensions of OpEx. We conclude from this study of 40 industrial firms in Morocco, that an above-average level of OpEx maturity is obtained for all dimensions of OpEx from all large firms (LEs) belonging to different sectors in Morocco. On the other hand, only 2 OpEx dimensions for Small-Medium Enterprises (SMEs) are below average. Comparing the two company sizes, we conclude that an OpEx maturity level is reached and its average was exceeded for the LEs, which is not the case for all OpEx dimensions for SMEs.

OpEx remains an ultimate goal for every company aiming to increase productivity and improve production output in the short, medium, and long term. For some, it is all about staying ahead of the competition, while for others it is about leading the market. This goal of excellence certainly remains unique. For SMEs, staying on this competitive path is already a goal. For LEs, competition is ruthless, and they certainly want to dominate the market with any method or tool. This path to excellence may differ from one company to another. Of course, if we are to achieve concrete results, we really need to think about the opinions of the managers of the target companies. A goal of future research could be a field study on employees working for different companies in Morocco. The aim would be to find out what managers and workers think about this path of excellence. Comparing the acquired results, a positive difference is highlighted for all 8 OpEx dimensions and the maturity level for LEs is higher than that of SMEs operating in the different sectors. The added value of this article is to show that the size plays a fundamental role in determining OpEx maturity levels, and this is confirmed with certainty. We all play by the rules and aim for excellence, especially the larger firms.

REFERENCES

[1] M. J. Hakeem and M. M. Nahas, "Improving the Performance of a Microstrip Antenna by Adding a Slot into Different Patch Designs," *Engineering, Technology & Applied Science Research*, vol. 11, no. 4, pp. 7469–7476, Aug. 2021, https://doi.org/10.48084/etasr.4280.

[2] P. Ubare and D. N. Sonawane, "Performance Assessment of the BLDC Motor in EV Drives using Nonlinear Model Predictive Control," *Engineering, Technology & Applied Science Research*, vol. 12, no. 4, pp. 8901–8909, Aug. 2022, https://doi.org/10.48084/etasr.4976.

[3] F. Belloum, L. Houichi, and M. Kherouf, "The Performance of Spectral Clustering Algorithms on Water Distribution Networks: Further Evidence," *Engineering, Technology & Applied Science Research*, vol. 12, no. 4, pp. 9056–9062, Aug. 2022, https://doi.org/10.48084/etasr.5116.

[4] D. Sarkar, *Little BIG Things in Operational Excellence*, 1st ed. SAGE Publications Pvt. Ltd, 2021.

[5] P. Found, A. Lahy, S. Williams, Q. Hu, and R. Mason, "Towards a theory of operational excellence," *Total Quality Management & Business Excellence*, vol. 29, no. 9–10, pp. 1012–1024, Jul. 2018, https://doi.org/10.1080/14783363.2018.1486544.

[6] L. A. Gólcher-Barguil, S. P. Nadeem, and J. A. Garza-Reyes, "Measuring operational excellence: an operational excellence profitability (OEP) approach," *Production Planning & Control*, vol. 30, no. 8, pp. 682–698, Jun. 2019, https://doi.org/10.1080/09537287.2019.1580784.

[7] J. Antony *et al.*, "An empirical study into the reasons for failure of sustaining operational excellence initiatives in organizations," *The TQM Journal*, vol. 35, no. 7, pp. 1569–1587, Jan. 2022, https://doi.org/10.1108/TQM-05-2022-0176.

[8] S. K. Ojha, "Operational Excellence for Sustainability of Nepalese Industries," *Procedia - Social and Behavioral Sciences*, vol. 189, pp. 458–464, May 2015, https://doi.org/10.1016/j.sbspro.2015.03.196.

[9] S. J. Rusev and K. Salonitis, "Operational Excellence Assessment Framework for Manufacturing Companies," *Procedia CIRP*, vol. 55, pp. 272–277, Jan. 2016, https://doi.org/10.1016/j.procir.2016.08.026.

[10] F. Khan, A. Ahmed, M. Ahmed, and M. a. U. Baig, "An Evaluation of Cost Optimization Strategies for BRT Projects in Pakistan," *Engineering, Technology & Applied Science Research*, vol. 12, no. 4, pp. 8825–8830, Aug. 2022, https://doi.org/10.48084/etasr.4956.

[11] Y. Kayikci, D. Durak Usar, and B. L. Aylak, "Using blockchain technology to drive operational excellence in perishable food supply chains during outbreaks," *The International Journal of Logistics Management*, vol. 33, no. 3, pp. 836–876, Jan. 2021, https://doi.org/10.1108/IJLM-01-2021-0027.

[12] R. M. Shehadeh, Z. M. F. Al-Zu'bi, A. B. Abdallah, and M. Maqableh, "Investigating Critical Factors Affecting the Operational Excellence of Service Firms in Jordan," *Journal of Management Research*, vol. 8, no. 1, pp. 157–190, Jan. 2016, https://doi.org/10.5296/jmr.v8i1.8680.

[13] M. Sony, "Implementing sustainable operational excellence in organizations: an integrative viewpoint," *Production & Manufacturing Research*, vol. 7, no. 1, pp. 67–87, Jan. 2019, https://doi.org/10.1080/21693277.2019.1581674.

[14] S. Sehnem, C. J. Chiappetta Jabbour, S. C. Farias Pereira, and A. B. L. de Sousa Jabbour, "Improving sustainable supply chains performance through operational excellence: circular economy approach," *Resources, Conservation and Recycling*, vol. 149, pp. 236–248, Oct. 2019, https://doi.org/10.1016/j.resconrec.2019.05.021.

[15] S. Sehnem, C. J. Chiappetta Jabbour, S. C. Farias Pereira, and A. B. L. de Sousa Jabbour, "Improving sustainable supply chains performance through operational excellence: circular economy approach," *Resources, Conservation and Recycling*, vol. 149, pp. 236–248, Oct. 2019, https://doi.org/10.1016/j.resconrec.2019.05.021.

[16] M. H. A.-A. A. Wahab, M. Ismail, and M. N. Muhayiddin, "The Effect of Internal Environmental Factors on Operational Excellence of Manufacturing Industry: A Pilot Study," *International Journal of Academic Research in Business and Social Sciences*, vol. 9, no. 2, pp. 1087–1099, Mar. 2019, https://doi.org/10.6007/IJARBSS/v9-i2/5666.

[17] R. M. Sheahadeh, M. Maqableh, M. O. Al-Zoubi, A. H. O. Akhorshaideh, and M. K. Al-Sham, "Review the Operational Excellence Factors of Service Firms: A Literature Review," *European Journal of Business and Management*, vol. 8, no. 3, pp. 1–11, Jan. 2016.

[18] J. Antony *et al.*, "An empirical study into the reasons for failure of sustaining operational excellence initiatives in organizations," *The TQM Journal*, vol. 35, no. 7, pp. 1569–1587, Jan. 2022, https://doi.org/10.1108/TQM-05-2022-0176.

[19] J. Antony *et al.*, "Critical success factors for operational excellence initiatives in manufacturing: a meta-analysis," *Total Quality Management & Business Excellence*, vol. 34, no. 9–10, pp. 1152–1172, Jul. 2023, https://doi.org/10.1080/14783363.2022.2157714.

[20] O. Fok-Yew, H. Ahmad, and S. Baharin, "Operational Excellence and Change Management in Malaysia Context," *Journal of Organizational Management Studies*, vol. 2013, Sep. 2013, Art. no. 957636, https://doi.org/10.5171/2013.957636.

[21] J. S. Mitchell, *Operational Excellence: Journey to Creating Sustainable Value*. Wiley, 2015.

[22] Y. Evrard, B. Pras, and E. Roux, *Market*, 4th ed. Paris, France: Dunod, 2023.

[23] M.-H. Jobin and D. Lagacé, "La démarche Lean en santé et services sociaux au Québec: comment mesurer la maturité des établissements?," *Gestion*, vol. 39, no. 3, pp. 116–127, 2014, https://doi.org/10.3917/riges.393.0116.