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OPTIONS FOR IMPLEMENTING LEAN MANAGEMENT ELEMENTS (CASE STUDY OF A RESTAURANT AT THE WARSAW CHOPIN AIRPORT)

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Abstract

The study presents the outcome of application of selected Lean Management tools in a fast-food bar located at the Warsaw Chopin Airport. Relying on observations made in other bars managed by the company since 2010, we prepared reliable proposals of how to improve selected elements of production and organisation of work. The following tools were used in the study: (1) Value Stream Mapping (VSM), (2) Kaizen, (3) 5S.

Application of Lean Management tools shortened the production process, enhanced work and reduced energy consumption. Simple organisational changes and changes in the attitudes of employees maximised profits and saved time and money.

It must be remembered that the tools presented in the study were tailored to the case discussed. With the ability to consult all possibilities related to the distribution of working tools and side dishes with the employees, we managed to choose the most optimum and ergonomic solutions.

Keywords: *lean management, lean manufacturing, management concepts*

JEL Classification: *M11, M51, L83*

1 Introduction

In recent years many companies have introduced fundamental changes into their production processes. One of the most influential of such changes has been the implementation of Lean Management (Krafcik, 1988; Tillema & van der Steen, 2015; Cortes et al., 2016). Lean Management is an operating concept of managing a manufacturing company (Walentynowicz, 2013; Grycuk, 2016), listed among the most effective strategies used in companies worldwide (Hadaś et al., 2012). As stated by Womack et al. (2007) *lean production is 'lean' because it uses less of everything compared with mass production-half the human effort in factory, half the manufacturing space, half the investment tools, half the engineering hours to develop a new product in half time. Also, it requires keeping far less than half the needed inventory on site, results in many fewer defects, and produces a greater and ever-growing variety of products*.

However, Lean Management cannot be applied only in relation to the company's manufacturing processes. The attitude must be a comprehensive one, meaning that it needs to apply to the entire enterprise (Kwiatkowski et al., 2016; Hashmi et al., 2015).

Within the last 30 years, the method has significantly changed production, services, commerce and the public sector (Bahsin, 2015; Pedersen & Hunishe, 2011; Kowalewski, 2015; Gupta et al., 2016). Initially, it was implemented only in big companies, but has for some time been gaining popularity in small companies as well (Nowosielski, 2015; Martínez-Jurado & Moyano-Fuentes, 2014; Mrugalska & Wyrwicka, 2017). Although literature mentions the benefits of individual Lean Management tools, a properly composed and configured combination of tools proves to be even more effective in the process of improvement of manufacturing processes (Antosz, 2013; Boskrobko, 2007). In the simplest of interpretations, this method consists in the slimming of management processes, elimination of redundant actions, reduction of production times and minimisation of consumption of raw materials and energy. The Lean system is based on three main pillars: (1) strategic planning, (2) business structure, (3) HR capacities, the foundations of which are continual improvement, enhanced performance and cost reduction (Okręglicka, 2015).

2 Data and Methods

The study presents outcome of the application of Lean Management tools in a fast-food bar located located at the Warsaw Chopin Airport. The place was chosen because of its large potential (spatial, demographic and market) - each

year an airport takes a growing number of passengers, and a restaurant constantly increases its turnover. Relying on observations made since 2010 in other bars managed by the company, we prepared reliable proposals of how to improve selected elements (Antczak & Puchała, 2014; Pakdil & Leonard, 2014), i.e. how to enhance performance whilst reducing the times of production cycles and energy consumption (Hadaś et al., 2012; Okręglicka, 2015). The applicability of the Lean concept depends, among others, on: (1) nature of the business activity conducted, (2) concept implementation phase, (3) professionalism, which reflects the expertise of implementers (Tillema & van der Steen, 2015).

The Lean Management method was selected upon a thorough analysis of the working system in the facility. The following tools were used in the study: (1) *Value Stream Mapping (VSM)*, a method that seeks to recognise all actions that are undertaken during the cycle of production or service provision, (2) *Kaizen,* a method based on involvement of the entire staff employed by the enterprise in the working and production processes, and, finally (3) 5S, used in order to eliminate redundant elements that lead to waste of materials in the source stream (Bączkowicz & Gwiazda, 2014; Wolniak, 2014). The paper demonstrate the VSM method on the example of two products: pieces of chicken and sandwiches that requires passing through all the positions of the production line. The focus was on ergonomics and the availability of semi-finished products and packaging. These facts has helped the possibility to carry out the changes without interference with the already existing solutions. In tested restaurant the *Kaizen* method has been integrated with *5S*. The awareness of employees was raised, common conversations were introduced (searching for the source of problems and implementation of achieved solutions), and also the self-discipline of the staff. Workers were provided by information about their progress and improvements. Received changes allowed to maintain the popularized principles and developing them.

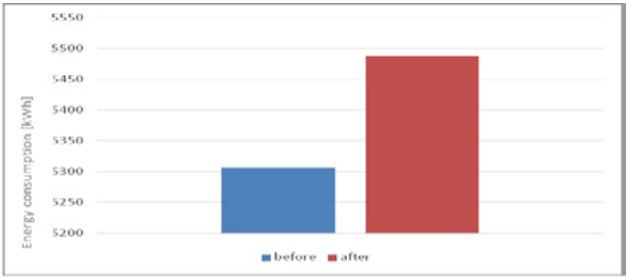
The solutions presented were verified in practice. Because of the specification of the place (a small amount of menu items, low prices and very fast customer service), they should be treated individually. The techniques selected may produce different effects in another bar owned by the Polish fast-food market leader. Due to the standards in place at the organisation, some of the solutions were only verified, without being permanently implemented (for one week).

3 Results

The first of the solutions proposed encompassed: (1) reduced use of the other side of kitchen and slots, (2) reduction of working hours of table heaters, cake heaters and meat heaters, (3) switching off two coolers after closure of the restaurant (4)

switching off one of the coffee machines during night hours, (5) turning off cashes after closure of the facility, (6) switching off the redundant lighting (menuboards, logos and all screens). After the implementation of equipment operation schedule, energy consumption decreased from 5488 kWh to 5307 kWh (Figure 1).

Figure 1 **Energy consumption before and after implementation of equipment operation schedule (data presented for one week in August 2015 and May 2016).**



Source: Author's own work.

Average energy consumption in comparison with the number of daily transactions (TC) in the week analysed was lower by 3.88% than in comparable days of the previous year (Table 1, Figure 1). The benefits may not seem high, but produce notable savings of money and energy for the year as a whole (above 5200 PLN/year). The result is attainable with the introduction of a schedule of operation of equipment, without additional costs related to replacement of devices.

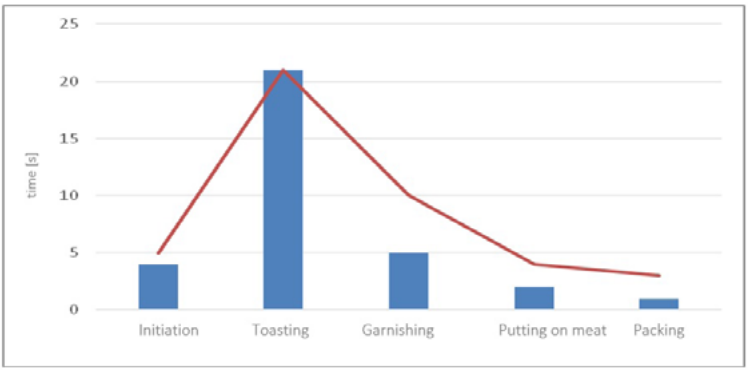
Table 1 **Daily energy consumption with the new schedule**

Day	TC	Energy consumption [kWh]	Date of comparison	TC	Consumption [kWh]	Proportional consumption [kWh]
08/05/2016	14599	693.06	16/08/2015	14288	714.04	729.54
09/05/2016	1445	693.64	16/08/2015	1428	714.04	722.54
10/05/2016	1119	619.20	19/06/2015	1119	658.72	658.72
11/05/2016	1193	656.95	15/09/2015	1192	669.8	670.36
12/05/2016	1145	634.20	09/09/2015	1146	668.16	667.58
13/05/2016	1339	675.49	20/07/2015	1332	699.96	703.64
14/05/2016	1023	628.99	03/09/2015	1024	649.08	648.45
15/05/2016	1439	705.15	16/08/2015	1428	714.04	719.54

Source: Author's calculations.

Elaboration of a new VSM significantly shortened duration of the production process (15 employees has been tested, regardless of seniority). Simple organisational changes and changes in the attitudes of employees (better human relationships, interviews with employees, different style of restaurant management, further training of employees, the circulation of information) brought in better performance and acceleration of work (Figure 2). Operating hours were shortened in virtually every work station.

Figure 2 **Histogram of operating hours in selected work stations [blue line: time before VSM implementation, red line: time after VSM implementation]**



Source: Author's calculations.

The only work station where the operating hours were not reduced was the toasting station, which was because of the quality requirements in place at the organisation. The average duration of the production cycle was shortened by 10 seconds (from 43 to 33). The performance of the work stations grew by 20, 50, 56 and 67%, respectively. The histogram (Figure 2) above does not include the times of migration between individual stations. Calculations showed, however, that they decreased from 44 to 30 s. To better show the performance improvement, a Material Stream Map was created (Figure 3). The map illustrates the handling of an order of "sandwich + coffee". Before the implementation of the VSM time of sandwiches making was 58 seconds and the time of coffee production lasted 37 seconds. After the introduction of VSM system, restaurant staff resigned from sticking stickers on drinks. This betterment fixed one of the bottlenecks of production. Transition times of material between the positions has decreased. This was possible by organizing workplaces and change the position of some of the tools and packaging. The time of production an order

Figure 3 **New VSM after introduction of LEAN tools**

Source: Author's own work.

Lean Management was also used to enhance the semi-finished product tagging system. Before the tool was introduced, the specification of all tags took, on average, 58s. Production of groups of tags describing similar semi-finished products was proposed. With the leaning process, the number of tags produced was reduced and the average time dropped to 10.5 s, with concurrent performance enhancement by 82.5%. The so saved time can be devoted by employees to the proper production process.

After numerous discussions, employees, acting according to the principle *a place for everything and everything in its place*, proposed changes concerning order and designation of a place to keep the most commonly used objects: tongs for different kinds of meat. Additionally, a new distribution system was introduced for such objects (according to the rule that the most frequently used devices should be located at hand). Yet another enhancement was the adaptation of the work surface under the table into a storage place for unused drawers/containers. Finally, the coffee preparation area was improved, too, through the change of layout of containers with sides and tools. For the following reasons, coffee tagging was abandoned: (1) reluctance of employees to use the company's system, resulting from bartenders' knowledge about coffee, (2) lack of identifiable usefulness of the tags to customers.

As was noted during the study, the organisation's production system had a number of characteristics typical of Lean Management. The foods/beverages are freshly produced, which minimises losses and food wastage. A pull production system is used in the kitchen, meaning that the products are pulled forward and do not retract to other stations. Speaking the language of the Kaizen philosophy, it can be said that everything gets better. The example of the restaurant reflects the sense of this

philosophy. The system seemed good already before the study, but the study showed that it can be even better.

4 Conclusion

The changes introduced aim at improving the quality of the products offered. The study brought about notable and tangible benefits for the restaurant, meaning that the selected management method does work and has improved the organisation. A number of the solutions proposed have been implemented permanently. Some are still being consulted with top management. The following conclusions have been drawn from the survey:

1. better results can be obtained without financial expenditures. In the case analysed, diligence of employees played a most important role. If all employees know and abide by the principles of operation of the production system, food wastage is significantly reduced.
2. Additionally, the sequencing of operation of individual devices proved effective in reducing the costs of power consumption. It must be noted that all tools presented in this study were tailored to the case examined (meaning a specific restaurant).
3. The study shows that a number of Lean Management Tools are possible to introduce in the bar subjected to study. With these, the entire operation cycle can be accelerated by as much as 23%. Value Stream Mapping (VSM) made it possible to eliminate certain actions that used to significantly extend the duration of the production process. In some cases, Lean tools made it possible to "slim" the operating hours by nearly 70%.

References

1. ANTCZAK D., PUCHAŁA, M. (2014). Lean Management jako metoda optymalizacji procesów logistycznych w magazynie firmy X - cz. I. *Zarządzanie Innowacyjne w gospodarce i biznesie 2(19), 40-53*. Retrieved from www.yadda.icm.edu.pl
2. ANTOSZ, K. (2013). *Narzędzia Lean Manufacturing*. Rzeszów: Wydawnictwo Politechniki Rzeszowskiej.
3. BĄCZKOWICZ, M., GWIAZDA, A. (2014). Improvment of the piece production system using Lean Management approaches. *Selected Engineering Problems 5, 11-14.* Retrieved from www.yadda.icm.edu.pl

4. BAHSIN, S. (2015). *Lean Management Beyond Manufacturing. A Holistic Approach. Coventry*: Springer International Publishing
5. BOSKROBKO, B. (2007). *Zarządzanie środowiskiem*. Warszawa: Polskie Wydawnictwo Ekonomiczne.
6. CORTES H., DAABOUL J., Le DUIGOU J., EYNARD B. (2016). Strategic Lean Management: integration of operational Performance Indicators for strategic Lean Management. *IFAC-PapersOnline 49 (12), p. 65-70*. https://doi.org/10.1016/j.ifacol.2016.07.551.
7. GRYCUK, A. (2016). Bariery w stosowaniu koncepcji Lean Management. *Kwartalnik Nauk o Przedsiębiorstwie 3, p. 72-79*. Retrieved from www.yadda.icm.edu.pl
8. GUPTA S., SHARMA M., SUNDER, M. V. (2016). Lean services: a systematic review. *International Journal od Productivity and Performance Management 65 (8), p. 1025-1056*. https://doi.org/10.1108/IJPPM-02-2015-0032
9. HADAŚ Ł., FERTSCH M., CYPLIK, P. (2012) *Planowanie i sterowanie produkcją*.Poznań: Wydawnictwo Politechniki Poznańskiej.
10. HASHMI, H., KHAN, N. R., MIRZA, A. H. (2015). The impact of lean management implementation on organizational operational performance. *Scientific Journal of Logistics 11 (4), p. 375-385*. doi: 10.17270/J.LOG.2015.4.6
11. JASTI, N. V. K., KODALI, R. (2014). Lean Production: litearure review and trends. International Journal of *Production Research 53, p. 1-19*. doi: 10.1080 / 00207543.2014 . 937508
12. KOWALEWSKI, M. (2015). Lean accounting, czyli jak szczupła rachunkowość wspiera wykorzystanie koncepcji lean management w przedsiębiorstwie. *Studia Ekonomiczne 224, p. 73-82*. Retrieved from www.yadda.icm.edu.pl
13. KRAFCIK, J. F. (1988). Triumph of the Lean Production System, *Management Review 1, p. 41-45*. Retrieved from https://www.lean.org/downloads/MITSloan.pdf
14. KWIATKOWSKI M., LORENC K., NOWICKA D., PROSÓŁ H., SIKORA M. (2016). Lean Management jako instrument zrównoważonego rozwoju przedsiębiorstwa. *Management Systems in Production Engineering 1 (21), p. 31-36*. Retrieved from www.yadda.icm.edu.pl
15. MARTÍNEZ-JURADO, P. J., MOYANO-FUENTES, J. (2014). Lean Management, Supply Chain Management and Sustainability: a literature review. *Journal of Cleaner Production 85, p. 134-150*. https://doi.org/10.1016/j.jclepro.2013.09.042

16. MRUGALSKA, B., WYRWICKA, M. (2017) Towards Lean Production in Industry 4.0. *Procedia Engineering 182, p. 466-473*. https://doi.org/10.1016/j.proeng.2017.03.135
17. NOWOSIELSKI, S. (2015) Koncepcja Lean Management w małym przedsiębiorstwie. Możliwości i ograniczenia zastosowania. *Przedsiębiorczość i Zarządzanie 16(3), p. 69-80*. Retrieved from http://piz.san.edu.pl/docs/e--XVI-3-2.pdf#page=69
18. OKRĘGLICKA, M. (2015). Zastosowanie Lean Management w małych przedsiębiorstwach. *Przedsiębiorczość i Zarządzanie 16 (7), p. 459-468*. Retrieved from http://piz.san.edu.pl/docs/e-XVI-3-2.pdf#page=69
19. PAKDIL F., LEONARD, K. M. (2014). Criteria for a lean organisation: development of a lean assessment tool. *International Journal of Production Research 52, p. 4578-4607*. http://dx.doi.org/10.1080/00207543.2013.879614
20. PEDERSEN, E. R. G., HUNICHE, M. (2011). Negotiating lean: The fluidity and solidity of new management technologies in the Danish public sector. *International Journal od Productivity and Performance Management 60 (6), p. 550-566*. https://doi.org/10.1108/17410401111150742
21. TILLEMA S., van der STEEN, M. (2015) Co-existing concepts of management control. The containment of tensions due to the implementation of lean production. *Management Accounting Research 27, p. 67-83*. https://doi.org/10.1016/j.mar.2015.01.002
22. WALENTYNOWICZ, P. (2013). Zakres zastosowania Lean Management w przedsiębiorstwach produkcyjnych - wyniki badań empirycznych. Innowacje w Zarządzaniu i Inżynierii Produkcji, Zakopane 2013; Retrieved from http://www.ptzp.org.pl/files/konferencje/kzz/artyk_pdf_2013/p038.pdf
23. WOLNIAK, R. (2014). Relationship between selected Lean Management tools and innovations. *Zeszyty Naukowe Politechniki Śląskiej. Organizacja i Zarządzanie75, p. 157-166*. Retrieved from www.yadda.icm.edu.pl
24. WOMACK, J. P., JONES, D. T., ROOS, D. (2007). *The Machine That Changed the World.* New York: Free Press.