

# Application of the Philosophy of Management and Production Engineering in Eastern Asia in Improving the Processes of Urban Transport Operation

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## **INTRODUCTION**

Enterprises, including public transport companies looking for possibilities of achievement of competitive advantage on market. First of all these possibilities are available on domestic market. These include modern technical means (vehicles) supporting the implementation of the basic tasks of such organizations, consisting in the provision of transport services, as well as processes and systems in the enterprise. Modern management methods and techniques can also be distinguished, thanks to which company managers achieve their goals. A chance in the described area are means and ways of tasks performance in these organisations which achieved the economic success. Particularly one should pay attention to firms in the countries of Eastern Asia. The meaningful results, which they achieved should interest researchers and practitioners occupied the functioning companies in Europe.

The article addresses the subject of the activities of companies operating in the Far East of Asia as an antidote to the problems of domestic enterprises. A particular attention will be paid to transport companies, whose problem is an efficiency, connected with their activity. The article also shows the possibilities of changes in such organisations, which let to achieve a success.

## **MANAGEMENT AND PRODUCTION ENGINEERING IN FIRMS IN EASTERN ASIA AND POSSIBILITIES OF APPLICATIONS IN POLISH ENTERPRISES OF URBAN TRANSPORT**

A subject matter concerning an efficiency of urban transport is actual and practically applies to all major cities in the world. Modern and increasingly intelligent city management systems must take into account the problem of rapid movement of large numbers of passengers within them. This problem also applies to Polish cities. In this regard, it seems reasonable to take advantage of the experience of Japanese solutions that are characterized by high efficiency

and passenger satisfaction. In the chapter the basic papers in these area and the possibilities of their application in Polish realities were described.

### **Management and production engineering in firms in Eastern Asia – study of bibliography**

Contemporary urban transport touches problems which required immediate solution, but will be also an object of interest as well researchers as managers in the future in this area of the activity. Such problem can be global increase of temperature, what was indicated in (Auvinen et al., 2012). Connected with it is a smog in cities, which requires an application of proper means and ways, which cause its solution. This problem will be solved by low imissivity reduction, whose causes are cars. Unfortunately there are the more cars (this problem is signaled by (Wootton, 1991).

Another problem related to the topic of climate change, which he draws attention to (Auvinen H. et al., 2012, May, 2005) is the energy consumption and smoke emissions of passenger cars. According to (Pucher, 2007) one of the problem in transport, which requires the appropriate activities are accidents and their victims, pollution, traffic jams and problems of poor people mobility.

One of the problems to solve is a need of growth in quality of services, provided basing on better resources management (including human ones) and also a need of an application modern technical mean, including digital technologies and systems of automations in urban transport. An attention to this problems was paid in (Auvinen et al., 2012, Metz, 2017). The problem of quality improvement by an influence on resources in enterprise, what affects the efficiency of operation and maintenance of technical systems requires a search of new means and ways, which will cause to solve them. It can be done by watch secretly firms which elaborated the best solutions. An example of them are the firms of Far East (Asia).

The examples of organisations which are the authors of success may be Japanese firms. These firms after the II World War developed solutions which inherited from american companies. Moreover they caused to their improvements, what was a reason of the success. Its essence is the presence of religious and national values.

Confucianism present in life of Japanese people and Buddhism preaches „the necessity of human self-betterment by the realization of his duties: obedience toward head of the family, compliance with ethics in interpersonal relations, respect for authority (Encyklopedia Popularna PWN, 1966). Values systems assumed in Japanese impose self-betterment obligations on people – Kaizen. They spread stoicism, proclaim praise of patience and moderation. They include human only as an element of nature. They do not place human in the centre of the world, but they try to find a place for him (he is in a specific position in the hierarchy), they try to form him. Hence the inborn tendency of individual and urge into knowledge, respect of the authority. There is not a freedom, without authority and obligations (Figuła, 2014, Waters, 1995).

In Japan human has an authority by work and belonging to group (Suzuki, 1989) and loyalty towards it, whose symptom is spirit: shudanshui – „all together”, present in company. In Chinese enterprises there is a loyalty towards dense, elastic family firms, whose relatives busy executive positions. A rule is nepotism (Waters, 1995).

In Japanese firms a particular attention is paid to building mutual trust, sharing responsibility, participation in making decision, creating the quality circles and „from top to down” management. It is assumed that the force of team as a whole is larger than the sum of component forces of individual members. With the use of this method in Japanese enterprises attack groups are created and the fight in the battle for elaborating new products takes place (Waters, 1995).

The element of work in a group is worker’s membership to quality circle. This is grassroot initiative. Meetings of workers creating quality circle take part out of work hours (like clubs in schools outside school hours). Nowadays in Japan, there are two million quality circles with twenty million employees (Tachwala and Mukherjee, 2009). The advantage of Japanese companies in the field of quality control lies in instilling care for the quality level of employees employed at all levels, and not only of services appointed for quality control (Figuła, 2014).

In the Chinese people, the person in the father's role is personally interested in all employees. He should know that the care and goodness she shows them will be beneficial to both parties. Visiting the boss of employees during their illness is a common practice (Waters, 1995).

In Japan, we think that everything has been loaned to a person as a sacred deposit and it cannot be missed (Morita et al., 1996). The mottainai concept derives the highest in the world Japanese propensity to save and the willingness to sacrifice work for low wages (Figuła, 2014).

The main features of Japanese management philosophy may be (Nosewicz, 2016):

- long-term employment of an employee in one company,
- decisions taken on the basis of consensus,
- individual responsibility for completed tasks,
- promotion options are not defined in a uniform manner,
- career paths are not laid out in advance,
- the company's interest in the employee's family, which creates a bond between the employee and the workplace.

The philosophy worked out in Japan, which decides on high effectiveness of enterprises in this country is Lean Manufacturing. The main goal of Lean Manufacturing according to (Szwedzka and Lubiński, 2015, Jasiulewicz-Kaczmarek, 2013) is an elimination of waste, so everything what increase production costs without without making any useful contribution to it. Asian

management methods supporting Lean Management include, among others (Kraśiński, 2013):

- Kaizen,
- 5S,
- Just-in-Time,
- Kanban,
- Quality circles,
- SMED (ang. Single Minute Exchange of Die),
- TPM (ang. Total Productive Maintenance).

*Kaizen* according (leancenter.pl) is a Japanese word [改善] and means change for the better by coming to the solution in small steps. It is a concept associated with the lean management approach and means making daily process improvement through the involvement of every employee of the company. Process improvement is carried out in order to:

- reduce of process realization time,
- quality improvement,
- technical changes to system components for proper customization,
- costs reduction,
- creating appropriate evaluation and reward criteria.

*Kaizen* philosophy were described in (Maurer, 2010).

*5S method* is one of the approaches to lean management. The main goal of its application is safety increase in workplaces at simultaneous increase of productivity (Gapp, 2008). *5S method* includes five elements. There are:

- seiri (selection/sorting),
- seiton (systematics),
- seiso (cleaning),
- seiketsu (standardization),
- shitsuke (self – discipline/self – improvement).

*Just-in-Time* according to (Żurawek, 2014) is a concept that aims to effectively organize the production process, including the storage of raw materials in such a way that they do not bring losses. Just in Time assumes that the right material is at the right time, in the right place, and in the exact quantity without stock security (Just-in-Time, [www.system-kanban.pl](http://www.system-kanban.pl)).

*Kanban* is defined as: a system of organizing the supply of parts, semi-finished products, materials for production at the time of actual demand for these elements

(Gawlik et al., 2013).

Among other things the use of a kanban solution in an enterprise allows to (Kraśiński, 2013, Wawak, 2011):

- reduce processing time to a minimum,
- minimize inventory while ensuring harmonious production and timely delivery of orders,

- adjust the production volume to the number of orders,
- achieve the effect of quality self-control at every stage of the process to minimize control costs.

*SMED* is a method, whose application is connected with the purpose to reduce a time of the changing over of main losses. In the area of TPM concept most of main losses connected with effectiveness of machinery park usage can be divided to six categories. One of it are changing over and regulations. Their eliminations causes significant growth of machines and devices efficiency (Kowal and Knop, 2017) for (Brzeski and Figas, 2006, Borkowski et al., 2006).

*Value Stream Mapping (VSM)* is graphic presentation of material and information flow on the way along the path that the product moves through the stream. Mapping allows you to easily see various types of waste, indicates where to accumulate inventory and any other activities leading to a decrease in production efficiency.

The Total Productive Maintenance (TPM) strategy is one of the lean management methods and aims to achieve maximum machine efficiency. This method assumes:

- zero accidents at work,
- zero faults,
- zero failures.

There are six great losses (types of waste) in TPM:

- failures,
- losses resulted from a preparation devices to work,
- setting and changing over,
- machines work on slow motion,
- micro-stoppage and idleness of machines,
- quality deficiencies, corrections and production waste.

This method involves the implementation of planned and preventive works (maintenance) not only by employees of the maintenance department, but also by machine operators.

The main measure of TPM activity efficiency is OEE. We can indicate the following TPM pillars:

- Autonomous Maintenance,
- Planned Maintenance,
- Focus Improvement,
- Education & Training,
- Safety & Environment,
- Logistic,
- Early Management,
- TPM in Office.

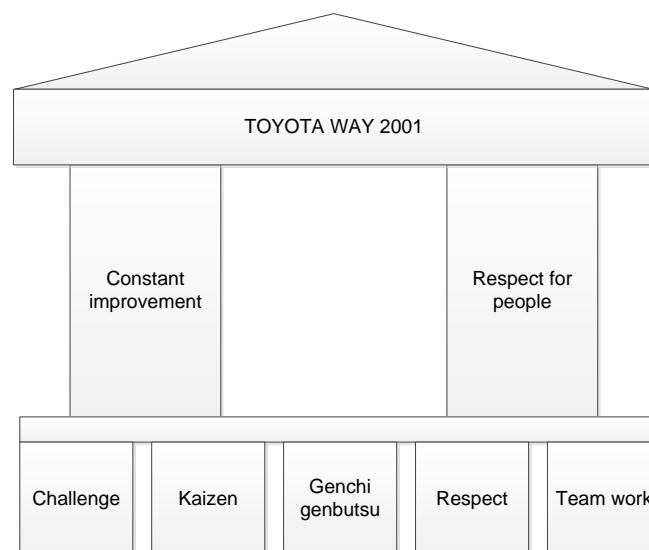
Toyota is the leader among Japanese companies using Lean Management methods and tools and thus achieving very high production efficiency. In its

production activities, this company sought to achieve the long-term vision they comprised (Rother, 2011):

- zero faults,
- zero deficiencies,
- 100 % added value,
- one piece flow, sequentially, as required,
- safety for people.

Currently, Toyota has an original production philosophy that aims to eliminate inefficiency and achieve optimal performance. This is achieved through lean management, using the Just-in-Time method (Toyota production system). Toyota's work philosophy (Toyota Way) is a set of rules of conduct that guide all Toyota Corporation employees. Toyota Way describes the most important elements of the company's organizational culture, as well as the mission and values that are transferred not only to the company's employees, but also to business partners and the local body (Toyota production system).

Philosophy of Toyotarium is presented by Toyota house on the Figure 1, which is described in detail in (Liker, 2018).



**Fig. 1 The Toyota Way Concept**

Source: (Liker, 2018)

The Toyotarium philosophy is based on the following 14 principles (Liker, 2005):

- principle 1: base management decisions on a far-reaching concept,
- principle 2: create a continuous and smooth process of disclosing problems,
- principle 3: use 'pull' systems to avoid overproduction,
- principle 4: equalize workload (heijunka),
- principle 5: create a culture of process interruption to solve problems to get the right quality right away,
- principle 6: standard tasks are the basis for continuous improvement and empowerment of employees,

- principle 7: use visual control so that no problem remains hidden,
- principle 8: use only reliable, thoroughly tested technology for employees and processes,
- principle 9: raising leaders who thoroughly understand work, live the general concept of the company and teach others,
- principle 10: to educate exceptional people and teams implementing the overall concept of the company,
- principle 11: respect the wide network of partners and suppliers by challenging them and helping them to improve,
- principle 12: get involved personally to thoroughly understand the situation (genchi genbutsu),
- principle 13: make decisions slowly by consensus and carefully considering all options; implement decisions quickly (nemawashi),
- principle 14: become a learning organization thanks to tireless reflection (hansei) and continuous improvement (Kaizen).

**The possibilities of application of methods and techniques of production engineering used in firms in Eastern Asia to improved an efficiency of operation and maintenance processes and systems for urban transport means in Poland**

The first part of the article draws attention to the possibility of using Eastern Asian management methods mainly in manufacturing enterprises. The next step should be to consider the possibilities of their use in improving the efficiency of processes and systems for the exploitation of public transport buses.

An effectiveness was defined in (Muślewski, 2010, Wieczorek and Madej, 2020). The authors of the article are interested in the rationalization of resources used for bus servicing and repairs. Therefore, the closest to them will be the concept of technical and economic efficiency, which should be understood as the ratio between the amount of expenditure incurred on the materials used and / or employees involved in the implementation of services and repairs, and the price for transport services. This efficiency may be achieved by the application of tools from the area of lean management in management of urban bus company; references on the subject of using lean management in services are: (Korbala, Liker, 2018, Locher, 2012, Ulrych, 2018. The example of application of described solutions was shown in (Aleksandrowicz, 2016). In this article the areas of applications of lean manufacturing methods were presented. They are: organization and functioning of bus and tram terminal, creation and transformation of transport infrastructure, organization of transport in cities and assignment of fleet to route. Therefore, an example of using the PDCA cycle in process optimization in public transport was presented. The need to adapt a public transport enterprise to the conditions of a market economy prompts the search for further resource savings in such an enterprise.

A chance in this regard may be the search for methods, techniques and procedures that will support the rationalization of resources in the enterprise. The solution may be to develop original bus operation strategies. A proposal in this area may be a strategy that assumes greater involvement of employees of a public transport enterprise in the creation and implementation of a savings program/programs. The challenge that needs to be taken is the use of the ring method (rin in Japanese means posting proposals and a request for decision, while gi – considering and making decisions) is based on shared decision thinking when employees who can effectively influence the development of the situation come to agreement of views. The developed approach based on the presented philosophy should be represented by an algorithm in the implementation of which the following methods will be used:

- benchmarking basic on indicators of effectiveness assessment of exploitation and auxiliary processes and systems,
- expert method, represented by BOST method, described in (Borkowski, 2012, Borkowski, 2016a, Borkowski, 2016b, Borkowski, 2017a, Borkowski, 2017b). This method enables the analysis of opinions from employees and is based on surveys, whose main purpose is to identify factors affecting the efficiency of urban transport companies. Two groups of variables can be used in research conducted in this companies using this method. The first covers the characteristics of respondents: gender (2), education (4), age (8), seniority (8), mobility (6), admission mode (3), (the number of variants for a given characteristic should be provided). However, dependent variables include assessments of the importance of a given factor according to the respondents' opinions. Each factor indicates one cause of irregularities in resource management,
- models of operation processes according to the sequence of events – these models will be developed for various scenarios of operational processes, including events related to the process of operation and maintenance.

## CONCLUSIONS

An important problem occurring in the functioning of many enterprises is insufficient efficiency, which threatens the effective competition of the enterprise on the labor market. So it is necessary to search solutions, which corrects it. A chance for it are ways and methods elaborated in companies in countries of Eastern Asia. Modern management methods adapted and introduced there can be a model for enterprises in Europe, also in Poland, where the problem is the resources used in the repair and maintenance of technical means owned by the enterprise. An opportunity to improve his business can be methods, the development of which is an opportunity to make the necessary changes. One of it is BOST method. Further research will be concentrated on its wide application in urban transport companies in Poland.



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## REFERENCES

- Aleksandrowicz, J. (2016). Narzędzia metodologii lean w procesach doskonalenia miejskiego transportu zbiorowego. *Autobusy*, 12, pp. 1726-1730.
- Auvinen, H. and Tuominen, A. and Ahlqvist, T. (2012). Towards long – term foresight for transport: envisioning the Finnish transport system in 2100. *Foresight*, vol. 14, iss. 3, pp. 191-206.
- Borkowski, S. (2016a). Potencjał naukowy toyotaryzmu i metody BOST. Warszawa: Polski Instytut Jakości.
- Borkowski, S. (2016b). Toyotaryzm. Analiza strumieni wartości produkcyjnych. Warszawa: Polski Instytut Jakości.
- Borkowski, S. (2017a). Toyotaryzm. Ocena funkcjonowania przemysłu spożywczego z wykorzystaniem metody BOST. Nowa Wieś – Częstochowa: Centrum Szkoleń Personalnych Monika Otrąbek.
- Borkowski, S. (2017b). Tototaryzm. Przydatność zasad zarządzania Toyoty w różnych branżach. Nowa Wieś – Częstochowa: Centrum Szkoleń Personalnych Monika Otrąbek.
- Borkowski, S. (2012). Toyotaryzm. Wyniki badań BOST. Warszawa: Wydawnictwo PTM.
- Borkowski, S. and Salejda, J. and Salamon, S. (2006). Efektywność eksploatacji maszyn i urządzeń. Częstochowa: Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej.
- Brzeski, J. Figas, M. (2006). Focused Improvement. Available at: [http://www.utrzymanieruchu.pl/index.php?id=47&no\\_cache=1&tx\\_ttnews%5Btt\\_news%5D=2578&cHash=f9fea16206&type=98](http://www.utrzymanieruchu.pl/index.php?id=47&no_cache=1&tx_ttnews%5Btt_news%5D=2578&cHash=f9fea16206&type=98) [Accessed 15 April 2017].
- Dąbrowska, G., Kudła, R. and Teresiak Z. (1987). Efektywność sterowania eksploatacją urządzeń elektroenergetycznych. In: *Efektywność Eksploatacji Systemów Technicznych. III Szkoła Eksploatacji Systemów Technicznych*. Szklarska Poręba
- Encyklopedia Popularna PWN, (1966), p. 489.
- Figuła, J. (2014). Wartości narodowe a konkurencyjność Japonii. *Wroclaw Economic Review*, 20/1, 3587.
- Gapp, R. and others (2008). Implementing 5S within a Japanese context: an integrated management system. *Management Decision*, 46, pp. 567.
- Gawlik, J. and Plichta, J. and Świć, A. (2013). *Procesy produkcyjne*. Warszawa: Polskie Wydawnictwo Ekonomiczne, pp. 293.
- Jasiulewicz-Kaczmarek, M. (2013). Role and contribution of maintenance in sustainable manufacturing. In: *7<sup>th</sup> IFAC Conference on Manufacturing Modelling, Management, and Control*. N. Bakhtadze, K. Chernyshov, A. Dolgui, V. Lototsky, (eds.), Series Title: *Manufacturing Modelling, Management, and Control*, Vol. 7, Part 1, Publisher: International Federation of Automatic Control, pp. 1146-1151.
- Just-in-Time. Available at: [www.system-kanban.pl](http://www.system-kanban.pl) [Accessed 27 May 2020].
- Kaizen-czym jest i jak działa w polskich firmach. Available at: [www.leancenter.pl](http://www.leancenter.pl) [Accessed: 27 May 2020].
- Korbal R.: *Ukryty skarb. Praktyczny podręcznik dla specjalistów z sektora usługowego*. Lean Enterprise Institute Polska.
- Kowal, S. and Knop, K. (2017). Wykorzystanie metody SMED do poprawy efektywności pracy stanowiska wytłaczania rurek gładkich. *Zeszyty Naukowe: Quality, Production. Improvement*, 2 (7), pp. 94-105.

- Krasiński, M. (2014). Kulturowe uwarunkowania wykorzystania japońskich koncepcji, metod i technik zarządzania. Wrocław: Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.
- Krasiński, M. (2013). Możliwość zastosowania metodyki Kanban w zarządzaniu projektami. *Management Sciences*, 1(14), pp. 24-32.
- Liker, J.K. (2018). Droga Toyoty do doskonałości w usługach : jak rozwijać lean w firmie usługowej. Warszawa: MT Biznes.
- Liker, J. K. (2005). Droga Toyoty – 14 zasad zarządzania wiodącej firmy produkcyjnej świata. Warszawa: MT Biznes.
- Locher, D. (2012). Lean w biurze i usługach : przewodnik po zasadach szczupłego zarządzania w środowisku pozaprodukcyjnym. Warszawa: MT Biznes.
- Loska, A. (2016). Metodyka modelowania eksploatacyjnego procesu decyzyjnego z wykorzystaniem metod scenariuszowych. Monograph. Gliwice: Wydawnictwo Politechniki Śląskiej.
- Maurer R. (2010). Filozofia Kaizen. Jak mały krok może zmienić Twoje życie. Gliwice: Helion.
- May, G. (2005). Transport in Europe: where are we going ? *Foresight*, vol. 7, iss. 6, pp. 24-38.
- Metz, D. (2017). Future Transport Technologies for an Ageing Society: Practice and Policy. In: C. Musselwhite, ed., *Transport, Travel and Later Life. Transport and Sustainability*. Vol. 10. Emerald Publishing Limited, pp. 207-220.
- Morita, A. and Reingold, E. M. and Shimomura, M (1996).: *Made in Japan*. Akio Morita and Sony. Warszawa: WNT.
- Muślewski, Ł. (2010): *Podstawy efektywności działania systemów transportowych*. Bydgoszcz-Radom: Instytut Technologii Eksploatacji – Państwowy Instytut Badawczy.
- Nosewicz, K. (2016). Japońskie metody i techniki zarządzania oraz ich stosowanie w polskim przedsiębiorstwie. *Journal of Modern Management Process*, 2(1), pp. 8-23.
- Ulrych, W. (2018). Praktyki performance management w kontekście wymogów koncepcji lean w środowisku usług. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.
- Pomietlorz, M. (2015). Istota koncepcji Lean Manufacturing. In: *Materiały Konferencji „Komputerowo Zintegrowane Zarządzanie”*, t. 1, Zakopane, pp. 612-621.
- Pucher, J. and Peng, Z.-R., Mittal, N., Zhu, Y., Korratyswaroopam, N. (2007). Urban transport trends and policies in China and India: Impacts of Rapid Economic Growth. *Transport Reviews*, July 2007, vol. 27, iss. 4, pp. 379-410.
- Rother, M. (2011). *Toyota Kata. Zarządzanie ludźmi w celu doskonalenia, zdobywania umiejętności, adaptacji oraz osiągnięcia ponadprzeciętnych wyników*. Wrocław: Wydawnictwo Lean Enterprise Institute Polska.
- Sienkiewicz, P. (1987). *Teoria efektywności systemów*. Warszawa: PAN.
- Suzuki, T. M. (1989). *A History of Japanese Economic Thought*. London-New York, Routledge.
- System produkcyjny Toyoty. <https://www.toyotapl.com/world-of-toyota/system-produkcji>. [Accessed 23 April 2020].
- Szwedzka, K. and Lubiński, P. (2015). Koncepcja implementacji systemu Kanban – studium przypadku. In: *Materiały Konferencji „Komputerowo Zintegrowane Zarządzanie”*, t. 1, Zakopane, pp. 635-645.
- Tachwala, T. and Mukherjee P. (2009). *Operations Management and Productivity Techniques*. New Delhi: PHI.
- VSM – Value Stream Mapping. Available at: <https://lean-management.pl/vsm/vsm-value-stream-mapping>. [Accessed 23.04.2020].
- Waters, D. (1995). *Zarządzanie w XXI wieku. Jak wyprzedzić Japończyków i Chińczyków*. Warszawa: Wydawnictwo Naukowo-Techniczne.

- Wawak, S. (2011). Zarządzanie jakością. Podstawy, systemy i narzędzia. Gliwice: Helion.
- Wieczorek, A. and Madej, R. (2020). Koncepcja metody poprawy efektywności procesów eksploatacji autobusów komunikacji miejskiej z uwzględnieniem idei toyotaryzmu. R. Knosala, ed., Inżynieria zarządzania. Cyfryzacja produkcji. Aktualności badawcze 2. ed. Warszawa: Polskie Wydawnictwo Ekonomiczne.
- Wootton, J. (1991). Transport options and the future of cities. Property Management, vol. 9, iss. 2, pp. 123-129.
- Woropay, M., Muślewski, Ł. (2005). Jakość w ujęciu systemowym. Bydgoszcz-Radom: ITeE, Bydgoszcz-Radom.
- Żurawek, L. (2014). Zarządzanie zapasami z zastosowaniem koncepcji Just in Time. Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humanistycznego w Siedlcach. Seria: Administracja i Zarządzanie, 103, pp. 315-318.

**Abstract:** The subject matter presented in the article touches the problem of insufficient efficiency of processes and systems in organisation. Achievement of adequate efficiency value is a guarantor of competitive advantage of enterprise. Therefore, it is necessary to constantly work on methods and techniques to improve efficiency, tailored to the needs of various organizations, which also includes service enterprises. Service enterprises include public transport companies. The purpose of the latter is to guarantee that the passenger will be transported from stop A to stop B within a certain time. Failure to achieve this goal incurs certain social costs. Therefore, the article focuses on measures and ways to improve efficiency, developed in Eastern Asian enterprises that have been successful as a result of their use. The first part of the article reviews the literature, including the methods used in this part of the world. The second part, however, concerns the possibility of using the BOST method in improving the efficiency of public transport enterprise processes in Poland.

**Keywords:** lean management, lean manufacturing, urban transport, exploitation, service management