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The meaning of strategic areas in enterprises applying principles of Toyota

Abstract: Harmonizing aims of the organization with workers needs, at taking into consideration determined outside and internal conditionings, is one of essential objectives of the personnel and production management in model applying principles of Toyota.

Findings of the examination carried out in production plants of several different branches were presented in the article. An assessment of production workers made in the scope of superiors attitudes and chosen strategic areas of the enterprise is an object of analysis. The Pareto-Lorenz diagram and innovative BOST method were applied for research needs. BOST method is a questionnaire method using interpretation of Toyota principles in the context of contemporary conditions of crisis.

The research findings are basis of improvement actions project for some production enterprises.

Key words: control, standardization, Toyota

1. Introduction

The human resources management constitutes specific philosophy of the human potential management in all contemporary enterprises both production and service. All elements of this management should be cohesive and aimed at goals resulting from the strategy adopted by the organization. Attitudes of workers and the management staff with regard to problems resulting from the specificity of enterprise's activity are an effect of the realized enterprise management model. The importance and the diversity of problems connected with personnel management and production management force the enterprise to seek ways of activity effectiveness increase. Applying of tested principles which let for harmonizing aims of the organization with needs of workers, but also raise effectiveness level of the enterprise action, is one of such ways. Toyota principles, which are bases of the Toyota Production System, constitute are most well-known because of their contribution to the theory of management.

2. Model of Toyota Production System

The first element of the Toyota Production System (Eng. TPS) appeared at the beginning of the 20th century and was implemented for the practice in 1924 in first world automatic loom called Type-G Toyoda Automatic Loom. It was Sakichi Toyoda invention - solution detecting the motif breaking moment in the mechanical sewing frame and stopping loom. Today solutions performing the similar role are called jidoka and constitute - by Just in Time - pillar of the system. Toyota system distinguishes four main objectives of its production system:

- delivering of products and services characterized by the highest quality world,
- staff capacity development through mutual trust and cooperation,
- costs reduction by waste eliminating (Japanese - muda, English - waste),
- creating a flexible production system responsive to changes in market demand.

Contrary to widespread opinion, the operational objective (technical and economic) of JIT system (Just in Time system) is inventories minimizing. The aim is leveling manufacturing process flow with the smallest cost of this process, achieving liquid, uninterrupted and perfectly synchronized flow this process.

Minimizing or rather the optimization of inventories is one of the "side" consequences of the process improvement. The manufacturing process has the best liquidity, when the supply chain between suppliers and customers both internal and external is perfectly integrated. Therefore, from a scientific side, Toyota system is defined as the continuous improvement

organizational system of supply chain integration and the integration of the chain with the manufacturing process.

In addition to the operational aim described a moment ago, other goals pursued the Toyota construction, rarely mentioned in literature. System couldn't function without implementation of them. Already the simplest examples can show that the key management system solutions, such as Kanban, can operate and develop only thanks of the cooperation of executive workers collectively solving a problem. Therefore, TPS is sometimes referred to as a system of enforced problem-solving. A comprehensive system of productive maintenance (TPM - Total Productive Maintenance), which is one of the pillars of human resource development, is included in Toyota Production System. The TPS system, we find an unusually intense learning process and personal development of employees.

It is possible briefly to describe the Toyota way (Toyota Production System) pointing at two pillars on which it is resting; "constant improvement" and "respect for people". Constant improvement, called often "kaizen" ("good change") determines a fundamental attempt at conducting enterprise activities. One should question everything. Real value of the constant improvement consists in creating the atmosphere of the constant learning and the environment, which is not only accepting the change, but it also straight forces this environment change. It is possible to form such a environment only where people are respected - hence the other expensive pillar of the Toyota. The company shows this respect providing the safety of the employment and trying to draw members into teams for the active involvement in improving their workstations. Motivating and employing people so that they cooperate on the way towards shared goals constitutes important part of the management work.

Attempts to introduce the Toyota system in foreign enterprises being involved in large international concerns are quite common in the world. However, these companies are not recorded significant achievements since the implementation is usually undertaken in a fragmentary and schematic, too formalized, without the necessary socio-cultural changes. Examples: the practice of "5S" performed by workers and directors, without understanding, and just because they received such an order or allegedly as a punishment (in the case of directors), workers handling the introduction of team work (manipulation is mainly posting teams alone, without the authorization of responsibility, thus boils down to "tightening the screws"), incomplete, inconsistent and not terminated the implementation of statistical quality control.

Generally one can say that inconsistency's nonconformity is managers defense of the traditional hierarchical social system and sabotage of the actual improvements in the interest of the company (the defense of their position prevails over the interests of the company.)

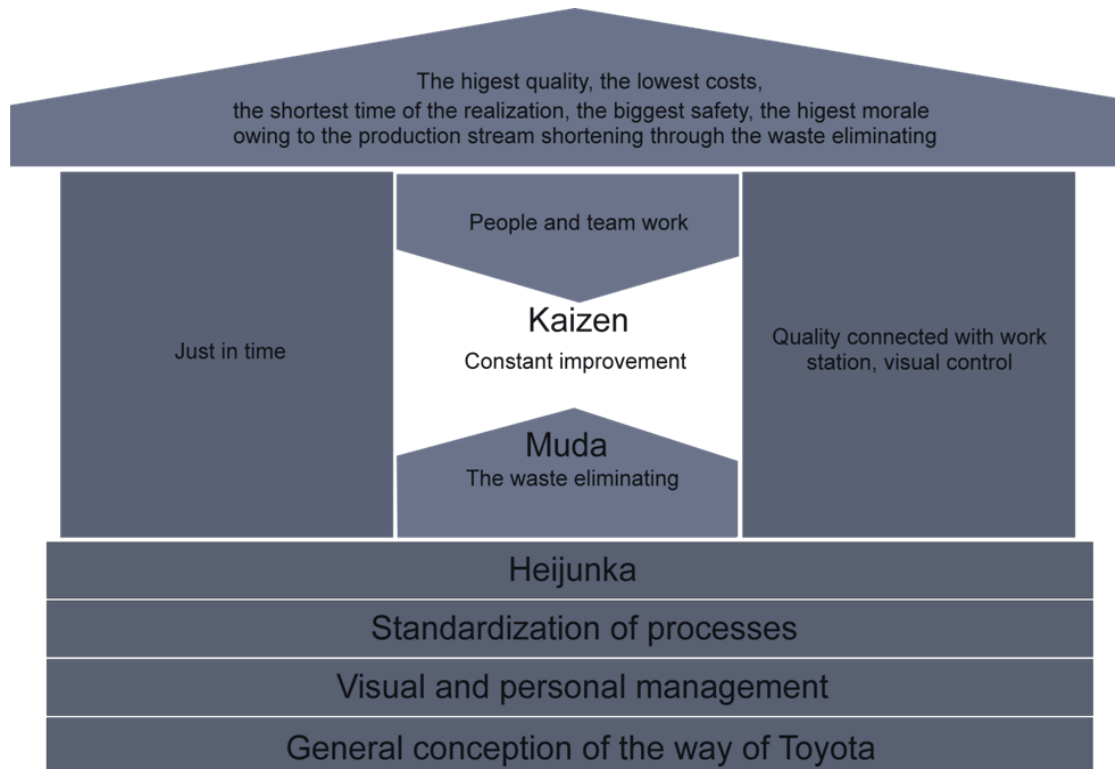
Accordingly, Toyota's HRM policies and practices will be construed as comprising a set of four policies designed to maximize (Winfield I., 1994: 41 – 42):

- (1) The goal of organizational integration.
- (2) The goal of employee commitment.
- (3) The goal of flexibility and adaptability.
- (4) The goal of quality.

The technology of manufacturing will exert a force to shape the management infrastructure including the company's HRM. This occurs not necessarily in a rigidly casually-determined way as adumbrated by tenets of technological determinism. Instead, the technology of manufacturing shapes HRM in ways, which allow a degree of latitude for strategic decision making. The technology of production means can thus be seen as providing management not with a constriction but instead with a degree of choice over how its human resource is managed. Issues of social control and power, management choice and politics therefore immediately enter into the discussion. In the case of Toyota Ltd, the unique and much-lauded Toyota Production System, together with the social and cultural contexts, drive our four selected HRM goals ((Winfield I., 1994).

Toyota Production System (TPS) has a characteristic structure and is often referred to as the "home of Toyota." Scheme "home of Toyota" has become one of the most recognizable symbols of modern production (Fig. 1). The house is a structural system, is strong only when its foundations, pillars and the roof are strong. Roof of the Toyota house presents objectives in the form of the following factors: the highest quality, the lowest cost, the shortest lead time, then two external pillars as: a production "just in time" and judoka indicating that it never be allowed to move defect to another position. The role of the TPS is releasing men from the machines. People are in the center of the Toyota house.

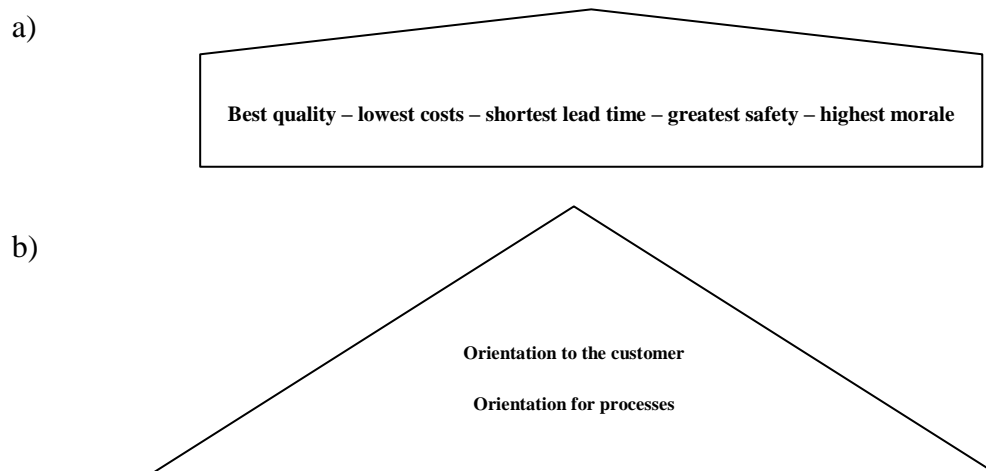
Fig. 1. The house of Toyota production system.



Source: materials of TideSoftware.pl

In the literature there are several versions of the Toyota production system structure (Liker K.J., Chong C.S., Sivakumar, Gay Y., 2003). Denotation ‘house’ also exists in the name of the mentioned system. So that’s why it is reasonable to use the concept of the roof, which elements are shown in Figure 2.

**Fig. 2. Roof elements of the Toyota house according to different authors:
a) LIKER K.J. 2005, b) CHONG C.S., SIVAKUMAR and. And., GAY Y. 2003.**



Source: data from publication listed authors.

Analyzing those elements contained in the roofs, it can be found that:

- common components are the following concepts: quality, cost, time, safety, morale,
- in the case of Figure 2a it was pointed, what elements should be (the highest quality, the shortest delivery time),
- data of Figure 2a shows how to achieve a given level by shortening the production of components by eliminating losses,
- on the basis of Figure 2b, it can be concluded, that the most important elements of the mentioned system are customer orientation and process orientation, and only emphasizes the importance of factors so as: safety, quality, delivery, cost, morale.

Deliveries have been interpreted as the time (delivery realization).

In summary, analysis of the elements of the Toyota roof it should be noted, that there is no clarity as to the importance of these factors, such as a house. Figure 2.1a, shows that 'quality' is the most important, while in Figure 2.1b shows that, the most important element is 'safety'. Diversity creates a scientific problem, and therefore it is justified to undertake studies to determine the hierarchy of the five elements (safety, quality, time, cost, morale), which are selected strategic areas in different types of economic organizations.

Each element of the schema itself is extremely important, but more importantly it is how the elements reinforce each other. In the center of Toyota's house are the people, because only through continuous improvement of the operation can achieve the required stability (Liker J., 2005: 72 – 73).

Toyota production system is not like a "tool kit". There is not set of tools such as the production with regard to the following factors so as: "just in time", objectives, visual inspection, Kanban. This is the sophisticated system of production, which all elements are working for all. The whole system is intended to support and encourage people to be implemented steadily improving their work processes. This system more generally boils down to applying the principles of the Toyota way (Liker, 2005: 75). These principles classified in accordance with the pyramid concept to the way Toyota 4 parts:

1. **Far-reaching concept** - the foundation of the pyramid.
2. **Processes** - the processes leading to the respective results.
3. **People and Partners** - the enrichment of organizations with a concern for the development of its own people and partners.
4. **Solving problems** - ongoing problem-solving as a driving force for a learning organization.

Individual elements of the Toyota house can be divided into 14 principles:

1. Far-reaching concept:

Principle No. 1 - is based on the concept of a far-reaching decisions, even at the expense of short-term benefits.

2. Processes:

Rule No 2 - We provide continuous and smooth process of disclosure problems.

Principle No. 3 - We use a system of "drawing".

Principle No. 4 - Align workload (Japanese - heijunka).

Principle No. 5 - We believe a culture of interrupting the process in order to clarify the problem.

Principle No. 6 - use as many standard operations.

Principle No. 7 - Using the control of the "visual".

Principle 8 - We use only reliable, thoroughly tested completely technology for the workers.

3. People and Partners:

Principle No. 9 - educates leaders for understanding and promoting the concept of our company.

Principle No. 10 - Education exceptional people pursuing business assumptions.

Principle No. 11 - We respect our network partners and suppliers, casting an ever new challenges and helping them to improve.

4. Solving problems:

Principle No. 12 - We are committed to personally to understand the essence of the problem (Japanese - genchi genbutsu).

Principle No. 13 - Decisions are made wisely, by consensus after thoroughly examining all possibilities. Decisions are implemented quickly (Japanese - nemawashi).

Principle No. 14 - trying to be a learning organization, thanks to the tireless reflection (Japanese - hansei) and continuous improvement (Japanese - Kaizen).

3. Research methodology

Today's enterprises include the Toyota model using the idea of human resources, because they treat each employee as tangible and intangible resources bringing potential benefits for the enterprise. This follows from the model presented above, where the center are people who have contact with the problems/issues of production and service.

Based on assessments made by the workers, it can be determined which factors affect product or enterprise market position preferably and which adversely affect. Such information can be obtained by workers' surveys.

The purpose of research study, whose results were presented in the following article, was an analysis of selected issues and opinions of management employees in manufacturing companies. The practical aim is to provide preventive measures, which should contribute to the improvement of the management system. In order to identify staff opinion concerning importance of specific strategic areas in enterprises that use elements of the Toyota model, the BOST method has been developed, which involves obtaining answers to questions concerning Toyota's principles applying.

The BOST method is a research tool, in which the technique of a questionnaire form is being exploited. This method can be successfully used in production and service enterprises or institutions (at industrial enterprises, administration, banks, hospitals, shops, schools etc). In the questionnaire used in the BOST study, respondent answers a series of questions concerning the company/institution. This tool is used for importance assessment so elements of Toyota model, as: standardization principles, visual control, using of Toyota principles, 4E + 1 principles and importance hierarchy of strategic areas in production/service enterprises and service institutions. In addition, the subject of BOST research are also (Borkowski, S., 2010: 19):

- factors determining the correct execution of the production process (cost, quality, safety, workload of machines and workers),
- development opportunities for companies/institutions,
- technological opportunities,
- possibilities of the production process,
- factors of visual control,
- areas needing improvement.

It should be emphasized that the evaluation of mentioned factors is made by both employees and supervisors. Particularly important part of the questionnaire is supervisors assessment according to the principles of Toyota. The final part of the survey includes an assessment of employees, the respondent's characteristics and identification of the business nature of analyzed enterprise/institution. Using this research method it is possible to evaluate the level of enterprise/institution perception by the staff and supervisors, because Servqual method is

attached to the BOST questionnaire. Servqual questionnaire enables service/enterprise quality assessment.

4. Characteristics of research objects

The object of the study were small, medium and large enterprises, which are defined as follows:¹

- small enterprise is an enterprise that employs on average less than 50 employees and an annual net turnover from sales of goods, products and services and financial operations not exceeding the equivalent in PLN 10 million or total assets of its balance sheet as at the end of one of these years have not exceeded zloty equivalent of EUR 10 million,
- medium-sized enterprise is an enterprise that employs on average less than 250 employees and an annual net turnover from sales of goods, products and services and financial operations not exceeding the PLN equivalent of EUR 50 million or total assets of its balance sheet as at the end of one of these years have not exceeded zloty equivalent of 43 million euros,
- large enterprise is an enterprise that employs on average more than 250 employees and an annual net turnover of more than 50 million.

Definition of SMEs (small and medium enterprises) is valid under the European Commission Regulation No 364 of 25 February 2004. Microenterprises were placed to this group since 1 January 2005. Small business constitute more than 99% of the 88 million enterprises in the EU and 17 million businesses in the United States.

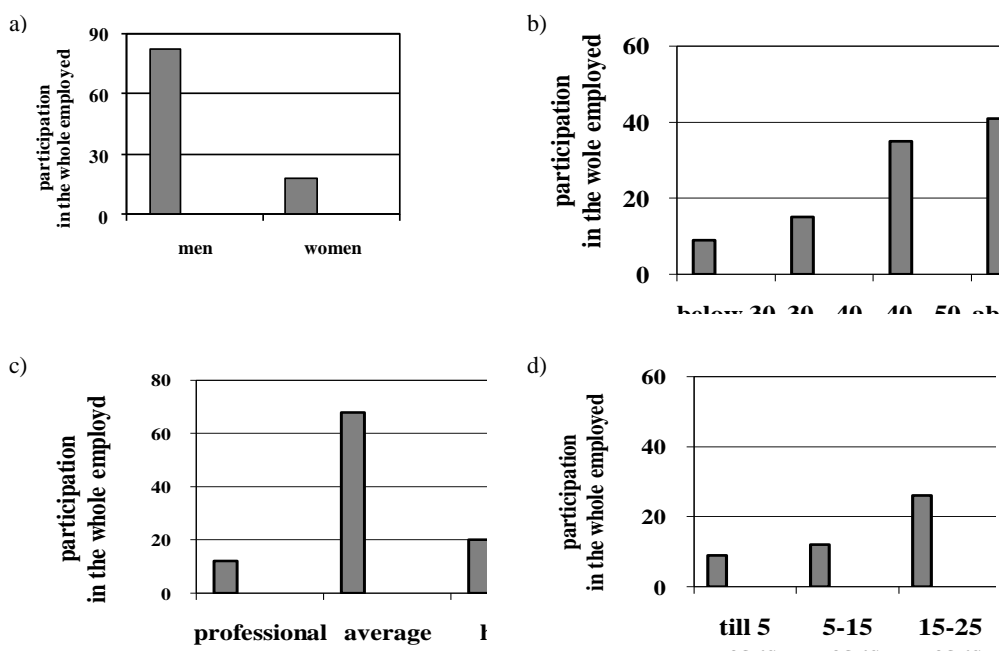
In research 584 manufacturing companies operating on territory of: Poland, Slovakia, Czech Republic and Lithuania were studied. These were companies belonging to the following industries: metallurgy (15 companies - a sector of large enterprises), construction (160 firms - mainly small businesses), chemical (75 medium companies), furniture (130 firms - the sector of small enterprises), footwear (144 companies - the sector of small enterprises) and food (60 of medium companies).

Small and medium enterprises (SMEs) are crucial for the economic development of countries, where research objects operate. They are essential for the sustainable functioning of the economy and contribute to faster economic growth. The main features of the SME sector are: the ability to rapidly respond to market needs, openness to technological and organizational advances, potential ability to create new jobs, low cost of job place and easiness of accommodating oneself to the place, the time and stores.

¹ On the basis of the Polish Law on Freedom of Economic Activity, 2 July 2004.

General characteristics of respondents (employees and managers) was made on the basis of BOST questionnaire (Fig. 3). Men constitute majority of workers in research objects (88%). About 70% persons have the secondary education. Workers with the vocational secondary education constitute the smallest percentage of respondents (12%). However workers with the university education constitute 12% of the whole employed. They are mainly workers of the management staff. Analyzing workers age of analyzed enterprises, it can be stated that persons, who are above 50 of year of the life, constitute majority of the workers group (41%). Figure 3 presents characteristics of respondents.

Fig. 3. Structure of the employment in research objects with regards to chosen criteria so as: a) sex, b) age, c) education, d) work experience.



Source: own study.

It results from Figure 3 that, the most respondents have the work experience above 25 years of the work (26%).

5. Importance structure of strategic areas in the workers' opinion

Strategic areas are content of management principles of the Toyota house roof and in the BOST research main attention was given to these elements. Strategic areas result from the first principle of Toyota, which is based on the concept of a far-reaching decisions, even at the expense of short-term benefits.

Every organizational action in the scope of production requirements determines initial conditions and specifies the aim of this action, which is producing of appropriate quality product with determined date of its delivery (Náprstková N., Náprstek V., 2006: 37).

Many irregularities and incapacities in organizations action results from the lack or improper production steering. Effective production steering can lead to considerable production increase and productivity – more spectacular and characterizing by lower costs – than any other management technique. Control is an element, which is bonding all production management functions together (Borkowski S., Ulewicz R., 2008: 43). The effective control is connected with: dynamic control, searching and predicting problems connected with product quality. Experiencing the control policy from the conception for its practical applying, one should states that the control serves the following purposes (Borkowski S., Kliber J., 2008: 30):

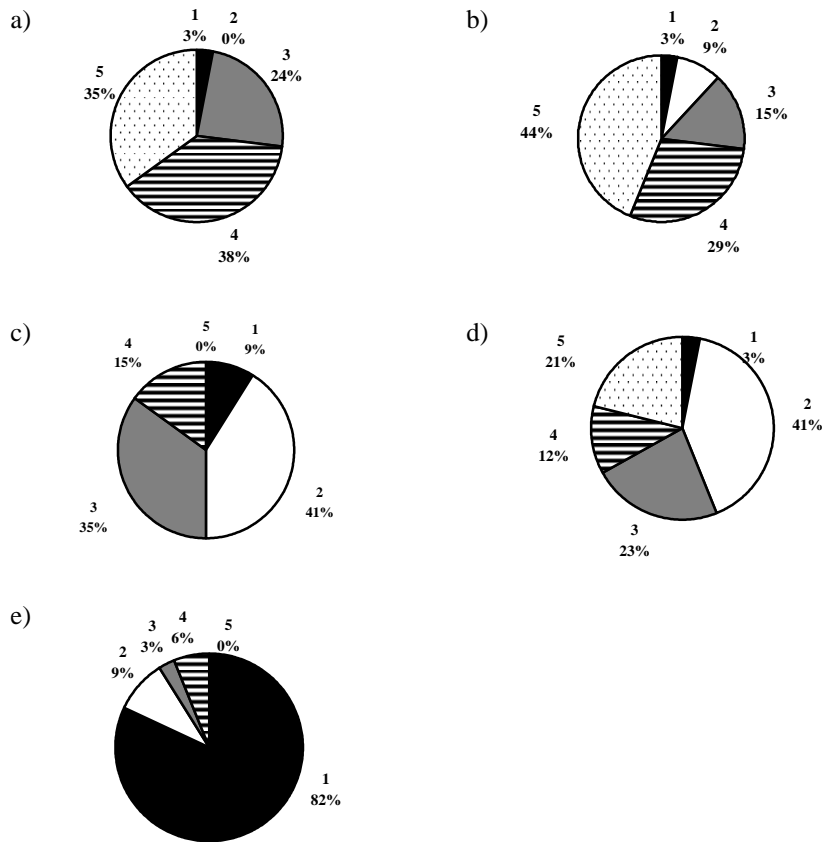
1. Identification of problems.
2. Preventing of appearing problems.
3. Elimination of problems.

The standardization of the production is a next effective factor, which supports effective production management. The standardization guarantees: the appropriate level of the quality, standardizing times of the production and supplies, the high level of the safety as well as the identical level of staff training.

Analysis of strategic areas importance in the opinion of workers was made on the basis of BOST research. Research findings concerning identification of the most important factors in enterprise applying Toyota model of management were presented on Fig. 4 and Fig. 5. These factors are: quality (denotation - JA), costs (denotation – KO), realization time (denotation – CR), work safety (denotation – BP) and morale of the crew (denotation - MZ). For identifying hierarchy of these factors, the scale of 1 ÷ 5 (1 is the least important factor, and 5 means the most important factor).

As a result of the analysis of Figure 4, it can be concluded that two factors were most high assessed: ‘quality’ (35%) and ‘cost’ (44%), because the largest percentage of workers assessed those factors as the most important issues for strategic activity of enterprise. However factor “costs” has been most rated ("5" - 44% of responses). “Morale of the crew” received the lowest mark (mark ‘4’ was indicated only in 6% of workers opinion). This means that in the workers minds of the analyzed companies, the importance of ‘cost’ and ‘quality’, which are part of the Toyota house roof is strongly established.

Fig. 4. Assessment of the most important strategic areas in analyzed enterprises in workers opinion: a) quality (JA), b) costs (KO), c) realization time (CR), d) work safety (BP), e) morale of the crew (MZ).



Source: own study.

Factors so as: work safety, realization time and morale of the crew are on the following positions, according to received marks.

The analysis of Figure 4a shows, that ‘quality’ is seen as one of the most important issues in company activity. Opinions of 35% employees assessing quality as “5” and 38% of workers assessing “4”, what was decided about high importance level of ‘quality’. Equally high scores “5” was received by factor “costs”. A worrying fact is that 82% of respondents rated importance of ‘morale of the crew’ (Fig. 4e). This assessment results probably from a lack of the crew integration and low level of managers interest by the crew problems. It should be pointed, that managers’ activities should be oriented primarily to the rationalization concerning with the costs reducing while maintaining high quality, what is impossible without workers engagement.

The results for the identification of selected strategic areas importance were analyzed by Pareto – Lorenz diagram applying.

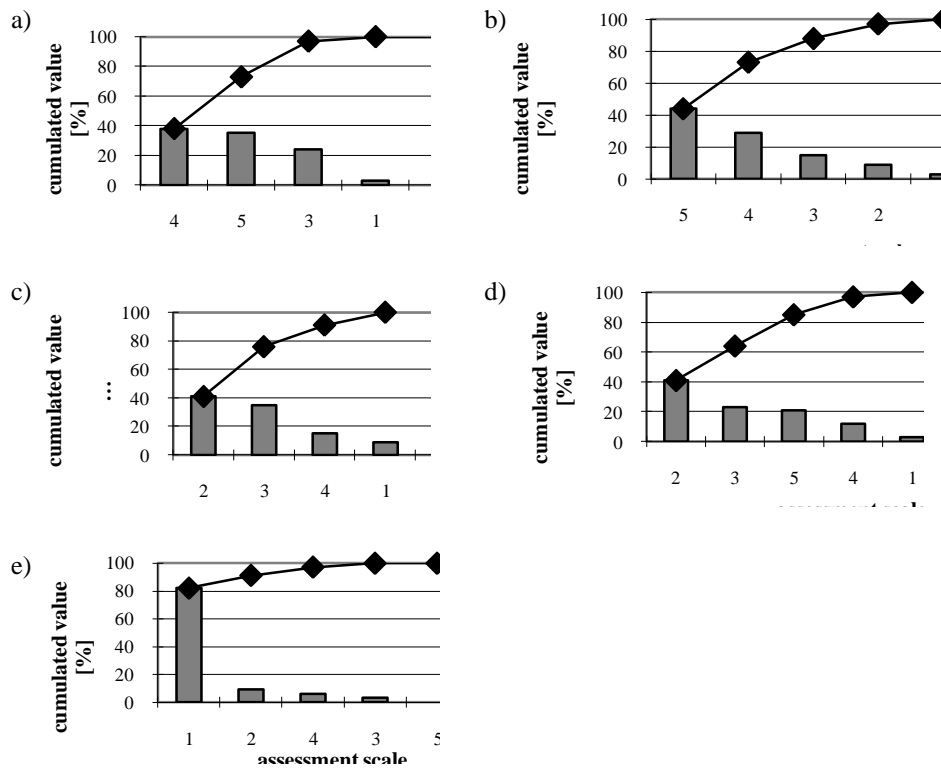
As a result of the Pareto – Lorenz analysis it can not only identify causes (that make up the phenomenon) and the frequency of their occurrence. Pareto analysis organizes the data in terms of their validity. The purpose of this tool is to determine not only importance hierarchy of various factors, but also the identification of possible corrective action. Rule 80/20 is the underlying for this tool that says the 80% of defects is an effect of the 20% of causes (Borkowski, S., 2004: 34 - 36).

Pareto – Lorenz diagram, in the case of BOST findings analysis, allows identifying those factors (that most contribute to specific problems appearance in the enterprise) and ranking these factors in order of priority specified measure conferred on them by staff evaluations. These evaluations constitute importance rank of certain factors. Their systematization allows to define corrective actions.

In order to make Pareto – Lorenz analysis, individual factors with regard to received marks was lined up, and next percentage share of individual marks in the whole of received marks was established. Putting of findings on the Pareto – Lorenz diagram was the next step in the proceedings (Fig. 5). Applying Pareto – Lorenz diagram in the scope of the importance structure for individual research areas (strategic issues), it is possible to notice which marks are reweighing enterprises in individual strategic areas.

It results from Figure 5a, that two marks "5" and "4", which constitute the 20% of all marks, account for 70% of all responses. This confirms the principle of 20-80 (mentioned above). In the remaining cases this situation is moved closer, however the 20% of marks is generating about 60% of the replies. Such a situation means, that area of 'costs' and 'quality' constitute area, in the opinion of company crew, point for all previous action of the enterprise. In addition, it can be concluded, that source of increased efficiency of the analyzed companies is hidden within the highest rated strategic areas.

Fig. 5. The Pareto-Lorenz diagram for value assessment for individual strategic areas of analyzed enterprises: a) quality, b) costs, c) realization time, d) work safety, e) morale of the crew.



Source: own study.

In the case of other strategic areas (such as: ‘time’, ‘safety’, or ‘morale of the crew’), the significant participation in the evaluation are in the range of assessments "1" and "2", which indicates its minor importance for the employees of the analyzed companies. Within the frame of organization’s improvement, it is proposed in the studied companies to introduce measures that focus workers’ attention on low-rated factors, primarily on ‘work safety’.

Trainings that will ensure staff integration and crew morale increase will be this element, which enhance the effect of the improvement action.

Summarizing the results of analysis of the strategic areas in question E1 (BOST questionnaire) and its importance degree in analyzed enterprises, it should be noted the alarming phenomenon of the low importance assessment of ‘work safety’ and ‘morale of the crew’. ‘Quality’ and ‘costs’ are the most important issues in analyzed enterprise that guarantee Toyota model applying. One might also ask here whether the workers are not provided with adequate work safety conditions and low morale are likely to produce high quality products in a short time of implementation.

6. Managerial grid for different organizations

The ninth management principle (coming from 14 Toyota principles) says that, a world manufacturing leaders are: ‘grow leaders who thoroughly understand the work, live the philosophy, and teach it others’. According to this principle, a fundamental task of Toyota leader is to build a learning organization, thus strengthening of particularly strong element of culture in this company. There is a popular phrase in Toyota: ‘before we started building cars, we’d built people’. The goal for each leader is to develop people so that they contribute substantially to achieve joint goals and they can think the Toyota’s way and follow it at each step in the corporate ladder. The company which grows their own leaders and finds ‘building learning organization’ as ultimate goal for the leadership, sets foundation for real long-term successes (Liker J.K., 2005).

The attempt to transform 14 principles of Toyota management into questions was reflected in BOST questionnaire (Borkowski S., 2009). The research problem was presented in this questionnaire in relation to the principle 9:

E9. Assess using scale 1 to 9, the importance, in your enterprise, of:

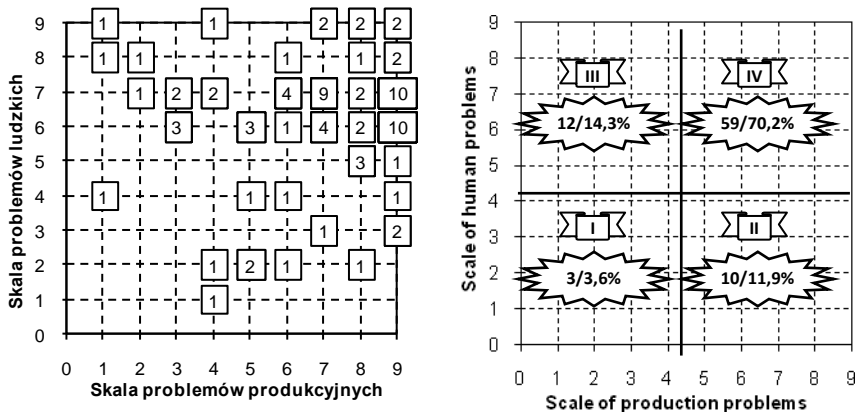
- human issues, - production/service issues.

1 – disinterest, 9 – high interest

In this question, the staff expressed their views on the validity and interest by the management of human affairs, and manufacturing issues.

The assessment of importance of human problems and production issues in analyzed companies was determined based. Managerial grid was divided into four parts (see Fig. 6); its individual parts denote: part I – low level of importance of human and production issues, part II – low level of importance of human problems, high level of importance of production issues, part III – high level of importance of human problems, low level of importance of production issues, part IV – high level of importance of human and production issues. The diagram, which illustrates described situation, is presented in Fig. 6.

Fig. 6. Managerial grid (a) and answer structure by division on four parts (b).

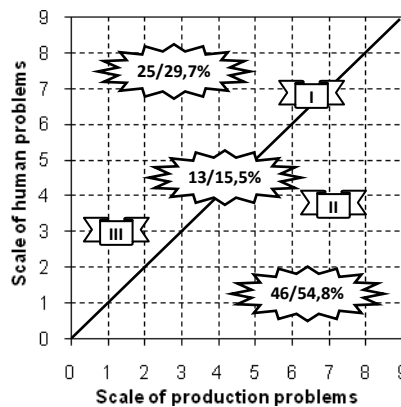


Source: own study.

As results from Fig. 6, distinct focus in analyzed companies is on production and human issues – overwhelming majority of answers (70.2%) are accumulated in part IV.

Managerial grid was divided into three areas, where area I shows answers with similar importance (expresses with similar values of scores, regardless of the marks' value) for human and production issues in the investigated enterprises. Part II contains the answers according to which more importance in the company is attached to production issues rather than to human problems. On the other hand, part III, through combination of the answers, points to a higher focus on human issues as compared to production ones. The results of this analysis are presented in Fig. 7.

Fig. 7. Managerial grid according to three parts.



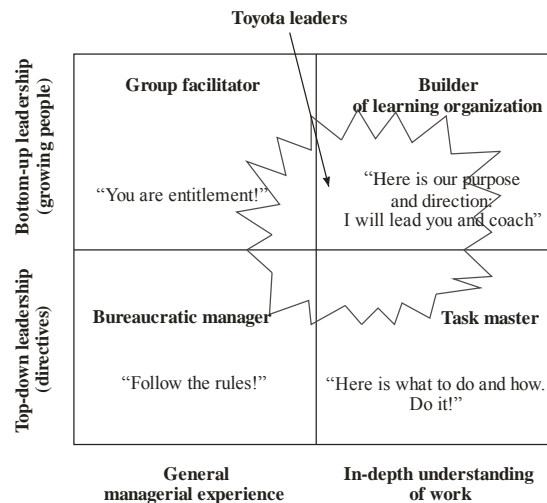
Source: own study.

Results of answers classification to three parts revealed that, from the standpoint of employees, the enterprise attaches great importance to widely understood production issues (54.8%). 29.7% of the respondents observed more interest in human problems in the enterprise. In consideration of relationships between answers, one can note that the most popular arrangement are 9-6 (10 times), 9-7 (10 times) and 7-7 (9 times). Production issues

are mainly in the first place in the company (according to the employees), whereas human problems are also very important – high assessment of 6-7.

Main premise of the ninth principle of Toyota is to grow leaders instead of buying them (Liker J.K. 2005). Growing, in each situation, is implemented according to particular principles and models. In the case of Toyota, leaders are grown with consideration of the elements presented in the Figure 8.

Fig. 8. Toyota leadership map.



Source: Liker J.K. 2005.

As results from description of Y axis, Toyota leaders can use some top-down directives issued by the superiors or a bottom-up style. This style is characterized by the commitment of people, which allows for their own development, contributing to independent decision-making by themselves. This approach stimulates staff to be involved in the process of continuous improvement. One can conclude that Y axis should be used as a measure of willingness of the staff to learn and improve. However, axis of ordinates (Y) in two-dimensions coordinate system is connected with human (staff). Second axis (X) in this system concerns understanding of work (i.e. production, services).

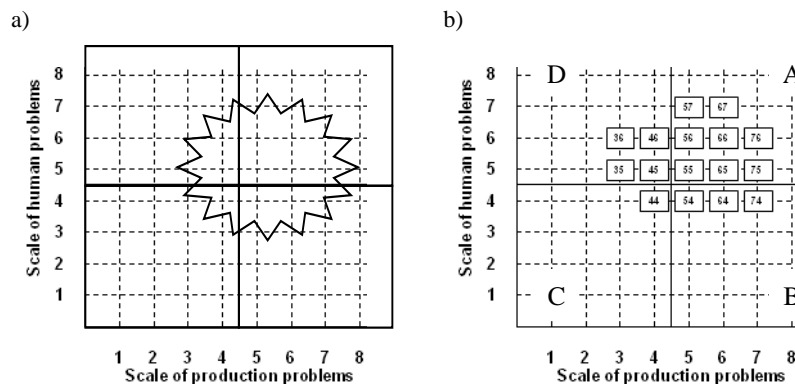
When plotting the scale of importance of production problems (understanding of work), it is remarkable that the range of 1÷4 concerns „a general managerial experience” whereas the range of 5÷8 relates to „in-depth understanding of work”. In the case of similar approach to Y axis, one can observe: for the range of 1÷4 „top-down leadership (directives)”, 5÷8 – „bottom-up leadership (growing people)”.

Leadership map is divided into ‘quarters’ (marked A, B, C, D). Quarter A, „builder of learning organization”, is based on the thesis „Here is our purpose and direction: I will lead you and coach”. In quarter B, „task master” works on the basis of the principle: „Here is what

to do and how. Do it!”. Quarter C relates to „bureaucratic manager” whose activities are based on the thesis: „Follow the rules!”. „Group facilitator”, corresponding to the range of the quarter D, with their motto „You are entitlement”.

As results from the Figure 8, an area corresponding to management styles of Toyota leaders was plotted on the leadership map. Combination of in-depth understanding of work and ability to grow people and manage them causes that employees respect them for their technical knowledge and follow them, which is the result of their leadership skills. The presented in (Liker J.K. 2005) Toyota leadership map does not contain scale in the axes. By using some experience (Borkowski S., Ulewicz R., 2008), the scale for both axis within the range of 1 to 8 was plotted during the study, thus dividing the Toyota leadership map on 64 fields. Whole field of map was divides on four fields A, B, C, D (Fig. 9b). It facilitates reference to Toyota leadership map.

Fig. 9. Toyota leadership map with consideration of a) optimum, b)author’s approach.



Source: own study.

The optimal area was marked in the Figure 9 to characterize knowledge and understanding of work by Toyota leaders. This area encompasses elements of all the separated fields (quarters) and concerns as follows: field A - 55, 56, 57, 65, 66, 67, 75, 76, field B - 54, 64, 74, field C - 44, field D - 35, 36, 45, 46 measurement points. In total, optimum in Toyota leadership map takes 16 measurement points, which, if compared to 64 available points, accounts for 25%. Assignment of measurement points in the map to optimal area for individual quarters is not equal: field A - optimum encompasses 8 points, i.e. 50%, field B - 3 measurement point, 18.8%, field C - only 1 point (6.2%), field D - 4 points (25%).

The obtained results, were further analysed graphically with consideration of Toyota requirements (see Fig. 9b). This analysis is supposed to produce answers to the questions of:

- How are opinions from Toyota optimum divided into individual quarters in managerial (leadership) grid (map)?
- To which degree were the results subjected to Toyota leadership optimum in individual quarters?

Quantitative reply to first question is placed in Table 1.

Table 1. Division of opinions [%]with Toyota optimum into management-related quarters

Quarter	Denotation of research object			
	P92	P93	P94	P95
A	45.4	55.6	84.6	50.0
B	18.2	27.8	7.7	45.1
C	0	5.5	0	0
D	36.4	11.1	7.7	4.9

P92 – micro enterprises (very small, individual enterprises), P93 – small enterprises, P94 – medium enterprises, P95 – large enterprises.

Source: own study.

For the enterprise P92, the most of points from Toyota optimum are located in quarter A, which means that the analysed object has 45.4% of features of learning organization. Furthermore, P92 is located in quarter D of the map. This proves the fact that workers „are entitlement” to the process of improvement and have suitable conditions for self-actualization and a sense of co-ownership. In remaining studied objects in quarter A of the map, higher share of opinions is observed as compared to P92. However, it is remarkable that quarter B of the map („Here is what to do and how. Do it!”) takes second position in the share. Obviously, this opinion concerns the part of staff who are able to realize activities determined in instructions. Answer to the second question is presented in Table 2.

Table 2. Percentage of opinions [%] assigned to Toyota optimum in individual quarters of leadership map

Quarter	Denotation of research object			
	P92	P93	P94	P95
A	62.5	71.4	57.9	85.7
B	33.3	25.0	16.7	41.7
C	0	8.3	0	0
D	80.0	50.0	33.3	33.3

P92 – micro enterprises (very small, individual enterprises), P93 – small enterprises, P94 – medium enterprises, P95 – large enterprises.

Source: own study.

The results contained in this table 2 point to the fact that distribution of the results in the leadership map for three quarters in the map overlaps with Toyota optimum. Particularly high correspondence of the results can be observed for the quarter A, then for the quarter D of the map.

7. Summary

In summary, personnel participating in the BOST study found that 'costs' and 'quality' are the most important strategic area of enterprise activity. By contrast, 'morale of the crew' is the least important in the hierarchy of the strategic areas. As a result of received evaluations (marks), 'work safety' and 'time of realization' are respectively the third and fourth place. Low importance meaning of 'time of realization' and 'work safety' are these very important problems that should be resolved, because of their meaning for production/service management. These areas have been among the lowest marks and should be included in plans of improvement action.

On the basis of the analysis of answers to the question E9 in BOST questionnaire, much valuable information was acquired about the interest of managers in the scope of human problems and production/service issues in all the investigated production units. The assessment of the companies was made by the most important resource – employees. Visualization of the results in diagrams in the form of managerial grid and then division of it into parts (3 and 4) allowed for unequivocal determination of importance of the researched problem. Results effected from the managerial grid allow also for conclusion that all the investigated enterprises put great emphasis on realization of production/service issues, however, human problems are also of high priority.

It was stated, on research findings analysis that, in majority of analyzed eastern enterprises workers are interested in 'costs' and 'quality' at work positions. They focus their attention on production issues even managers concentrate their activity not only on production/services problems but also on human resources having aware of the human problems importance. Even workers matters are important for managers, they don't treat workers as a partner in production/service problem solving. It could be the main reason of low level of crew morale and work safety. Managers in small enterprises are able to be more open for new solutions in production/services management then in bigger enterprises, where the majority of decisions are taken on the top management without participation of other lower level managers.

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