A Case Study on Influence of T-D ABC on Realization of Lean Management Strategy

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Correct determination of costs of offered products, services or logistic processes is one of principal factors of efficient functioning of enterprises. It is particularly important today, in the era of increasing competition, where the cost of the service grows along with the quality of the service. Authors' belief that processes create the value important for the customer, resulted in the performance of the analysis of logistic costs in a selected process from the area of electronic and traditional commerce and consequently, the example of an electronic warehouse was presented in which Time-Driven Activity Based Costing method was implemented. The analysis is aimed at reaching the assumed level of quality of service. The goal of the analysis is to show areas that require special attention because of waste identified with Lean Management approach and introducing reasons to implement substantial changes in analyzed areas.
Keywords: process, Activity Based Costing, Time-Driven ABC, costs, Lean Management, sell.

1. INTRODUCTION

Enterprises search for intensive competitiveness and globalization of their markets in contemporary market environment. Therefore firms look for new solutions concerning particular spheres of their functioning. The diversification of manufactured products, segmentation of own market, flexible reacting for changes and others, all these activities reaching new cuss are aimed at reaching new customers. But, does reaching new clients is equal to "conquering" them? The answer seems obvious. Thus, the superior objective should be providing the client with a product that is adjusted to his particular, more and more individual needs, equally from the point of view of the quality, reliability, and even aesthetics.

The activity of a company is a sequence of its internal and external processes, which are aimed at adding value to the created product presented to the client. Hence, it becomes important to separate individual processes that take place within frames of the company and their deep analysis. The analysis of a selected process gives basics for understanding and identification of operations that take place in it and gives possibilities of improving the determined process and upgrading its quality, productivity, decreasing lead times/deadlines and costs.

2. MODERN CONCEPTS OF PROCESS-ORIENTED MANAGEMENT

The constantly rising market competition, development of modern techniques and technologies, as well as the desire to adjust to the dynamically changing situation of the market, forced entrepreneurs to initiate trials of searching and implementing new methods of management. As the result of the following modern trends at the turn of 20^{th} and 21^{st} century several concepts of management were shaped, which were based on methods that differed from conventional ones in the area of management and organization. These were among others concepts: *Total Quality Management* (TQM [Karaszewski, 2001], [Bank, 1997], [Steinbeck, 1998], [Pike, Barnes, 1996], *Business Process Reengineering* (BPR) [Durlik, 1998], [Peppard, Rowland, 1997], [Manganelli, Klein, 1998], *Lean Management* (LM) [Ohno, 2008], [Womack, Jones, 2001], [Bednarek, 2007],

[Lisiński, Ostrowski, 2006], *Six Sigma* [Barney, McCarty, 2005], [Eckes, 2010], [Harry, Schroeder, 2001]. They are based on the process approach, which was developed in 90s of XX century. The process approach assumes that work should not be focused on functions, tasks or workstations. It should rather be directed on processes, which represent the added value for the client. So, what is the added value? First of all, it is what the client is ready to pay for, more specifically speaking – all activities that lead to changing a raw material into something that represents value to the customer [Productivity Press Development Team, 2008, p. 12], and the process itself is a chain of operations leading to manufacturing a value that is suitable to client's requirements [Muller, Rupper, 2000, p. 21]. Concentration on processes means among all a change of perspectives. It gives endless prospects to the activity of enterprises, but also for the life of its workers [Hammer, 1999, p. 17-18]. In the process approach employees are of the key importance because they are the ones who recognize their processes, they focus on these processes and improve them, give them new dimensions and importance. Thus, the main objective of all concepts oriented on processes in, among all, integrating people in the organization, determining new rules of cooperation and – in consequence – creating such organizational culture that enables identifying and properly using the enormous potential hidden in the company.

The implementation of the process approach should take into account improvement of processes, and it is believed that the approach of Lean Management guarantees it. The idea is focused on eliminating waste (of time, assets, place, etc.) in every aspect and in its every manifestation. According to Lean Management, waste is every action that does not bring the added value, as well as waste is inaction where action is necessary and where it causes extension of time of production and increasing costs.

The process of creating value without waste has been captured into six Lean Principles abbreviated as *Value, Value Stream, Flow, Pull, Perfection* and *Respect People* [Oppenheim, Murman, Secor, 2011, 33-34]:

1. Capture the **value** defined by customer, who may be either external or internal. The external customer who pays for the product or service defines the final value for the deliverable. Internal customers receive the output of a task or activity and usually don't explicitly pay for it. The customer is the one who defines what constitutes value.
2. Map the **value stream** and eliminate waste: map all end-to-end linked tasks, control/decision nodes and the interconnecting flows necessary to realize customer value. Eliminate all non-value added activities, minimize all necessary non-valued activities and make the remaining activities flow. A key concept to grasp in moving from the manufacturing to the engineering domain is that in the former, material is transformed, while in he latter information is transformed.
3. **Flow** the work through the planned and streamlined value-adding steps and processes, without stopping or idle time, unplanned rework or backflow. To optimize flow, plan for maximum concurrency of the tasks, up to the near-capacity of the enterprise. Robust capture of the value and program planning are the two necessary conditions for subsequent Lean execution of the program.
4. Let customers **pull** value. In manufacturing, the ideal pull principle is implemented as the Just-In-Time delivery of parts and materials to the needing station and to the external customer. The pull principle has two important meanings: (1) the inclusion of any task in the program must be justified by a specific need from an internal or external customer, and (2) the task should be completed when the customer needs the output.
5. Pursue **perfection** of all processes. Perfecting and refining the work output in a given task must be bounded by the overall value proposition which define when the output "is good enough". Otherwise the notorious waste of over-processing may occur. In contrast, engineering and other processes must be continuously improved for never-ending competitive reasons.
6. **Respect people**. A Lean enterprise is an organization that recognizes that its people are the most important resource and is one which adopts high performance work practices. In a Lean enterprise people brainstorm openly without fear, plan together by consensus, identify problems honestly and solve problems in real time effectively, not allowing the problem to appear again.

The idea of Lean Management is accompanied by a set of tools which contribute to elimination of most important aspects of waste: overproduction, stock, unnecessary manipulation, waiting time, unnecessary processing, unnecessary movements, shortages, faults and defects. The list of tools the most often presented in the literature consists of:

- **5S** – 5 Japanese words defining standardization of well-kept workplace and referring to: selection, standardization, systematic, cleaning, standardization and self-discipline
- **VSM** – the technique is used to identify places where waste appears and after preliminary analysis development of ways to reduce waste, limit or fully eliminate it.
- **Visual Management** – visualization creates standard work environment by instructions, guidelines and other ways to coordinate work performance (using colours, control systems, coloured lines, kan-bans, visual alarm systems etc)
- **SMED** – is a team process that reduces setup times, which in consequence leads to increasing time for production activities and simultaneously enables decrease of lots and stock, as well as lead times and in consequence leads to decrease in production costs. The goal is to decrease set-up time to max 10 minutes.
- **TPM** –is a system enabling minimization of breakdowns and improvement of quality thanks to commitment of all employees. The main goal of TPM is achieving the level of three zeros: zero breakdowns, zero defects, zero accidents at work
- **Poka-Yoke** –is a method of preventing defects that result from mistakes, it reduces physical and psychical load of employees as they do not have to concentrate on avoiding simple mistakes all the time.

The idea of Lean Management aims at permanent improvement obtained due to new orientation to the client and strict connection with suppliers and change of enterprise's culture. All determined factors lead to improvement of productivity and flexibility, as well as to increase of the diversity of production while reducing employment, assets, time of realization of the investment and elimination of failures [Jünemann, 1993, p. 125-126]. The skill of identifying and preventing waste gives the enterprise the possibility of manufacturing products with level of quality that suits its potential recipients and simultaneously, it provides supplies on time and in place that is most comfortable to the client. Taking this context under consideration we are able to talk about *Kazein* – a system of continuous improvement of every process and operations directed on the added value and elimination of waste.

The principle of Kazien activity („*kai*" - decompose, change, „*zen*" – improve) [Imai, 2007] is about observing a selected process and its particular elements and understanding their way of functioning in order to find next areas that can be improved. Continuous improvement is a result of "small steps" made by teams of employees and by individuals. The main idea of the continuous improvement is about the fact that the majority of members of every organization discover possibilities of improvement of processes, in which they take part; they find and put into practice solutions serving the increase of productivity and quality of operations and products [Grajewski, 2007, p. 104]. This is the exact reason why Kaizen constitutes one of most important aspects of the philosophy of lean production. It is the fund, on which all solutions used in this concept are based [Productivity Press Development Team, 2010].

The comparison of the Lean Management concept with ideas mentioned before is presented in [Lisiński, Ostrowski, 2006, p. 77-86]. Once more, it is worth to stress out the fact that each concept concerning process approach is focused and directed on reduction of time, errors, costs, etc., which can be gained by absolute engagement of all employees – from lowest to highest levels of the organization's hierarchy.

3. COMPARISON OF CONCEPTS: ABC AND TIME-DRIVEN ABC

If we want the process to function well, then this "well" must be very precisely defined, so that the process is measurable and methods of its measurement are clear and understandable for every person that takes part in the process [Hammer, 1999, p. 65-66]. It is important to test new improvement solutions whether they really improve the quality or productivity, or whether they reduce operational costs. Therefore, present elaboration presents two approaches: ABC method and Time-Driven ABC method, which are methods

of measurements and calculation of efficiency costs of efficiency of assets, operations or cost objects.

3.1. ACTIVITY BASED COSTING - ABC

Activity Based Costing (ABC) has been presented for the first time in 1987 by Kaplan, Cooper and Johnson[1]. It was created as a result of criticism of the cost accounting systems used in U.S. companies. The main cause for creating a new approach by the authors was to take into account the actual consumption of production factors related with the diversification of the line and its size, the varied complexity of the manufacturing process, implementation of new products and the pursuit of new marketing strategies that were not taken into account in the traditional full-cost accounting [Cooper, 1988, p. 45 - 46], [Lasota, 2001], [Piosik, 2006, p. 279].

The ABC concept focuses on good recognition of causes of indirect costs, and knowledge of the behavior of these costs. Exemplary actions causing the arise of indirect costs are as follows: material supply, materials' and half-products' warehousing, technical preparation to the production, maintenance of machines and devices on, preparation of a part of products for sell, quality control, etc. The process costing are the actions that must be estimate first, costs of these operations are next allocated into clients and companies. All actions are combined with each other and so they create a process [Jarugowa, Nowak, Szychta, 2000, p. 45 – 46], [Kaplan, Cooper, 2002, p. 117 - 123], [Kudelska, 2006, p. 100 - 102], [Zabawa, 2003, p. 262 - 263].

According to the concept of ABC, costing areas of actions do not have to be the same as the organizational structure of the enterprise. It is possible to identify several actions that remain reasons of the fact that very different types of costs arise within frames of one place, where costs originate [Lasota, 2001].

Besides concepts mentioned earlier in the paper, there are also other terms, which we should enumerate while we discuss the ABC costing:

- cost object;
- assets' costs carrier;
- actions' costs carrier.

The idea of "cost object" should be interpreted as the cause of accumulation and calculation of costs, as well as the reason for realizing determined operations.

"Assets costs carrier" is another term that requires to be explained. It is a measure of quantity of assets that must be used in a determined action. In other words it expresses the level of requirement of assets in particular actions. This way it is possible to create a so-called set of costs. Determining costs for costs objects takes place through transmitting a suitable set of costs of actions on specified cost objects. It takes place with help of actions' costs carriers, which are also called keys of calculation of the second degree. Each action has it own individual carrier[2]. A number of hours or of employees necessary to realize a certain action can be an example of such carrier; however the actions' costs carrier can be exemplified by the number of supplies, controls or series of production [Piechota, 2005, p. 32 - 34], [Kaplan, Cooper, 2002, p. 126 - 130].

The calculation of costs in the ABC method takes place in several stages [Kudelska, 2006, p. 103]:

1. Preparation of the action's dictionary.
2. Determining costs of individual actions.
3. Establishing/determining products, services and clients of the enterprise.
4. Selection of action's costs carriers, which will combine action's costs with products, services or clients of the firm.

[1] Two years after publishing the ABC costing, P. Horvath and R. Mayer presented in Germany the Prozesskostenrechnung – process costing. The principal difference is in the fact that the process costing analyzes costs of non-production functions; it also assumes a division of process costs according to a generic structure – it distinguishes fixe and variable costs [Piosik, 2006, p. 282].

[2] In the process of identification and reception of carriers of action's costs, it is necessary to determine their place in the hierarchy of actions, which describes the way the operation is used by the cost object. Authors: R. S. Kaplan and R. Cooper enumerate three classes of action's carriers: transaction, expressing time required for realization of the action and diversified intensity [Kaplan, Cooper, 2002, p. 95 – 99].

The modified method ABC is called *Time-Driven Activity Based Costing (T-D ABC)*. Authors of this costing decided to answer two questions [Kaplan, Anderson, 2003]:

- How much does a supply of assets to each process cost, if we count it in time measure?
- How much time do we need to realize works necessary in producing products of the organization or finalize a transaction, or realizing a service to a client?

T-D ABC estimates only two parameters: necessary time for realization of the operation and unitary cost.

3.2. TIME-DRIVEN ACTIVITY BASED COSTING – T-D ABC

T-D ABC is a method that enables obtaining precise information on operational costs – it is based on so-called time equations [Matuła, 2010], [Kędzierski, 2009, p. 39-41] that enable determining the time and cost of realization of individual operations in the company that are oriented on determined cost object, particular client, product, order, supply, etc.

As in standard term, in this approach the procedure starts from the identification of actions, assets and their costs. Stages of calculation in accordance to the cost calculation based on time are as follows [Bojnowska, 2008, p. 6], [Kaplan, 2011], [Sar, 2008, p. 4 - 11]:

1. Identification of processes and operations in the unit.
2. Finding and fixing resources and their costs in the enterprise.
3. Estimating the real efficiency of assets.
4. Calculated cost for a determined unit of time.
5. Determining potential courses of realization of operation on basis of interviews.
6. Determining the time of operation that are components of the action.
7. Finding dependencies between operations and cost objects.
8. Calculation of costs of cost objects.

The allocation of assets in particular operation in the organization is the next characteristic that distinguishes the time-based activity costing. This is related to the estimation of assets used in the determined process and their real efficiency and calculating the cost of individual time unit.

However, assigning costs to objects in the method T-D ABC takes place with use of time equations, also called time formulas, which are the central element of determined approach.

It is also a very important issue that T-D ABC enables evaluation of particular actions on basis of real use of assets, instead of doing it in theory; for example: 20% of time of staff's work are breaks and stops; remaining 80% are actions realized in favor of cost objects. Therefore it creates possibilities of pointing at which places production abilities are not used and it also presents these factors in values [Matuła, 2010].

T-D ABC has an important advantage, which is capacity of using it for measuring differences resulting from different variants of the course of processes and expressing them both in time and in cost. Such information allows evaluating different variants of the course of processes, taking under consideration both time and cost, it also enables making decisions that make the realization effective [Bukh, 2007, p. 13 - 28], [Kędzierski, 2009, p. 38 - 41].

Key elements of the new approach T-D ABC are: defining the real possibility of using assets for particular actions, estimating costs of carriers of these abilities and determining the cost of one unit of time, which will define the potential present in assets engaged in the process, as it also determines unused capacities and places for savings in process costs.

4. COSTING IN TIME-DRIVEN ABC ON THE EXAMPLE OF AN ELECTRONIC WAREHOUSE

In order to determine real costs of initiated actions, there have been attempted a trial of analyzing one but principal process that takes place in the analyzed company - a process of sell.

The company presented in the case study is an electronic warehouse; it functions in the area of Poznań for about 20 years. It employs 7 people and it sells wholesale and retail of various industries, like household items RTV items, computer accessories, cables, navigation, toys. The warehouse supplies several dozen shops, stalls and other places in the market of Greater Poland. In this group, 30 units are regular customers of the organization. The enterprise mainly sells imported goods, only 10% of its offers are goods from

domestic production. Assortment of goods offered in the analyzed unit includes about 2000 types of product. The warehouse has its own website. This allows buying its products online. It also sells in shops and on online auctions. Thus, the purchase is possible both at the company is premises and via Internet – in this case the product is sent to any address from the entire country with the use of service of a courier company.

The company cooperates with points of warranty service of companies supplying wholesale goods (external service). In case of firms, which goods are sold service costs are borne by the distributor of the determined brand. Thus, in case of goods not included by the warranty of the producer or in situations of expiry of the warranty on a product; as well as in case of sale of goods damaged by a client, the company uses the internal service – in such case the cost of reparation must be paid by the client.

The realization of costing in accordance to the Time-Driven ABC method of a determined process in the organization - in this case it concerns sale, there has been analyzed the determined process and selected a range of actions performed by company's staff. Table 1 illustrates identified actions and their duration in time for each of them. All data necessary for the analysis was gathered and processed on basis of measurements, observations and interviews realized with employees of the company. Determining durations of actions was realized with taking under consideration one position of the product of the determined action.

Interviews revealed that the company has not only retail and wholesale customers – it also cooperates with clients, who are retail customers but from time to time, they realize purchase on the account of their companies. Therefore, in order to make a costing calculation, the following names of recipients of the warehouse goods have been assumed: new retail customer, regular retail customer, wholesale customer. The method of service and realization of the order was diversified in the company. Determined fact is well illustrated in Figure 1.

Table 1. Selected actions in the process of sell and their duration

Symbol of the action	Name of the action	Actions duration [min]
D1	Presenting a new product in a on-line auction	60
D2	Multiplying or extending an existing auction for a product that is already available online	2
D3	Service of incoming and outgoing mail	5
D4	Order execution 1	15
D5	Order execution 2	10
D6	Order execution 3	10
D7	Order execution 4	30
D8	Complaints service (external service)	20
D9	Complaints service (internal service)	35

Source: own elaboration

The term "customer service" includes methods of reaching contact of the customer with employees in order to present his order. Three possible ways of ordering have been distinguished:

- order by phone;
- order by Internet (e-mail);
- direct contact.

Table 2 shows durations of individual types of service.

Table 2. Types of customer service and their duration

Type of customer service	Duration [min]
Order by phone	10
Order by Internet	5
Direct order	15

Source: own elaboration

Apart from kinds of customer service, there have been distinguished four types of realization of order. The first type symbolizes sending the product to the recipient by a courier company that cooperates with the warehouse. Determined sort of order can be related with the realization of operations, like: completing the order, pack it, preparing the bill of lading, contacting the courier, dispatch. The second type of order realization is direct contact, where it is required to complete the order and pack it. Third type is similar to the realization no. 1, only the client presents his own courier who provides the product. Comparing with the first type of realization of the order, the number

of actions performed in this form of realization of the order is smaller (the employee does not have to prepare the bill of lading, etc.). And so, it takes less time. This type of realization is rare, still sometimes it takes place in the company. The last – fourth type of realization concerns a determined regular retail customer, who systematically orders a selected number of products from the company's assortment. In this case, the dispatch is realized via courier company that cooperates with the warehouse. It is worth to point at the fact that such orders are seasonal (they are realized only in summer). Summarizing, it should be noted that the significant part of realizations are direct contact and orders realized via dispatching goods via courier that cooperates with the described organization.

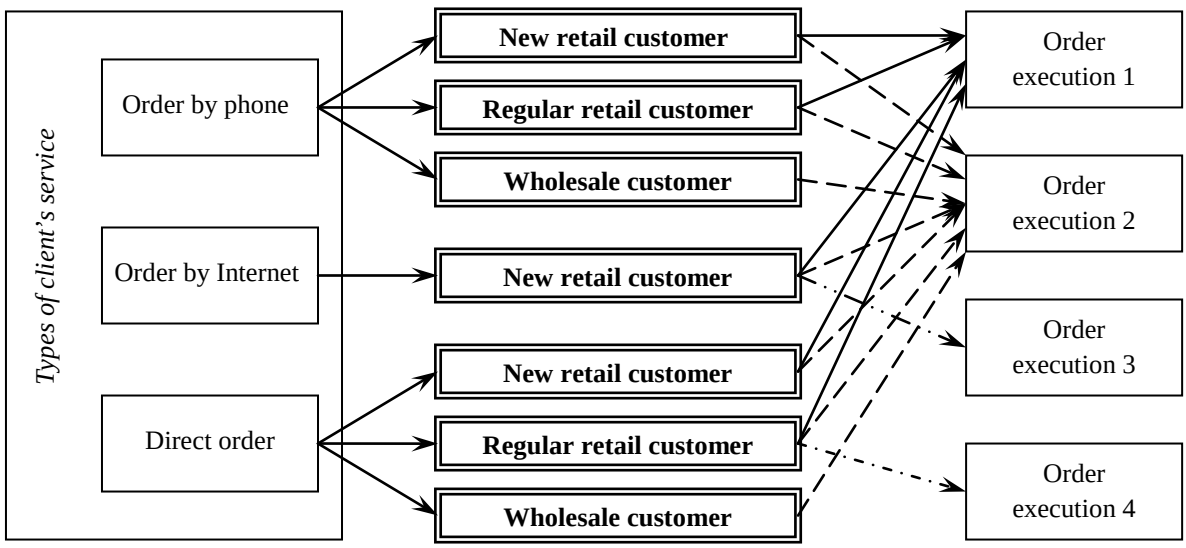

Figure 1. Scheme of potential courses within frames of ways of realization of orders
Source: personal elaboration

The realization of the Time-Driven ABC method requires determining assets and their costs, as well as estimating the efficiency of assets and time related with them. Tables 3 and 4 present determined dependencies.

Table 3. Listing of company's resources and their costs

No.	Name of the asset	Cost of the asset [PLN]
1	Remunerations, contributions, insurance, taxes concerning employees	24 500
2	Amortization of intangible assets and technical equipment (computers, printers, etc.)	800
3	Rent for the premise, amortization and other charges	8 500
4	Telecommunication bills	500
Total		34 300

Source: own elaboration based on [Bojnowska, 2008, p. 9]

Table 4. Summary of data on working time arrangements employees

Number of employed people	7 people
Number of hours of work per month for each person	168 h
Nominal time of work for one person	1176 h
Effective time of work foe employees (80%)	940,8 h

Source: own elaboration based on [Bojnowska, 2008, p. 9]

Calculated costs for one unit of time are the next step in T-D ABC; then it is necessary to calculate the cost of the action's product, therefore:

Cost of one unit of time = *sum of costs of used assets / number of hours of effective work* = 34 300 / 940.8 = 36.46 PLN/h = **0.61 PLN/min**

Cost of one product of action = *time necessary for the realization of the action * cost of one unit of time*

Therefore costs of products of action are as presented in the table 5, taking under consideration their duration.

Table 5. Actions costs

Symbol of the action	Name of the action	Duration [min]	Cost of the products of the action [PLN]
D1	Presenting a new product in a on-line auction	60	36.6
D2	Multiplying or extending an existing auction for a product that is already available online	2	1.22
D3	Service of incoming and outgoing mail	5	3.05
D4	Order execution 1	15	9.15
D5	Order execution 2	10	6.1
D6	Order execution 3	10	6.1
D7	Order execution 4	30	18.3
D8	Complaints service (external service)	20	12.2
D9	Complaints service (internal service)	35	21.35

Source: own elaboration

The calculation of costs of particular actions within frames of one month, there has been assumed an average monthly size of the product for every action; it was calculated on basis of interviews and observations. Table 6 shows results of determined calculations.

that he generated at least 90% of these actions. The action's cost was calculated suitably by counting the total time of duration, which resulted from the product of the number of products and times of duration of individual action presented in the table 1 and next, multiplication the obtained time by the cost of one unite of time – in the analyzed case it is equal 0.61 PLN/min (table 7).

Table 7. Actions producing costs concerning a new retail customer within the period of one month

Symbol of action	Number of action's products	Total duration [min]	Action's cost [PLN]
D1	3	180	109.8
D2	280	560	341.6
D3	940	4 700	2 867
D4	830	12 450	7 594.5
D5	250	2 500	1 525
D8	40	800	488
D9	16	560	341.6
Total	2 359	21 750	**13 267.5**

Source: own elaboration

Additionally to costs of selected actions, the calculation must include times for service of a customer, which concern actions in the realization of the order, i.e. actions D4 and D5 (table 8). Costs of customer's service was counted on basis of the total product of time for selected sorts of service (number of occurrence of determined type of

Table 6. Number of action's products and cost of actions in a period of one month

Symbol of action	Name of action	Product of action	Number of product in the period	Cost of action's product [PLN]	Cost of action [PLN]
D1	Presenting a new product in a on-line auction	Auction	4	36.6	146.4
D2	Multiplying or extending an existing auction for a product that is already available online	Auction	350	1.22	427
D3	Service of incoming and outgoing mail	E-mail	1176	3.05	3 586.8
D4	Order execution 1	Order 1	840	9.15	7 686
D5	Order execution 2	Order 2	420	6.1	2 562
D6	Order execution 3	Order 3	1	6.1	6.1
D7	Order execution 4	Order 4	4	18.3	73.2
D8	Complaints service (external service)	Notice of defect	50	12.2	610
D9	Complaints service (internal service)	Notice of defect	20	21.35	427
Total			3075		15 524.5

Source: own elaboration based on [Bojnowska, 2008, p. 11]

The knowledge of duration of determined actions and their costs enables calculating costs generated by a new retail customer during one month. While actions D1, D2 and D3 are directed mainly on service of a new retail customer, just like actions D8 and D9, it was possible to count

service* time of their duration presented in the table 2) and costs of one unit of time.

Table 8. Costs of a new retail customer

Type of service	Number of occurrence of the type of service	Total time for determined type of service [min]	Cost of determined type of service [PLN]
Order by phone	400	4 000	2 440
Order by Internet	470	2 350	1 433.5
Direct order	210	3 150	1 921.5
Total	1 080	9 500	**5 795**

Source: own elaboration

Taking under consideration total costs presented above, it is possible to count the cost of one new retail customer. In this case it is 19 062.5 PLN. However, considering the fact that the new retail customer absorbs 30% more time (as the observation shows) than a regular customer (20% more) or a warehouse customer (10%), authors calculated the total cost of a retail customer: 19 062.5 * 1.3 = **24 781.25 PLN**.

In order to compare costs generated by a new retail customers with profits they bring analysis of net profit was made. Net profit in the period analyzed was 25 320 PLN. and 65% was brought by retail customers, which was in that case **16 458 PLN**. Hence, the conclusion is that new retail customers generate in the same time the largest costs and the largest profits.

5. T-D ABC AS A BASIS FOR LEAN DECISIONS

As authors mentioned in the beginning of present elaboration, the most important thing for the customer is the value he obtains in form of final product, which fulfills his requirements and needs. The formation of this added value takes place in the moment the asset, material or half-product is being transformed into the final product; it takes place in result of a series of actions that constitute such sort of operations. According to the statement presented above, all realized actions should have a functional character, they should be effective and understandable foe every employee in the company. Otherwise, the initiation of ineffective actions will be followed by the increase of costs, extending the time of realization and – in result – upraising the value of the product. All this constitutes an unnecessary waste.

Time-Driven ABC, which includes among others creating decisive basis, should provide information concerning efficiency of process that take place in the company, involvement of the staff in determined processes, i.e. efficiency and profitability of their actions. Gathered information and the analysis of costs in the selected enterprise lead to following conclusions on the subject:

- the direct service takes most time, so it is the most expensive form of service;
- charges of the premise are very high;
- the percentage of new product that the company gains is very small;
- costs of products from the complaints service are one of highest costs of products that the analysis considered;
- the incoming and outgoing mail service and the realization of the order 1 are most required actions in the analyzed period;
- a new retail customer is the fundamental recipient of the firm.

The analysis of the first presented conclusion from the part of its improvement in accordance to the idea of Lean Management, presented that there are possibilities of shortening the duration of the direct service by creating a catalogue and putting products into certain order in the shop of the company, according to a method XYZ. Let's observe closer suggested solutions. The proposal of creating a catalogue of assortment, including a process and description of individual products, which allows the client recognize well the offer of the warehouse without the necessity of walking through the entire shop for finding a determined product; after defining the most interesting products the client can go to the firm's employee and ask him questions. In the same time, the suggested proposition reduces the need of being with the client all the time of his presence in the company and it reliefs the employee, gives him the possibility to perform other activities in this time.

Putting products into a determined order in the shop is another solution that enables eliminating waste, as authors think. The solution is about segregating products offered in the firm in accordance to the XYZ method, which allows storing offered products in accordance to the regularity of requirement for these goods. This allows finding fast the product on appropriate shelf and it reduces the time spend on service of the client.

The next factor significantly affecting logistics cost[3] of the company is the rent. The area of the premise is rather big but it is clearly not fully utilized. This means that the company wastes area. Elimination of this waste and reduction of expenditure of money related with payments of the rent is possible if the company changes the localization and moves into a smaller premise; or if it uses the existing space by, e.g. widening the assortment of offered products and placing them on further shelves in the sell area.

Authors think that negative results are caused by a small percent of gaining new products (4 new goods per month). Even though actions related to the implementation of new products into online auctions take the most time in the entire process of sell – it takes about one hour; still, it has a significant influence on the financial shape of the enterprise because it means gaining a new client. The firm cooperates with distributors of appropriate brands and it obtains from information about new products from them. Still it is much insufficient in situation where the company wants to gain new groups of customers. Premises supporting the determined statement show the need of looser cooperation with existing suppliers and initiating contacts with new ones.

Costs of complaints service lead to another important conclusion drawn from the ABC analysis. According to the concept of Lean Management, it is simultaneously a clear waste, while LM focuses on providing the customer the added value, i.e. a product that fulfills client's needs and requirements and which doesn't have defects. Lack of satisfaction of customers results among others from not providing products in time or providing a defective (damaged) product. In order to prevent such waste, which often accompanies actions connected with complaints service, it is necessary to initiate actions, like: bringing the product bought by customers online from suppliers in time, correct protection of goods and verifying the ordered product from the point of view of its quality and functionality. Referring to conclusions presented above will surely reflect in reduction of time and costs of the warehouse, as well as it will enable employees of the firm focusing on actions that add value to clients' orders.

It has been identified that the service of incoming and outgoing mail and realization of order 1 are actions that took place most often in the examined period. This conclusion points at the fact that the level of clients' interest in the purchase of products via Internet. This confirms one's again that the suggestion of extending the offer of assortment and presenting products in online auctions (which are most frequent way of selling) in the analyzed company. So, it is important to pay similar attention to the client that buys in the company's seat because it is the second most popular form of realization of sell.

If we assume that a new retail client is the principal recipient of company's products, its actions should be focused on fulfilling his needs. He generates the biggest costs, but also the biggest profits of the firm. Therefore he requires more attention. Effective service of electronic mail and direct service, fast dispatch of ordered products, providing high quality products – all these elements should by a priority in the service of a new retail client and they should be the cause of consequent elimination of all sorts of waste while realization of particular actions.

Suggested changes are "small steps" of the Kaizen philosophy, which allows constantly improving process that take place in the company and eliminating waste.

6. SUMMARY

The most important function of T-D ABC analysis is the information, i.e. providing information about costs that are necessary in management. The analysis realized by authors in the examined unit gave the possibility of observing actions that occur in it and their costs. Calculations performed resulted in identification of problems, links and conclusions taken as a basis for further discussion on waste elimination according to Lean Management paradigm. Further analysis of predetermined areas enabled development of improvement suggestions. Generally, they referred to elimination of waste emerging from time, place and use of resources. Elimination of waste was supposed to improve company's functioning.

[3]Logistics cost include cost of labor and means of work, financial expenditures and other negative consequences of events caused by material flows within a company and between companies, as well as costs of stock kept [Skowronek, Saryusz-Wolski, 2003, s. 336].

Hence, T-D ABC analysis is a reliable basis for determination of improvement actions for better functioning of process with respect to lean idea.

„The issue in Lean Management is that it is necessary to constantly change ways of defining the goal, organizing processes and involving employees. Lean gives the possibility to produce more and more and using less and less of human effort, devices, time and space; and simultaneously – approaching the objective, which is providing clients exactly what they want" – as it was explained by James Womack, world star and guru of the Lean Management concept, in Wrocław, during the 10th International Concept of Lean Management [Kostecka, 2010, p. 24]. It is known that problems always occur when the company will not involve energy into their deep solving, as well as preventing them or fighting against them; then it will remain in its initial point , where these problems change into waste that the company eliminated with such effort.

It is extremely important in the implementation of the process approach, which in this case is personalized in Lean Management concept, to be aware of necessary changes and be willing to initiate them. it is most of all the management that should know about benefits resulting from using this type of concept, in order to involve their staff in gradual improvement of processes. The Lean Management enables the company entering the process of continuous eliminating waste and obtaining satisfying results, which verification can be performed with use of T-D ABC analysis.

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