LEAN SIX SIGMA: METHODOLOGY AND PRACTICE IN OPERATIONS MANAGEMENT CASE: BOTTLE WATER DISTRIBUTION IN SERBIA

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Abstract Six Sigma and Lean Manufacturing are the two most popular and successful programs espoused by the industries over the last few decades. Many companies such as Toyota, Danaher Corporation, General Electric, Motorola and many others have achieved impressive results by implementing either a Lean or Six Sigma methodology in their organisation. Six Sigma, originated in Motorola in mid 1980s, brought revolution in the industries worldwide and has become the long term business strategy to achieve competitive advantage and to excel in operations excellence. Six Sigma is widely recognized as a methodology that employs statistical and non-statistical tools and techniques to maximize an organization's Return on Investment (ROI) through the elimination of defects in processes (Antony et al. 2011). Lean Manufacturing, on the other hand, was another quality initiative proposed by Americans in response to compete with Japanese manufacturers and its superior manufacturing techniques (following the concept of Toyota Production System (TPS) to resolve quality problems in their organization) as their import became serious concern to western producers.

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management

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1 Introduction

Operations Management is the activity of managing the resources which produce and deliver goods and services (Slack et al., 2010). Operations can be seen as one of many functions (e.g. marketing, finance, personnel) within the organisation. The operations function can be described as that part of the organisation devoted to the production or delivery of goods and services. This means all organisations undertake operations activities because every organisation produces goods and/or services.

1.1 Operations priorities

Operations should focus on specific capabilities that give it a competitive edge which may be termed competitive priorities. Four operations priorities or measures of these capabilities can be termed cost, time, quality and flexibility (Porter, 2011).

1.1.1 Cost

If an organisation is competing on price, then it is essential that it keeps its cost base lower than the competition. Then it will either make more profit than rivals, if price is equal, or gain market share if price is lower. Cost is also important for a strategy of providing a product to a market niche, which competitors cannot provide. Thus cost proximity (i.e. to ensure costs are close to the market average) is important to maximise profits and deter competitors from entering the market. The major categories of cost are staff, facilities (including overheads) and material with the greatest scope for cost reduction lies with reduction of the cost of materials. A relatively small proportion of costs are usually assigned to direct labour.

1.1.2 Time

The time delay or speed of operation can be measured as the time between a customer request for a product/service and then receiving that product/service. Speed is an important factor to the customer in making a choice about which organisation to use.

The concept of P:D ratios (Shingo, 1989) compares the demand time D (from customer request to receipt of goods/services) to the total throughput time P of the purchase, make and delivery stages. Thus in a make-to-stock system D is basically the delivery time, but for a customer-to-order system the customer demand time is equal to the purchase, make and delivery stages (P). In this case the speed of the internal processes of purchase and make will directly effect the delivery time experienced by the customer. Thus the advantage of speed is that it can either be used to reduce the amount of speculative activity and keep the delivery time constant or for the same amount of speculative activity it can reduce overall delivery lead time. Thus in competitive terms speed can be used to both reduce costs (making to inaccurate forecasts) and reduce delivery time (better customer service).

1.1.3 Quality

Quality covers both the quality of the product/service itself and the quality of the process that delivers the product/service. Quality can be measured by the '*cost of quality*' model were costs are categorised as either the cost of achieving good quality (the cost of quality assurance) or the cost of poor quality products (the costs of not conforming to specifications). The advantages of good quality on competitiveness include increased dependability, reduced costs and improved customer service.

1.1.4 Flexibility

There are a number of areas in which flexibility can be demonstrated. For example, it can mean the ability to offer a wide variety of products/services to the customer and to be able to change these products/services quickly. Flexibility is needed so the organisation can adapt to changing customer needs in terms of product range and varying demand and to cope with capacity shortfalls due to equipment breakdown or component shortage. Types of flexibility include product flexibility which is the ability to be able to quickly act in response to changing customer needs with new product/service designs and volume flexibility which is the ability to be able to decrease or increase output in response to changes in demand. Volume flexibility may be needed for seasonal changes in demand as services may have to react to demand changes minute by minute.

1.2 JIT and lean systems

Just-In-time (JIT) is a philosophy originating from the Japanese auto maker Toyota where Taiichi Ohno developed the Toyota Production system (Ohno, 1988). The basic idea behind JIT is to produce only what you need, when you need it. This may seem a simple idea but to deliver it requires a number of elements in place such as the elimination of wasteful activities and continuous improvements.

1.2.1 Eliminate waste

Waste is considered in the widest sense as any activity which does not add value to the operation. Seven types of waste identified by Toyota are as follows (Ohno, 1988):

- *Over-Production*. This is classified as the greatest source of waste and is an outcome of producing more than is needed by the next process.
- *Waiting Time*. This is the time spent by labour or equipment waiting to add value to a product. This maybe disguised by undertaking unnecessary operations (e.g. generating work in progress (WIP) on a machine) which are not immediately needed (i.e. the waste is converted from time to WIP).
- *Transport*. Unnecessary transportation of WIP is another source of waste. Layout changes can substantially reduce transportation time.
- Process. Some operations do not add value to the product but are simply there because of poor design or machine maintenance. Improved design or preventative maintenance should eliminate these processes.
- *Inventory*. Inventory of all types (e.g. pipeline, cycle) is considered as waste and should be eliminated.
- *Motion*. Simplification of work movement will reduce waste caused by unnecessary motion of labour and equipment.
- *Defective Goods*. The total costs of poor quality can be very high and will include scrap material, wasted labour time and time expediting orders and loss of goodwill through missed delivery dates.

1.2.2 Continuous improvement and JIT pull systems

Continuous Improvement or Kaizen, the Japanese term, is a philosophy which believes that it is possible to get to the ideals of JIT by a continuous stream of improvements over time.

The idea of a pull system comes from the need to reduce inventory within the production system. In a push system a schedule pushes work on to machines which is then passed through to the next work centre. A production system for an automobile will require the co-ordination of thousands of components, many of which will need to be grouped together to form an assembly. In order to ensure that there are no stoppages it is necessary to have inventory in the system because it is difficult to co-ordinate parts to arrive at a particular station simultaneously.

The pull system comes from the idea of a supermarket in which items are purchased by a customer only when needed and are replenished as they are removed. Thus inventory co-ordination is controlled by a customer pulling items from the system which are then replaced as needed (Ohno, 1988).

To implement a pull system a kanban (Japanese for 'card' or 'sign') is used to pass information through the production system. Each kanban provides information on the part identification, quantity per container that the part is transported in and the preceding and next work station. Kanbans in themselves do not provide the schedule for production but without them production cannot take place as they authorise the production and movement of material through the pull system. Kanbans need not be a card, but something that can be used as a signal for production such as a marked area of floorspace.

There are two types of kanban system, the single-card and two-card. The single-card system uses only one type of kanban card called the conveyance kanban which authorises the movement of parts. The number of containers at a work centre is limited by the number of kanbans. A signal to replace inventory at the work centre can only be sent when the container is emptied. Toyota use a dual card system which in addition to the conveyance kanban, utilises a production kanban to authorise the production of parts.

This system permits greater control over production as well as inventory. If the processes are tightly linked (i.e. one always follows the other) then a single kanban can be used. In order for a kanban system to be implemented it is important that the seven operational rules that govern the system are followed. These rules can be summarised as follows (Ohno, 1988):

- Move a kanban only when the lot it represents is consumed.
- No withdrawal of parts without a kanban is allowed.
- The number of parts issued to the subsequent process must be the exact number specified by the kanban.
- A kanban should always be attached to the physical product.
- The preceding process should always produce its parts in the quantities withdrawn by the subsequent process.
- Defective parts should never be conveyed to the subsequent process.
- A high level of quality must be maintained because of the lack of buffer inventory. A feedback mechanism which reports quality problems quickly to the preceding process must be implemented.
- Process the kanbans in every work centre strictly in order in which they arrive at the work centre.
- If several kanbans are waiting for production they must be served in the order that they have arrived. If the rule is not followed there will be a gap in the production rate of one or more of the subsequent processes. The system is implemented with a given number of cards in order to obtain a smooth flow. The number of cards is then decreased, decreasing inventory and any problems which surface are tackled. Cards are decreased, one at a time, to continue the continuous improvement process.

2 Total quality management (TQM) as a part of operations management

Total Quality Management (TQM) requires that the principles of quality management are applied in all aspects and at every level in an organisation (Hill, 2005). TQM has evolved over a number of years from ideas presented by a number of quality Gurus. Deming (1985) proposed an implementation plan consisting of 14 steps which emphasises continuous improvement of the production process to achieve conformance to specification and reduce variability. This is achieved by eliminating common causes of quality problems such as poor design and insufficient training and special causes such as a specific machine or operator. He also places great emphasis on statistical quality control techniques and promotes extensive employee involvement in the quality improvement program. Juran (2001) put forward a 10 step plan in which he emphasises the elements of quality planning - designing the product quality level and ensuring the process can meet this, quality control - using statistical process control methods to ensure quality levels are kept during the production process and quality improvement - tackling quality problems through improvement projects. Crosby (1996) suggested a 14-step programme for the implementation of TQM. He is known for changing perceptions of the cost of quality when he pointed out that the costs of poor quality far outweigh the cost of preventing poor quality, a view not traditionally accepted at the time.

Six Sigma is one of the most important and popular developments in the quality field. It has saved huge amounts of money and improved the customer experience for a large number of organizations across the world, yet it is applied in an inconsistent and often reductive fashion in many companies.

2.1 The cost of quality

All areas in the production system will incur costs as part of their TQM program. For example, the marketing department will incur the cost of consumer research in trying to establish customer needs. Quality costs are categorised as either the cost of achieving good quality - the cost of quality assurance or the cost of poor-quality products - the cost of not conforming to specifications.

2.1.1 The cost of achieving good quality

The costs of maintaining an effective quality management program can be categorised into *prevention costs and appraisal costs* (Knowles, 2011). Prevention reflects the quality philosophy of "doing it right the first time" and includes those costs incurred in trying to prevent problems occurring in the first place. Examples of *prevention costs* include:

- The cost of designing products with quality control characteristics.
- The cost of designing processes which conform to quality specifications.

– The cost of the implementation of staff training programmes.

Appraisal costs are the costs associated with controlling quality through the use of measuring and testing products and processes to ensure that quality specifications are conformed to. Examples of appraisal costs include:

– The cost of testing and inspecting products.
– The costs of maintaining testing equipment.
– The time spent in gathering data for testing.
– The time spent adjusting equipment to maintain quality.

2.1.2 The cost of poor quality

This can be seen as the difference between what it actually costs to provide a good or service and what it would cost if there was no poor quality or failures. This can account for 70% to 90% of total quality costs and can be categorised into *internal failure costs and external failure costs* (Knowles, 2011). Internal failure costs occur before the good is delivered to the customer. Examples of *internal failure costs* include:

– The scrap cost of poor quality parts that must be discarded.
– The rework cost of fixing defective products.
– The downtime cost of machine time lost due to fixing equipment or replacing defective product.

External failure costs occur after the customer has received the product and primarily relate to customer service. Examples of external failure costs include:

– The cost of responding to customer complaints,
– The cost of handling and replacing poor-quality products,
– The litigation cost resulting from product liability,
– The lost sales incurred because of customer goodwill affecting future business.

Although anyone who works in an organization will be familiar with many examples of these issues, business accounting systems are not set up to capture these costs. Traditional accounting approaches are designed to track the inflow and outflow of money in an organization (and, by extension, to product lines or departments). There is little emphasis on whether the money in the department is spent effectively.

Figure 1. shows Fiegenbaum's Prevention-Appraisal-Failure (P-A-F) model of costs of poor quality, although there are others.

Cost Area	**Cost of Control (Cost of Conformance)**		**Cost of Failure of Control (Cost of Non-Conformance)**	
Sub-Category	Prevention Costs	Appraisal Costs	Internal Failure Costs	External Failure Costs
Description	Arise from efforts to keep defects from occurring at all	Arise from detecting defects via test, audit, inspection	Arise from defects caught internally and dealt with by discarding or repairing the affected items	Arise from defects that actually reach the final customer.
Examples	Quality planning Statistical Process Control Quality training and workforce development Product design verification Market research	Test and inspection of purchased materials Inspection Testing Quality audit	Scrap Rework costs Management of rework systems Rejection paperwork	Warranty costs Out of warranty complaints Product recall Product liability claims Loss of customer goodwill

Figure 1: Cost of Quality types and examples
(adapted from Feigenbaum, 1961)

The lack of clarity of the cost of poor quality in organizations led to a lack of focus on improvement for many years It was only with the advent of the "Cost of Quality" approach in the 1950's (Defoe and Juran, 2010) that organizations had a financial tool to assess the costs associated with quality failures and thus focus on the most important areas for improvement.

The basic logic is that a relatively small increase in spending on prevention activities will deliver a more than compensating reduction in appraisal and failure costs (see figure 2.)

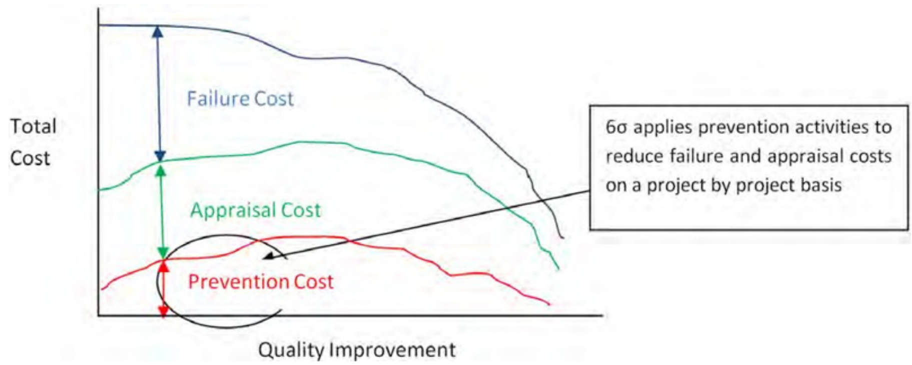

Figure 2: Quality costs during improvement
(adapted from Businessballs.com, 2011)

The concept of waste is fairly generic in nature and has been around for a long time. Many organisations refer to 'non- value added activities' and 'process waste'. However, these are rather broad terms and, whilst it is easy to agree that waste is bad and should be eradicated (or at least reduced) it does not much help in the process of improvement. The Seven Wastes were identified by Ohno as part of the Toyota Production System (Ohno, 1988) and have since been widely applied to process improvement, becoming particularly associated with the principles of lean manufacturing.

Type of Waste	Potential Associated Costs
Waiting	***Labour cost associated with idle time.*** ***Value of lost production (if units are lost) or cost of overtime if this has to be worked to catch up.*** Cost of late delivery if overall process time affected.
Correction	Rework cost (direct and overhead if applicable). Cost of delays (as above). Inspection costs. Disposal costs if correction is not possible. Paperwork system costs.
Over-Production	***Storage costs (inc. handling costs & capital tied up).*** ***Extra material costs if excess cannot be sold.*** Deterioration/depreciation costs (if appropriate). Cost of delays (as above).
Processing	Additional processing costs (direct and overhead if applicable). Transportation costs.
Conveyance	***Additional cost of unnecessary conveyance system.*** ***Cost of late delivery if overall process time affected.*** Deterioration/damage costs.
Inventory	***Storage costs (inc. handling costs & capital tied up).*** ***Deterioration/depreciation costs (if appropriate).*** ***Obsolescence costs (if appropriate).***
Motion	***Additional labour costs (including absenteeism).***

Figure 3: Types of waste and associated costs
(adopted from Ohno, 1988)

Lean Six Sigma directly assesses costs of poor quality on a project by project basis, providing clear motivation for improvement and an indication of expected gains.

3 Lean six sigma (LSS)

During late 1980s, two other business improvement strategies evolved (namely Lean and Six Sigma) that were cynosure for resolving quality or process related problems in manufacturing and service industries and having significant impact on the bottom-line of corporations globally. Six Sigma and Lean Manufacturing are the two most popular and successful programs espoused by the industries over the last few decades. Many companies such as Toyota, Danaher Corporation, General Electric, Motorola and many others have achieved impressive results by implementing either a Lean or Six Sigma methodology in their organisation (Knowles, 2011).

Before we study the subject of Six Sigma in any depth, we need to define the term. Perhaps unusually, Six Sigma has 3 distinct elements to its definition (Knowles, 2011):

– A Measure: A statistical definition of how far a process deviates from perfection.
– A Target: 3.4 defects per million opportunities.
– A Philosophy: A long term business strategy focused on the reduction of cost through the reduction of variability in products and processes.

Accordingly, it is defined in a variety of ways by several authors, but for the purposes of these notes the definition from (Pande et al. 2000) focused on the more comprehensive philosophy of Six Sigma will be used: *"A comprehensive and flexible system for achieving, sustaining and maximising business success. Six Sigma is uniquely driven by close understanding of customer needs, disciplined use of facts, data, and statistical analysis, and diligent attention to managing, improving, and reinventing business processes."*

The use of Lean Six Sigma (LSS) as a business improvement methodology has increased significantly over the last decade and its usage has broadened from the manufacturing sector to virtually every industry sector and developed country there is. Its ability to be applicable in this way is quite probably unique as it continues to spread out and grow in more diverse business sectors including pharmaceutical and banking (Wiesenfelder 2009).

LSS has evolved during a journey that can be traced back well over a century. This family tree, depicted in Figure 4., clearly demonstrates how LSS followed two completely different paths and only converged in recent years to become what is now the most accepted methodology namely Lean Six Sigma (Antony et al.2011).

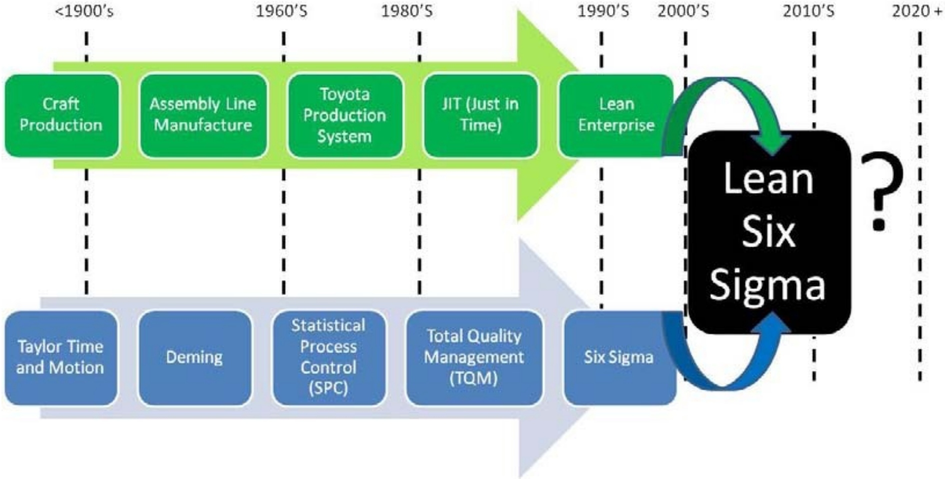

Figure 4: Evolution of Lean Six Sigma
(adopted from Antony et al.2011)

Lean and Six Sigma are both business improvement methodologies but they have some important fundamental differences. These differences are well documented in numerous academic research papers e.g. (Antony and Escamilla 2003), but can be summarised in Figure 5. below:

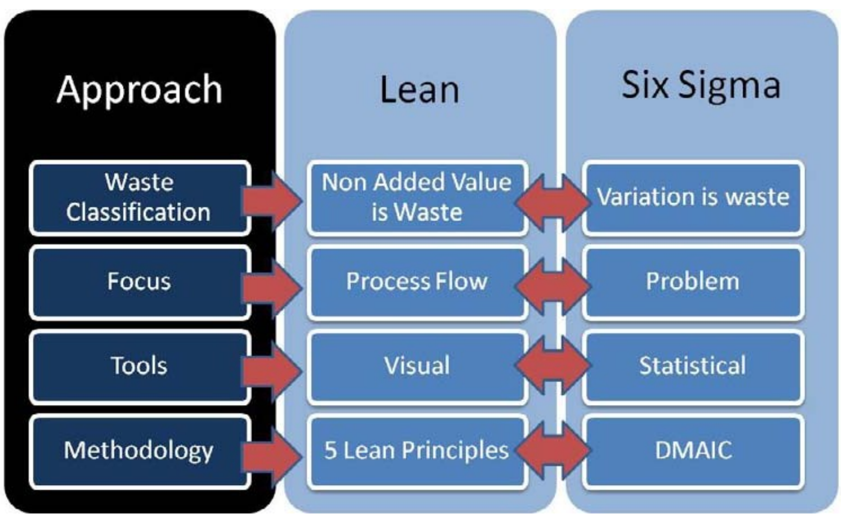

Figure 5: Key differences between Lean and Six Sigma Approaches
(adopted from Antony and Escamilla 2003)

What is well known however, is that when implemented correctly the benefits of combining Lean and Six Sigma makes it a formidable business improvement methodology (Snyder and Peters 2004).

Lean is much more than just about reducing and eliminating process wastes, it is a philosophy than can be applied in a continuous form for years if not decades. Toyota was the leaders in this philosophy which is still highly relevant today. Six Sigma meanwhile concentrates on the reduction/elimination of problems, which could manifest themselves in the form of defects or variation. The Six Sigma approach tends to be much more finite than Lean and mostly last over a period of weeks to months.

4 Planning tools for lean and Six sigma: case study in water distribution – case Serbia

The performances are defined in the context of measuring company's ability to determine/plan and accomplish goals, so that importance of objectives represents a key factor in the choice of performance indicators. According to Rameshwar (2011), it can be identified links between strategic planning and (measurable) performance indicator in distribution, in order to provide logistics processes involved in planned objectives achievement. Priority objectives in distribution management are:

(1) Orders fulfil-ment,
(2) Target Customer Service,
(3) Flexibility and rate of response,
(4) Customer service innovation, and
(5) Costs.

Rameshwar (2011) proposed a group of performances that apply regardless of business strategy and logistics strategy in a company: time, cost and quality.

Leong et al. (1990) identified role of production function and key indicators of manufacturing performance defined in terms of performance: quality, delivery speed, delivery reliability, cost and flexibility. Johnston et al. (2003) identifies scope and speed of response as performance "flexibility", where range of responses represents number of various possibilities for changes in the production system, while speed of reaction is the time required to change the production system. After selection of performances, it is important to define appropriate categories of indicators and/or concrete, measurable performance indicators, shown in Figure 6.

Performances	Indicators
Cost	Cost to satisfy customer requirements
	Cost with continuous improvement activities
	Cost of safety stocks
	Cost of reverse logistics
Flexibility	Responsiveness to customer requirements
	Logistics system responsiveness to especial orders
	Logistics system responsiveness to environmental changes
	Customer satisfaction available
Quality	Stock data accuracy
	Level of stock out
	Percentage of orders fulfilment
	Percentage of order without quality problems
Time	Delivery lead time
	Order cycle time

Figure 6: Performances and indicators in physical distribution systems
(adopted from Rameshwar, 2011)

KPIs (Key Performance Indicators) represent selected indicators used for measuring and planning MQI (and increasing business performance). KPIs are quantifiable key performance attributes, those that directly affect quality of company management and achievement of goals. KPI are defined in accordance with the importance of business processes for different participants (stakeholders) in business. Each KPI is related to a single measurable attribute (indicator) of the observed performance, while complex KPI can represent successfulness of more business entities (functions, processes, products). Performance indicators are defined and used by applying business intelligence techniques and through monitoring of activities, called BAM (Business Activity Monitoring). KPIs represent the key "package" of measurable properties of a (business) system and, therefore, important planning tools. They are defined by the rules, indicators, targets and time dimensions. KPIs dynamics should illustrate planned and actual states of observed entities of business system, thus they constitute a model for quality management system measuring.

LSS model for monitoring distribution using key performance indicators, in water distribution company *La Fantana,* Serbia. This company, with about 160 employees, is a leader in the field of bottling and distribution of water and water coolers in Serbia. Today, company has more than 10.000 clients with 25.000 installed water cooler devices at companies and individuals. La Fantana produces and distributes yearly over 16.000.000 liters of natural noncarbonated mineral water. Diversity of company offer is reflected in subscription packages adapted to various requests of our clients, as well as in the functionality of water cooler devices, enabling to enjoy cold, hot, carbonated or water heated to room temperature. La Fantana carries out water production and bottling in its own modern factory located in Mitrovo Polje, near Aleksandrovac Zupski in Serbia. La Fantana has 6 logistics distribution centers (LDC), positioned in different parts of a country. From these LDCs La Fantana company is supplying customers with small truck fleet (about 30 vehicles). All deliveries are done in 24h, and company has 99, 6 % rate of success deliveries in 24h. Full truck loads (FTL) are supplying LDC, from the plant and less than full trucks loads (LTL) shipments are supplying customers.

La Fantana company's KPIs system (as it is presented in this paper) is modelled and used in spreadsheets, in accordance with defined problems. The main method for data processing is simulation, "what-if" analyse that is significantly cheaper than with standard software packages. As shown in figures below, KPIs of logistics (distribution) model are developed in spreadsheet software and built from real data, collected in the Company in 2011 and 2012. KPI model was created in spreadsheet workbook, which contains eight different sheets with input data formats and forms for indicators calculation. Spreadsheet KPI model consists of the following sheets:

– Procedure sheet - which presents instructions for making KPI model and which verified steps of model development.

# (Order)	Sheet	Explanation	Time (Minutes)	Status	
1	Data	copy formulas in next row, make value previous month, ungroup current month		ok	
2	Rolling Consumption	copy formulas in next row, make value previous month, ungroup current month			
3	Input_LDR	copy LDR		ok	
4	Fuel Data	copy Fuel Data (OMV+ other suppliers), with discount, delete quantity from discount		ok	reporting data
5	Definitions	add rows, add new cars		ok	
6	Check	add data		ok	
7	Rolling	ungroup current month		ok	
8	Summary_DA_xy	ungroup current month, change formula in X8		ok	
10	11.fuel per bottle_xy	change month in chart's title		ok	
11	all	check the data, 90.data, charts, etc.		ok	
16		check new vehicles		ok	
17		check and correct definitions		ok	
18		check EVERYTHING about cars		ok	
19		check and correct LDR		ok	
23		failed drops		ok	
24		successful drops		ok	
27		make sanitizations			

To change cars in:
Rolling Consumption
Definitions
90.data

Note: DO NOT insert rows in Data and Rolling sheets!!! DO NOT insert rows in Data and Rolling sheets!!! DO NOT insert rows in Da

Figure 7: Procedure sheet

– Input LDR sheet - represents Logistic delivery report for daily base input of distribution data (about vehicles, delivery agent, number of bottles, new cooler installations, successful delivery etc.)

La Fantana d.o.o.

LDR - December 2012

	#	Code	Branch	CC	Date	Inv. No	Reg No	Type of Vehicle	Van / Truck	Loading capacity/ Cour...	Delivery/ Sanitization Agent	Helper	Water Delivered (19l)	Water Delivered (11l)	Water Returned (11l)	Water Returned (19l)	ZTI	ZTP	Successf Drops
3066	3045	4127480 662-CB	BG	LG	31.dec.12	X	BG 662-CB	Iveco Daily 2	Truck	90	Ivan Djuric		122	4			1		19
3069	3048	4127480 144-WP	BG	LG	31.dec.12	X	BG 144-WP	Iveco Daily 3	Van	90	Perica Peric		27	47	20	4	1	1	22
3070	3049	4127480 307-TH	NS	LG	31.dec.12	F_027	BG 307-TH	Iveco Daily 5	Truck	128	Zoran Ilic		51	38		35	3	2	24
3071	3050	4127480 077-BH	BG	LG	31.dec.12	F_035	BG 077-BH	Iveco Daily 3	Van	90	Mirko Ilic		33	59	16	5	1		21
3072	3051	4127480 604-AŽ	SU	LG	31.dec.12		BG 604-AŽ	Iveco Daily 3	Van	90	Goran Arbutina		144						2
3073	3052	41274x	BG	Client	31.dec.12	F_037	x	x	Van	0									
3074	3053	4127480 237-VŽ	KG	LG	31.dec.12	F_070	BG 237-VŽ	Iveco Daily 3	Van	90	Danko Milinkovic	Dejan Spasojevic	88	27	12				28
3075	3054	4127480 237-VZ	BG	LG	31.dec.12	F_037	BG 237-VZ	Iveco Daily 3	Van	90	Nikola Brinza		33	56	11	8			21
3076	3055	4127480 604-AW	BG	LG	31.dec.12	F_037	BG 604-AW	Iveco Daily 3	Van	90	Darko Stisovic		54	51	16	6			19
3077	3056	4127480 584-ŠŽ	BG	LG	31.dec.12	F_054	BG 584-ŠŽ	Iveco Daily 3	Van	90	Branko Grdijan		83	16	8	16	2	2	22
3078	3057	4127480 146-WZ	BG	LG	31.dec.12	F_071	BG 146-WZ	Iveco Daily 3	Van	90									
3079	3058	4127480 596-FD	BG	LG	31.dec.12	F_054	BG 596-FD	Iveco Daily 3	Van	90	Darko Petrovic		39	44	31	5	1		23
3080	3059	4127480 596-FČ	BG	LG	31.dec.12	F_071	BG 596-FČ	Iveco Daily 3	Van	90	Zoran Andric		111	33	7	6			22
3081	3060	4127480 601-ĐI	BG	LG	31.dec.12	F_027	BG 601-ĐI	Iveco Daily 3	Van	90	Milan Bogosavljevic		182	29	24	11			19
3082	3061	4127480 307-DK	SU	LG	31.dec.12	F_075	BG 307-DK	DAILY 35 S 1	Van	90	Borko Vranes		113	13				1	15
3083	3062	4127480 162-KĐ	NS	LG	31.dec.12	F_077	BG 162-KĐ	Iveco Daily 3	Van	90	Zoran Pejcic		59	8	5	4			15
3084	3063	4127480 574-MĆ	BG	LG	31.dec.12	F_025	BG 574-MĆ	Iveco Daily 5	Truck	128	Miodrag Milosavljevic		57	34	4	20	2	2	21
3085	3064	4127480 156-NĐ	BG	LG	31.dec.12	F_051	BG 156-NĐ	Iveco Daily 3	Van	90	Nebojsa Sentic		76	41	3	10			23
3086	3065	4127480 635-CK	NI	LG	31.dec.12		BG 635-CK	Iveco Daily 3	Van	90	Predrag Lazic		101	17	8	6	1		18
3087	3066	4127480 253-OU	BG	LG	31.dec.12	F_083	BG 253-OU	Iveco Daily 3	Van	90	Sladjan Popovic		72	50	8	7			22
3126	3105	4127480 320-NB	CA	LG	31.dec.12	F_028	BG 320-NB	Iveco Daily 5	Truck	128	Vladan Stanic		99	8	4				15

Figure 8: Logistic delivery report (LDR)

– Fuel data sheet - refers to a report of fuel consumption in the distribution and consumed fuel values, per vehicle and each distribution center.

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1	Grup	Ukupno sa PDV-om	Neto	PDV	Br Fakture	Datum fakturisanja	ACCOUNT	DED/NED	REG. NO.	CC	ROUTE X_4 CHR	Account	Accounted Values	Accounted Values	Supplier - fake	Check new cars
2	3186	2.153,88	1.794,90	358,98	8912342525	17.dec.12	fuel	NED	BG 110-BD	SL_NS	3186	5131	2.153,88	18,97	OMV	BG 110-BD
3	3855	654,63	545,53	109,11	8912342525	17.dec.12	gas	DED	BG 401-CČ	SZ_BG	3855	5131	545,53	4,81	OMV	BG 401-CČ
4	3574	2.593,58	2.161,32	432,26	8912342525	17.dec.12	fuel	DED	BG 237-KZ	DA_NI	3574	5131	2.161,32	19,04	OMV	BG 237-KZ
5	4028	1.643,99	1.369,99	274,00	8912342525	17.dec.12	gas	NED	BG 517-UD	SZ_BG	4028	5131	1.643,99	14,48	OMV	BG 517-UD
6	3699	5.159,97	4.299,98	860,00	8912342525	17.dec.12	fuel	DED	BG 320-NB	DA_CA	3699	5131	4.299,98	37,88	OMV	BG 320-NB
7	3947	7.214,79	6.012,33	1.202,47	8912342525	17.dec.12	fuel	NED	BG 525-JY	PW	3947	5131	7.214,79	63,55	OMV	BG 525-JY
8	3400	7.991,74	6.659,78	1.331,96	8912342525	17.dec.12	fuel	NED	BG 161-WJ	SM	3400	5131	7.991,74	70,39	OMV	BG 161-WJ
9	3392	3.619,50	3.016,25	603,25	8912342525	17.dec.12	fuel	NED	BG 149-NU	SL_BG	3392	5131	3.619,50	31,88	OMV	BG 149-NU
10	3319	4.454,65	3.712,21	742,44	8912342525	17.dec.12	fuel	NED	BG 136-NT	SL_BG	3319	5131	4.454,65	39,24	OMV	BG 136-NT
11	3335	4.370,83	3.642,36	728,47	8912342525	17.dec.12	fuel	NED	BG 131-NR	SL_BG	3335	5131	4.370,83	38,50	OMV	BG 131-NR
12	3640	3.180,59	2.650,49	530,10	8912342525	17.dec.12	fuel	NED	BG 307-FS	SL_BG	3640	5131	3.180,59	28,02	OMV	BG 307-FS
13	3723	7.000,91	5.834,09	1.166,82	8912342525	17.dec.12	fuel	NED	BG 347-IG	SL_CA	3723	5131	7.000,91	61,67	OMV	BG 347-IG
14	3491	1.545,54	1.287,95	257,59	8912342525	17.dec.12	fuel	NED	BG 214-PG	SL_BG	3491	5131	1.545,54	13,61	OMV	BG 214-PG
15	4002	1.534,00	1.278,33	255,67	8912342525	17.dec.12	fuel	DED	BG 293-CĐ	SL_CA	4002	5131	1.278,33	11,26	OMV	BG 293-CĐ
16	4002	3.287,11	2.739,26	547,85	8912342525	17.dec.12	gas	DED	BG 293-CĐ	SL_CA	4002	5131	2.739,26	24,13	OMV	BG 293-CĐ

Figure 9: Fuel consumption data sheet

– Data sheet - which includes a monthly based data about bottle sales and bottles delivery, vehicle capacity, vehicle capacity per active days, number of routes, number of kilometres, number of vehicles, number of undelivered orders, spent fuel, number of installed and withdrawn coolers, number of sanitizations and service.

	A	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU
1	La Fantana d.o.o. Serbia															
2	Rolling for Major Logistic Indicators															
3		working days budget														
4	Working Days															
5	Monthly	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
6	Total	21	22	22	21	20	22	19	21	21	22	23	20	23	21	21
7																
8	Water Delivered 19l															
9	Monthly - Actual	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
10	Belgrade	38.967	39.147	38.050	30.787	33.178	39.615	36.506	42.626	49.862	54.440	52.628	44.831	47.602	40.770	36.707
11	Novi Sad	12.270	11.887	11.140	7.239	10.205	12.740	11.320	13.910	14.579	15.692	18.007	14.427	12.433	12.455	10.508
12	Cacak	2.681	2.332	2.191	2.052	1.711	2.567	2.327	2.796	3.491	3.773	4.111	2.977	3.080	2.614	2.316
13	Nis	3.931	3.753	3.939	2.849	3.268	3.976	3.399	4.565	5.346	4.849	5.960	5.177	5.354	4.398	4.233
14	Kragujevac	3.500	3.645	4.204	3.110	3.471	4.699	4.071	4.472	6.377	7.913	9.471	7.636	8.082	6.616	4.962
15	Subotica	6.185	4.090	3.935	4.311	4.120	5.760	5.499	6.043	7.339	7.712	7.727	6.894	6.630	5.728	4.566
16	Branches	28.567	25.707	25.409	19.561	22.775	29.742	26.616	31.786	37.132	39.939	45.276	37.111	35.579	31.811	26.585
17	Total	67.534	64.854	63.459	50.348	55.953	69.357	63.122	74.412	86.994	94.379	97.904	81.942	83.181	72.581	63.292
18																
19	Water Delivered 19L+11L by LaF															
20	Monthly - Budget	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
21	Belgrade	48.380	46.767	50.678	30.759	35.206	44.005	37.455	39.186	38.442	40.535	42.869	42.412	43.460	41.640	42.411
22	Novi Sad	14.031	13.378	14.480	10.890	12.354	16.395	13.879	15.500	20.013	18.929	19.887	20.398	15.344	16.407	16.043
23	Cacak	3.286	3.196	3.465	2.449	2.781	3.640	3.086	3.454	4.394	4.166	4.407	4.477	3.469	3.698	3.627
24	Nis	4.278	4.015	4.340	3.423	3.879	5.200	4.398	4.903	6.398	6.041	6.317	6.522	4.805	5.149	5.023
25	Kragujevac	4.581	4.391	4.755	3.516	3.990	5.276	4.468	4.993	6.422	6.078	6.397	6.545	4.962	5.301	5.188
26	Subotica	5.749	5.404	5.841	4.587	5.199	6.964	5.889	6.568	8.561	8.085	8.457	8.728	6.441	6.901	6.734
27	Branches	31.925	30.385	32.881	24.865	28.204	37.476	31.721	35.418	45.788	43.300	45.465	46.670	35.021	37.456	36.616
28	Total	80.305	77.151	83.558	55.624	63.411	81.480	69.176	74.604	84.230	83.835	88.334	89.082	78.481	79.095	79.027
29																
30	Real Capacity															
31	Monthly - Actual	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
32	Belgrade	39.548	41.224	41.814	34.688	38.052	43.982	40.398	47.610	52.720	53.606	53.442	47.508	51.276	45.170	41.480

Figure 10: Logistics Data Sheet

– Rolling sheet - which presents plan realization, or percentage of achieved in comparison with scheduled from a sheet Data.

	A	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU
1	La Fantana d.o.o. Serbia																			
2	Rolling for Major Logistic Indicators																			
3																				
4																				
5	LDR per Route																			
6	Monthly - Actual	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
7	Belgrade	104%	103%	102%	103%	99%	95%	91%	89%	87%	90%	90%	90%	95%	102%	98%	94%	93%	90%	88%
8	Novi Sad	103%	99%	99%	100%	97%	96%	94%	93%	95%	98%	95%	95%	102%	100%	102%	99%	86%	95%	89%
9	Cacak	83%	74%	89%	82%	85%	79%	68%	70%	70%	69%	83%	75%	91%	95%	100%	83%	80%	76%	70%
10	Nis	98%	98%	95%	110%	100%	89%	91%	84%	93%	94%	97%	99%	106%	110%	99%	109%	101%	98%	92%
11	Kragujevac	90%	98%	111%	106%	105%	92%	89%	96%	99%	102%	85%	92%	104%	110%	113%	107%	107%	95%	88%
12	Subotica	96%	98%	94%	105%	94%	85%	219%	86%	82%	89%	82%	89%	103%	110%	101%	93%	101%	98%	87%
13	Branches	98%	96%	98%	101%	96%	91%	98%	87%	91%	93%	90%	92%	102%	104%	103%	99%	94%	94%	87%
14	AVG Total	101%	100%	100%	102%	98%	93%	94%	88%	89%	91%	90%	91%	98%	103%	101%	97%	94%	92%	88%
15																				
16	LDR per Route																			
17	Monthly - Budget	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Mar-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
18	Belgrade	130%	133%	133%	131%	125%	132%	134%	86%	93%	90%	94%	89%	80%	80%	81%	96%	87%	84%	91%
19	Novi Sad	130%	133%	133%	131%	125%	132%	134%	86%	93%	90%	94%	89%	80%	80%	81%	96%	87%	84%	91%
20	Cacak	130%	133%	133%	131%	125%	132%	134%	86%	93%	90%	94%	89%	80%	80%	81%	96%	87%	84%	91%
21	Nis	130%	133%	133%	131%	125%	132%	134%	86%	93%	90%	94%	89%	80%	80%	81%	96%	87%	84%	91%
22	Kragujevac	130%	133%	133%	131%	125%	132%	134%	86%	93%	90%	94%	89%	80%	80%	81%	96%	87%	84%	91%
23	Subotica	130%	133%	133%	131%	125%	132%	134%	86%	93%	90%	94%	89%	80%	80%	81%	96%	87%	84%	91%
24	Branches	130%	133%	133%	131%	125%	132%	134%	86%	93%	90%	94%	89%	80%	80%	81%	96%	87%	84%	91%
25	AVG Total	130%	133%	133%	131%	125%	132%	134%	86%	93%	90%	94%	89%	80%	80%	81%	96%	87%	84%	91%
26																				
27	LDR per Active Day																			
28	Monthly - Actual	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Mar-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
29	Belgrade	182%	176%	172%	185%	151%	143%	141%	129%	136%	140%	148%	138%	166%	180%	169%	167%	153%	146%	133%
30	Novi Sad	205%	189%	184%	193%	164%	162%	162%	139%	144%	165%	183%	173%	188%	199%	195%	197%	155%	167%	144%
31	Cacak	94%	93%	107%	113%	98%	79%	78%	76%	74%	87%	91%	99%	109%	123%	128%	106%	96%	89%	75%
32	Nis	114%	110%	114%	140%	116%	99%	102%	84%	101%	111%	111%	121%	135%	158%	138%	144%	129%	119%	107%
33	Kragujevac	108%	122%	150%	143%	139%	109%	110%	123%	121%	119%	126%	118%	154%	176%	153%	144%	136%	119%	102%
34	Subotica	197%	155%	151%	194%	159%	146%	262%	120%	121%	156%	137%	156%	192%	197%	192%	182%	180%	148%	130%
35	Branches	157%	146%	153%	166%	143%	127%	135%	112%	121%	136%	140%	143%	162%	178%	168%	162%	142%	135%	117%
36	AVG Total	171%	163%	163%	177%	147%	136%	138%	122%	129%	138%	144%	140%	164%	179%	168%	165%	148%	141%	126%
37																				
38	LDR per Active Day																			
39	Monthly - Budget	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Mar-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
40	Belgrade	153%	171%	182%	186%	186%	172%	172%	124%	138%	152%	156%	148%	145%	146%	148%	168%	144%	151%	154%
41	Novi Sad	163%	183%	199%	188%	178%	162%	176%	133%	159%	192%	188%	190%	246%	222%	223%	263%	172%	201%	197%
42	Cacak	187%	209%	183%	174%	167%	155%	168%	120%	143%	170%	167%	169%	216%	195%	198%	231%	155%	181%	178%
43	Nis	127%	142%	123%	115%	109%	97%	105%	84%	100%	122%	119%	120%	157%	142%	142%	168%	107%	126%	123%

Figure 11: Rolling sheet

– Summary distribution sheet - is used to represent and calculate distribution indicators.

2	La Fantana doo, Serbia	Delivery Activity; Summary Actuals vs Targets dec-12																
4		YTD 11	jan.12	feb.12	mar.12	apr.12	maj.12	jun.12	jul.12	avg.12	sep.12	okt.12	nov.12	dec.12	dec.12			
5		Actuel	Actuel	Actuel	Actuel	Actuel	Actuel	Actuel	Actuel	Actuel	Actuel	Actuel	Actuel	Actuel	Actuel	Budget	Variance	
6																	abs.	%
13	Fuel (euro)	107.831	8.000	8.469	9.869	8.785	10.228	11.037	11.814	12.608	10.786	12.333	11.058	10.280	10.280	11.066	(787)	-7%
14	Successful Drops	157.224	10.606	11.464	13.471	12.422	14.399	16.079	17.261	17.631	15.320	16.203	14.199	13.227	13.227	14.329	(1.102)	-8%
15	Boxes Delivered	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
16	Coolers Installed	9.856	561	658	808	849	1.000	977	681	1.148	1.148	1.148	1.148	1.148	1.148	749	399	53%
17	Coolers Returned	8.909	576	547	775	672	793	842	969	885	760	1.118	988	746	746	824	(78)	-9%
18	Coolers Sanitizations	2.515	328	233	185	266	240	155	129	184	127	216	246	203	203	218	(15)	-7%
19	Coolers Serviced	288	12	4	7	12	4	2	22	44	34	38	40	51	51	-	51	100%
20	Failed Drops	10.227	712	1.396	798	774	1.032	1.062	1.315	1.287	1.192	1.363	1.302	1.243	1.243	-	1.243	100%
21	Water Delivered by Third Parties	42.238	4.538	5.745	10.295	10.063	9.992	12.229	10.210	12.671	12.078	10.553	10.133	9.225	9.225	11.586	(2.361)	-20%
22	Active Days	5.632	418	438	510	444	550	544	539	609	527	596	540	526	526	489	37	8%
23	Routes	8.803	494	647	779	721	856	931	959	1.031	907	955	838	765	765	810	(45)	-6%
24	Standard Bottles **(see Note)	1.016.244	65.070	71.267	86.626	80.064	93.522	107.209	114.661	121.301	102.403	105.668	93.979	84.065	84.065	84.398	(333)	0%
25	**Key Performance Indicators**																	
26	AVG LD per Route (Standard Bottles)	120%	114%	113%	114%	114%	114%	120%	125%	125%	121%	119%	119%	117%	117%	97%	20%	20%
27	Routes/ Active Day	1,6	1,2	1,5	1,5	1,6	1,6	1,7	1,8	1,7	1,7	1,6	1,6	1,5	1,5	1,7	(0,2)	-12%
28	Average Bottles per Route (Standard Bottles)	115	132	110	111	111	109	115	120	118	113	111	112	110	110	104	6	5%
29	Usage of Fleet (Capacity for Active Days/ Capacity for Working Days)	82%	73%	79%	87%	81%	84%	91%	91%	92%	92%	93%	85%	92%	92%	86%	6%	7%
30	Bottles per Drop (Standard Bottles)	6,5	6,1	6,2	6,4	6,4	6,5	6,7	6,6	6,9	6,7	6,5	6,6	6,4	6,4	5,9	0,5	8%
31	Km's between two drops ***(see breakdown)	5,2	5,3	5,3	5,3	5,4	5,6	5,5	5,2	5,6	5,4	5,4	5,5	5,5	5,5	5,3	0,1	3%
32	Drops / Active Day	27,9	25,4	26,2	26,4	28,0	26,2	29,6	32,0	29,0	29,1	27,2	26,3	25,1	25,1	29,3	(4,1)	-14%
33	Bottles / Active Day (Standard Bottles)	180	156	163	170	180	170	197	213	199	194	177	174	160	160	172	(13)	-7%
34	Kilometres/ Vehicle/ Active Day	146	135	139	140	152	147	163	166	162	156	147	145	137	137	155	(18)	-12%
35	Failed Drops /Car /5Active Days	9,1	8,5	15,9	7,8	8,7	9,4	9,8	12,2	10,6	11,3	11,4	12,1	11,8	11,8	-	11,8	100%
36	Km's / Bottle (Standard Bottle)	0,81	0,87	0,85	0,83	0,84	0,87	0,83	0,78	0,81	0,80	0,83	0,83	0,86	0,86	0,90	(0,04)	-5%
37	Fuel (Litres) / bottle (Standard Bottle)	0,10	0,11	0,11	0,10	0,10	0,10	0,10	0,10	0,09	0,09	0,10	0,10	0,11	0,11	0,11	(0,00)	-2%
38	Fuel (Euro) / bottle (Standard Bottle)	0,11	0,12	0,12	0,11	0,11	0,11	0,10	0,10	0,10	0,11	0,12	0,12	0,12	0,12	0,13	(0,01)	-7%
39	Average Fuel Price (Euro/Litre excl. VAT deductible)	1,11	1,10	1,09	1,12	1,14	1,10	1,07	1,06	1,10	1,14	1,19	1,17	1,13	1,13	1,19	(0,06)	-5%
41	*** Km's between two drops // breakdown by branches																	
42	Belgrade	4,3	4,4	4,3	4,3	4,4	4,5	4,4	4,1	4,4	4,3	4,3	4,4	4,2	4,2	4,3	(0,1)	-2%
43	Novi Sad	6,2	6,3	7,0	6,9	6,1	7,1	7,6	7,1	6,7	6,6	6,5	6,3	6,3	6,3	6,2	0,1	1%
44	Cacak	5,3	5,8	6,5	6,1	5,7	5,6	6,1	5,3	5,2	6,0	6,4	6,7	7,8	7,8	5,3	2,6	48%
45	Nis	9,7	9,4	8,2	9,6	9,9	11,6	10,5	9,7	12,7	9,9	10,0	11,0	11,9	11,9	9,7	2,2	23%
46	Kragujevac	6,5	6,6	7,0	5,8	6,4	5,9	6,1	6,3	6,7	5,8	6,6	6,9	6,4	6,4	6,5	(0,1)	-1%
47	Subotica	8,7	7,8	7,0	7,6	9,6	8,1	8,2	9,1	8,7	9,2	9,3	9,5	9,3	9,3	8,7	0,7	8%
48	** Note: Standard Bottles = [Water Delivered with LoF Fleet + Boxes Delivered + (Coolers Installed + Coolers Returned + Coolers Sanitizations + Coolers Serviced) x 3]																	

Figure 12: Summary distribution sheet

– Summary KPI sheet - which presents crucial KPI for understanding success of distribution. Observed report is one of the most important reports for distribution management. If we observe indicator km/bottle, we can see that this is one of the most important indicators for distribution management in the company. It shows how many kilometers are passed for one bottle delivery. As distribution of water is one of the most difficult types of distribution, it can be said that the expansion of the market for distribution is based on this indicator.

La Fantana doo, Serbia

Delivery Activity; Summary Actuals vs Targets dec-12

	KPI Logistic	dec.12 Actual	dec.12 Budget	dec.12 Variance abs.	dec.12 Variance %	dec.11 Actual	dec.11 Variance abs.	dec.11 Variance %	YTD dec-12 Actual	YTD dec-12 Budget	YTD dec-12 Variance abs.	YTD dec-12 Variance %	YTD dec-11 Actual	YTD dec-11 Variance abs.	YTD dec-11 Variance %
8	No. of Vehicles	28	27	1	4%	27	1	4%	28	27	1	3%	26	1	5%
10	Water Delivered by LAF Fleet [19l + 11l]	77.621	79.027	(1.406)	-2%	63.459	14.162	22%	1.054.654	926.378	128.276	14%	826.738	227.916	28%
20	Failed Drops	1.243	-	1.243	100%	834	409	49%	13.476	-	13.476	100%	10.227	3.249	32%
26	AVG LD per Route (Standard Bottles)	117%	97%	20%	20%	102%	15%	15%	118%	93%	25%	27%	105%	13%	13%
27	Routes/ Active Day	1,5	1,7	(0,2)	-12%	1,5	(0,0)	-3%	1,6	1,7	(0,1)	-4%	1,6	0,0	1%
28	Average Bottles per Route (Standard Bottles)	110	104	6	5%	95	15	16%	114	103	11	10%	101	13	12%
31	Km's between two drops ***(see breakdown)	5,5	5,3	0,1	3%	5,2	0,3	5%	5,4	5,2	0,2	4%	5,2	0,2	4%
32	Drops / Active Day	25,1	29,3	(4,1)	-14%	27,1	(2,0)	-7%	27,6	28,4	(0,8)	-3%	27,9	(0,3)	-1%
33	Bottles / Active Day (Standard Bottles)	160	172	(13)	-7%	142	18	13%	180	170	10	6%	158	22	14%
36	Km's / Bottle (Standard Bottle)	0,86	0,90	(0,04)	-5%	0,99	(0,14)	-14%	0,83	0,87	(0,04)	-4%	0,92	(0,09)	-10%
37	Fuel (Litres) / bottle (Standard Bottle)	0,11	0,11	(0,00)	-2%	0,13	(0,02)	-16%	0,10	0,11	(0,01)	-6%	0,11	(0,01)	-9%

Figure 13: Summary KPI sheet

– Diagram distribution sheet - refers to the graphical presentation of the most important KPIs in water distribution.

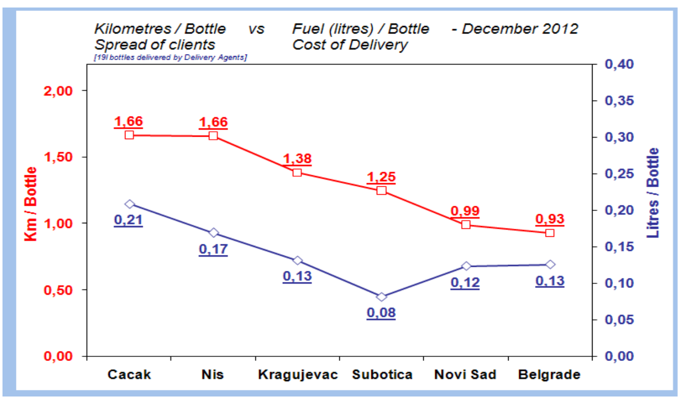

Figure 14: Diagram distribution sheet

The application is automated by procedures (macros), created in *Visual Basic for Application*, designed specifically to work in MS Office. Macros, made in this application, enable automation of data entry, linking tables (data) and formation of output reports. In order to prove superiority of spreadsheets for modelling, conclusion can be: this case is more convenient than standard software packages, at least in terms of development speed and user training for observed software. Finally, we can say that spreadsheets can be necessary LSS tool for simple, quick and easy processing and data analysis or in activities of planning, modelling and control of inventories.

5 Conclusion

LSS has developed and broadened its range of appeal both globally and by industry sector. Its ability to reduce costs, improve quality and reduce customer delivery time has sealed its place as a leading methodology for improvement of our businesses in the past, present and hopefully the future.

Also, according to the competition analysis, company is the only one in this kind of industry that has the organization for distribution operation described in this paper, and that has shortest time to customer in delivery

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