

*Proceedings of the 13th International Conference "Reliability and Statistics in Transportation and Communication" (RelStat'13), 16–19 October 2013, Riga, Latvia, p. 352–362. ISBN 978-9984-818-58-0
Transport and Telecommunication Institute, Lomonosova 1, LV-1019, Riga, Latvia*

COORDINATED MANAGEMENT OF BORDER CROSSING VIA JOINT INFORMATION SYSTEMS

Irina Kazina

*Transport and Telecommunication Institute
Lomonosova str. 1, Riga, LV-1019, Latvia
Ph.: (+371)-29555740. E-mail: irinakazina@yahoo.com*

The paper deals with the managerial aspects of new information technologies introduction, identifies areas in which it is possible to reduce transaction costs, in order to improve performance. The aim of this work is to develop procedures for providing better performance of different phases in the system "Single Window", which is also the object of study. Having analysed the process control methodology the mechanisms that help to resolve frame conflicts have been identified and developed. On the basis on these results we can conclude that the developed procedures to ensure enhanced efficiency in a phased commissioning of the system "Single Window" allows one to reduce transaction costs, increase efficiency and improve the quality of information and information field, and that diminishes the conflict within the framework. This is an important point to be considered for its application in the sphere of logistics and customs.

Keywords: frameworks, logistical information, framework conflicts, single window, transaction costs, valuation

1. Introduction

Deformation of concepts about the rights and duties of participants of contract financial relations and global economic relations leads to occurrence of frame conflicts. It is clearly seen, that the weak point of all contracts is that the Contractors put themselves into narrow frames in the international laws. The problem is that an output of the contract environment which is under the control of the state and politicians is different from that formed by subsystems. Because of this there are differences in treating rules and instructions that create the risk of conflicts occurrence. The contract environment has been transformed to an original web in the form of the isolated lines and levels. Therefore there is the question of connecting this all into a single entity in a single window. The aim of our research is the development of a procedure to ensure the increase in efficiency of the system "Single window" phased entry. This important point is considered for its application in the logistic and customs sphere.

2. Single Window System Development

The "Single Window" problem has become rather popular in recent years, and undeniable success has been achieved in this sphere. However, till now there is an electronic government only in a few countries, for example, in some Scandinavian countries where a person can solve a number of questions connected with management, without leaving the house. At present, in some countries it is necessary to go to the service centre of a single window and to receive service there. In this area, undoubtedly, there is space for further progress.

The software plays a major part in realization of methodology of efficiency management within the limits of this process. The software in the field of the analysis on the basis of information resources, for example SAS and SAP, is represented by powerful tools and mechanisms of management [1].

There are important structures, which are necessary for system development implementing SAS and SAP technologies:

- soft elements: management style, employee structure, organizational structure, skills;
- hard elements: management system, structure, processes.

Despite differences of informational space fulfilment of given system, principles of investigation are applicable on all stages. As a main factor characterizing space fulfilment acts an attitude to managing subject. This attitude determines historical stage of science development.

By developing the system for functioning in "Single window" in real time conditions negative consequences may appear if ignoring time restrictions. These possible consequences must be taken into account. If these consequences are disastrous, such as for flight system control or nuclear power plant

control, the real time operational system on base of which control over object is built, is called hard system.

But there are some objective factors which influence efficiency of transition to new information systems. Various treatments are available, and, as a result, conflicts may arise. Therefore, we shall speak about the efforts to be made to solve them on different levels: the governmental, state, and on regional level. For maintenance of dynamics necessary for transition to higher level, it is required to do much work not only from the technological point of view, but also from the administrative one. First off, it concerns administrative rules which need to be simplified, especially regarding interdepartmental and interstate interoperability. As a result, this will make the work of several departments or several official bodies simpler. Absence of mechanisms of effective and productive interoperability between them both on administrative, and on the technological level, impedes adequate decisions realization of a uniform window system of many state services. The effect of efficiency management is defined by a level of automation which is, in its turn, characterized by a degree of the financial information processing [2].

3. Application of Theory of Transactional Costs for Harmonization of Performance when Introducing Multistage System

Theory of transactional costs considers organizational problems as problems having specific basis. If there is a managerial task, its execution may be organized by several means. Each of options assumes accordance with formal and private contract with specific mechanisms of its support. What are the costs in these conditions?

Transactional costs such as ex ante and ex post must be distinguished. First type of costs includes contract preparation costs, negotiations costs and ensuring of the implementation of these contracts costs. This means that only necessity of solutions for appearing problems is discussed. Guaranties of contract implementation may take different forms. Moreover, ex ante guaranties may be developed for ensuring reliable obstacles and integrity of transactions.

The main factor is interrelation of contact costs. Thus, these costs must be analysed simultaneously – not consequently.

Financial data are most used approach to performance evaluation. Mixed approaches considering both financial and non-financial data are gaining popularity. To achieve given level not only data must be taken into account. To attain new potential level introduction of new informational technologies must be taken into account. Also, possible contract conflicts must be taken into account. To mitigate the risk of possible conflict intercompany contractual relationship were compared, Table 1.

Table 1. Intercompany contractual relationship

Characteristics of intercompany contractual relations	Who? (participants)	Why? (reasons of appearance)	How? (mechanisms)	When? (conditions)
Traditional type (industrial period)	Providers and distributors in several fields (back and forth, crossing company borders)	Reduction of transactional costs	Standard contracts, based on strictly defined rights and performance indexes	Depending on operational conditions
Emerging type (expert period)	Companies with important knowledge, experts	1. Reduction of transactional costs 2. Creation of a broad spectra of economic profits and guaranteed access to operational information	Creation of a contractual relationship which allow to balance different types of knowledge (often without preliminary specifications and performance data)	1. Dynamic shifts towards operational knowledge 2. Overcoming of traditional company borders

4. Harmonization of Performance by Introducing “Single Window” System

Besides administrative barriers and rules, there is also a technological factor. It concerns the creation of the uniform information environment of the state structures for interoperability with citizens, business and the state. A good example from world practice is the scale project which has been carried out in Great Britain, since the end of 90th years – a uniform portal of granting of information services. Its realization has taken more than 5 years, but the first results were received during the first year. Evolutionary progress, which does not stop up to this day, and it will go on in the future.

To lay the foundation in the form of a uniform infrastructure and to resolve key problems of interstate interoperability, to define the list of services and rules of granting of these services in an electronic type can be realized within some years. From the point of view of methodology of realization of this project, English colleagues have chosen a proper sequence of actions: first they constructed a uniform infrastructure within the limits of which all departments could exchange data in an electronic type and have uniform service of authorization, after that they created the interface in the form of a uniform portal which was divided not into departments, and in services. Thus, it is not necessary to give a thought, what agency or the ministry renders this or that service.

5. Introduction of Multi-Stage System “Single Window”

In Latvia the process of a uniform infrastructure creation of the uniform window type proceeds. It is being developed most actively in Riga and nearby cities where it is easier to create a uniform system for the governmental structures and to create it owing to uniform frameworks in a uniform window. On the general European level high progress has not been achieved in this issue yet. What such complexities at the state level are connected with? One of the factors is a factor of scale. Within the limits of one region it is much easier to solve questions of overcoming frame barriers and creation of uniform administrative rules. Availability of good will of the politicians in using such projects is especially important.

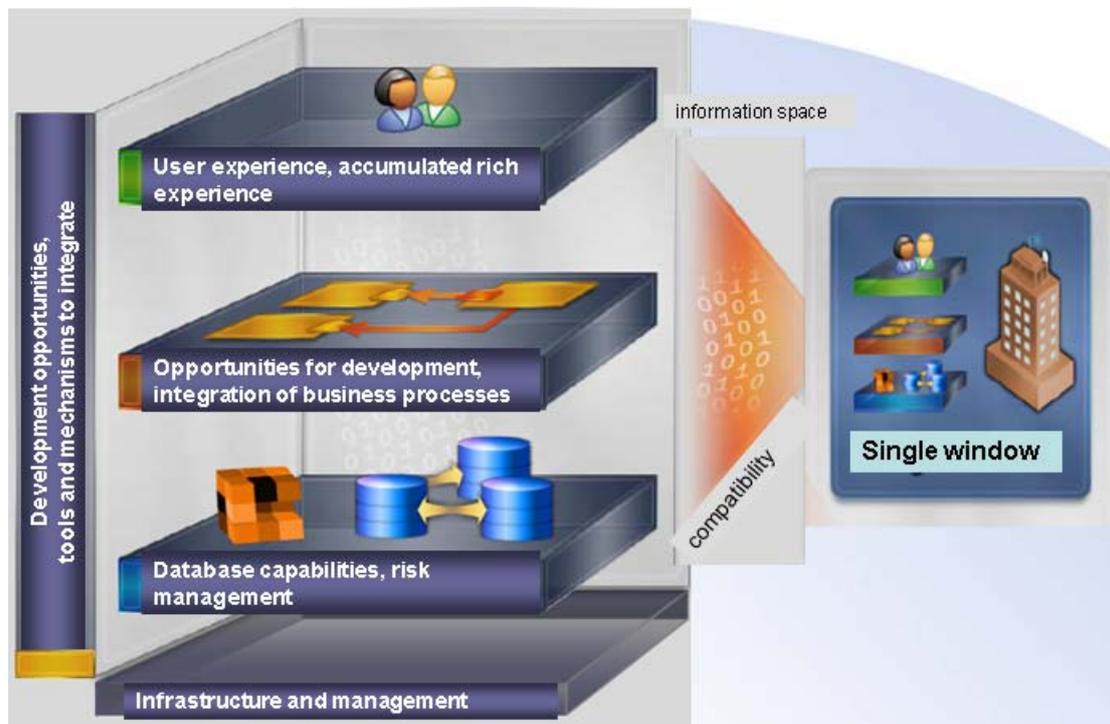


Figure 1. Single window system integration

For realization of productive transition it is necessary to shape an electronic portal in the form of a single window system, using the script uniform framework and further to develop use of IT-tools and technologies for productive work. Thus, use of mechanisms of frame conflicts solution will provide integrity to the system, and will allow to expand frame borders owing to what there will be an accumulation of improvements potential for duly transition of the system onto a new level of development. Besides, elimination of conflicts will allow simplifying procedures of commerce, to lower transaction costs, and to raise productivity, providing direct feedback to all participants of the process [3].

Creation of a single window system is a rather expensive procedure. How can we measure productivity of its creation? What mechanism of frame conflicts solution will be used while creating the given system? When we speak about productivity, we mean, specific figures, in particular, commercial profits.

The governments structures are not engaged in commercial activity, therefore to estimate directly productivity difficultly enough. In this case it is possible to assume what to estimate productivity, on the one hand, it is necessary by results of work of all system which is expressed in specific factors and figures, for example, how many inquiries are processed in a month, how many inquiries are processed with the certain result which satisfies and does not cause the conflict. Undoubtedly, these parameters can raise transition to new information technologies many times over. Also it is necessary to remember, that introduction of those or other mechanisms, let even expensive, are expenses of the state budget, and it is necessary to estimate influence of these expenses in a complex. Having introduced this or that information system, we receive decrease in expenses in adjacent areas. It is possible to estimate productivity of introduction after use of those or other technologies.

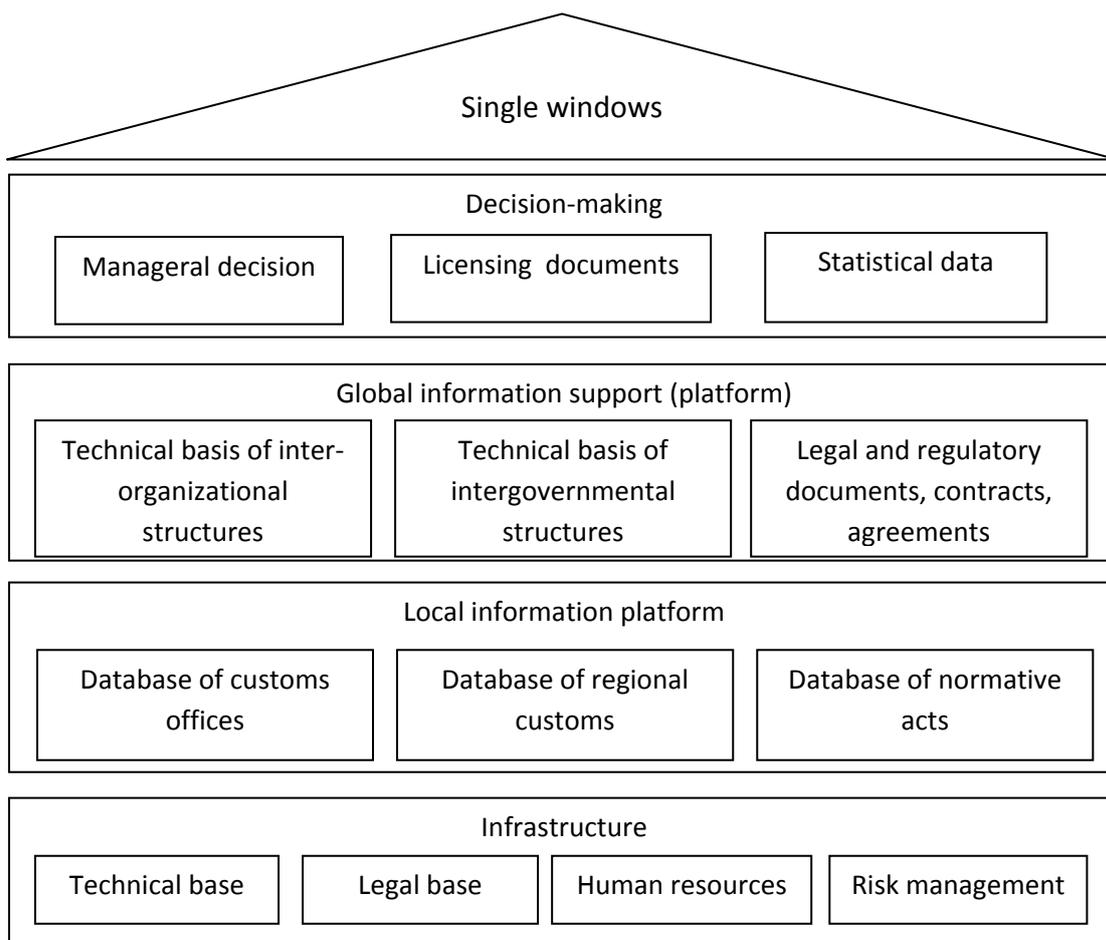


Figure 2. Levels of support for a single window in the customs sphere at border crossing

For example, if in the state structure various modules which among themselves are not connected introduction let even expensive uniform information system as a result will lower transaction costs are used many. Owing to it frame and contract conflicts will be solved, and there will be an increase of productivity. Besides it is necessary to remember social and political effect which can follow from introduction of system of a uniform window, owing to transition to new information technologies. First, this is improvement of quality of life. Secondly, if earlier on processing of the important trading document or the customs declaration spent 2-4 working days, and will spend now 10-20 minutes from the point of view of productivity the effect is visible clearly. Here the effect of savings of an expenditure of budgetary funds is visible. Thirdly, it is necessary to remember about the sociopolitical effect received because it became easier and more convenient to cooperate with the state bodies. Therefore also we speak, that we shall not become isolated only on monetary parameters, and we shall consider social and political factors.

6. Research Methodology

There was worked out a set of factors that affect the efficiency of work in logistics. Were identified the degree of influence of these factors on logistics activities. Mathematically measure the proximity of two of rank criteria for the growth of planned and actual allows the Spearman rank correlation coefficients (deviation) and Kendall (from inversions). Using these coefficients can be estimated proximity of one of ranking one row to another, in the range from +1 to -1, adopted as the standard [4]. As well was determined degree of pressure and defined the importance factor. The data displayed in the Table 2.

Table 2. Set of factors on logistics activities

Nr	Factors	Importance (1 - 5)	Degree of pressure (1 / 2 / 3)	Share	Estimate of the coefficient	Estimation of influence to the activity
1	Revenue per new customer	4	1	0.0870	0.2857	0.2857
2	Volume of purchases	2	1	0.0435	0.1429	0.1429
3	System integration	5	3	0.1087	0.3571	1.0714
4	Employee skills	3	2	0,0652	0,2143	0,4286
5	Processing time	4	3	0.0870	0.2857	0.8571
6	Negotiation	3	2	0.0652	0.2143	0.4286
7	Processing of incoming documents from clients	5	3	0.1087	0.3571	1.0714
8	Updated nomenclature standards and new requirements	4	2	0.0870	0.2857	0.5714
9	Issuing specifications Euro Union Regulas	3	2	0.0652	0.2143	0.4286
10	Content the legal services	2	1	0.0435	0.1429	0.1429
11	Restoration of violated rights	3	1	0.0652	0.2143	0.2143
12	Revenue from additional services for customs clearance	3	2	0.0652	0.2143	0.4286
13	Control of the compliance contracts	3	1	0.0652	0.2143	0.2143
14	Customer survey	2	1	0.0435	0.1429	0.1429
15	Sum	46		1	3.2857	6.4
16	Average	3.2857				

To determine the impact of the framework of limitations and critical metrics you can use the isolated influence factors on the changes effective. Factor analysis allows you to streamline indicators, taking into account the priority of measures to increase the efficiency of enterprises.

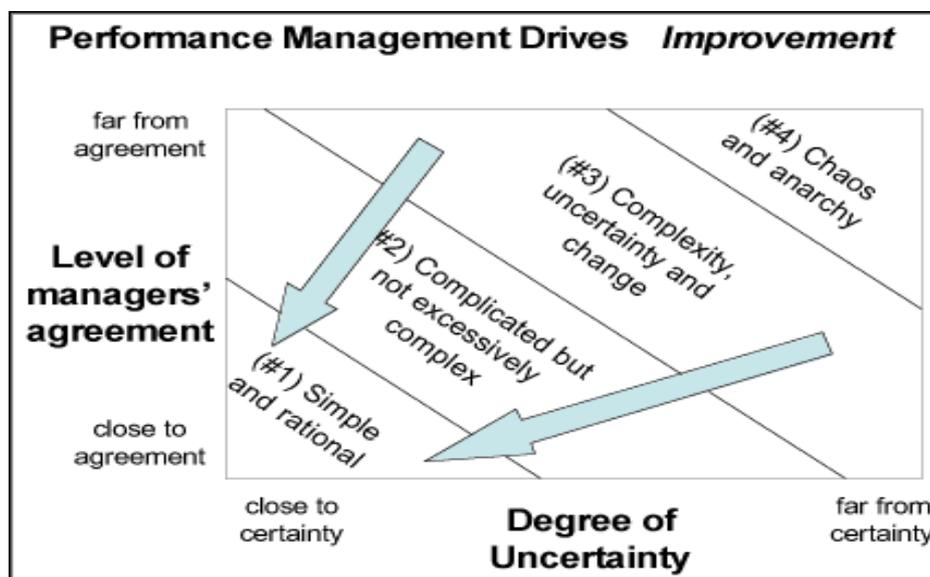


Figure 3. Levels of support for performance management

Virtual systems that include control elements and result output elements are created. That is why report systems are partly associated with strategic planning instruments, managerial reports and prediction, and also are able to service millions of records about products and clients.

All mentioned factors are important. More in-depth forces were considered in coordinated management performance control. Here are some of them:

- ✓ because of constant changes, employees have to make quick decisions in real time, using prognosis and scenery planning. Thus, they must be well familiarized with company strategy;
- ✓ growth of discontent towards managerial registry data which have incomplete or ill-timed information;
- ✓ incomplete system of customer value management. Preservation of existing client base is one of top-manager and general director duties;
- ✓ errors in supply managing systems. Lack of trust between suppliers and buyers, who must lead mutually beneficial cooperation;
- ✓ unrealised expectations after introducing different scale managerial systems.

Collection of information reflecting situation of company in single database and its updating in real time replaces scattered and unlinked information sources.

Performance measurement methodology provides that the dynamics and factors supported either the regulatory procedure established by level, i.e. on the pre-established limits and restrictions, or below it, so the generic impact assessment is based on a comparison with the actual state of the past, and with an ideal framework installed. It turns out that the dynamics of the traversed path, and not the one that's left to get to the ideal. In this regard, the influence is measured by the extent to which they have reduced the impact assessment compared to the ideal. In other words, not the actual unfolding factors impact assessment and the difference between the maximum and actual grades as follows:

$$\Delta P(\Pi_i) = P_s - P(\Pi_i), \tag{1}$$

$\Delta P(\Pi_i)$ – reduction of impact evaluations under the influence of the i -th level;

$P_s = 1$ – given the impact assessment;

Π_i – indicator set in the dynamic measurement for the i -th place (1st grade);

$P(\Pi_i)$ – impact assessment calculated only on the basis of the disturbances caused by the dynamics of the 1st indicator.

For greater visibility and ease of use is the proportion of each indicator to a general decline in productivity:

$$\delta_i = \frac{\Delta P(\Pi_i)}{\sum_{i=1}^n \Delta P(\Pi_i)} \cdot 100\% \quad (2)$$

For a graphical representation of the relative importance of the factors that caused the deviation, you must use the chart. In this case, this chart is based on the deviations of each annual performance indicator, calculated according to the formulas (1), (2).

7. Research Results

The system of endeavouring towards ideal - is a purposeful system, which follows new aim or ideal as soon it reaches any of its current goals and ideals, thus, improving itself constantly. Ideal – is a task, which cannot be solved in certain time limits, but it can be approached constantly; and every iteration can be considered as experience with methodology.

Productivity characterizes the level of achievement of given aims, as conditions for achieving necessary results. According to this when determining performance aspect of planning of all possible results is not always taken into account. Essence of given aspect is that in modern market economics conditions planning wide range if results can be hard to attain. Author proposes to use broader methodological treatment of performance as a measure of result achievement, related to given and assumed aims, which satisfy certain needs of parts involved.

According to this, all key data transform from absolute values to relative values – to chain growth rate of given indicators. This is the essence of model dynamic component, i.e. by changing performance emphasis is put on changes in values, not on absolute values. Also, it allows performing curtailment of different data. Example of ranging of factual performance data by growth rate is shown in Table 3.

Table 3. Ranging of factual performance data by growth rate

Performance index	Reference	2010		2011		2012	
		Growth rate	Rang	Growth rate	Rang	Growth rate	Rang
Revenue, thousand LVL	1	3.671		0.974	0	0.715	6
Production funds and savings, thousand LVL	2	2.298	3	1.052	6	1.016	11
Equity, thousand LVL	3	1.524	8	1.074	4	1.102	8
Salary fund, thousand LVL	4	1.936	5	0.925	1	1.395	1
Total costs on new informational systems, thousand LVL	5	1.401	9	1.069	5	1.106	7
Employee satisfaction index, point	6	1.012	3	1.134	3	1.09	9
Client loyalty index, point (0-100)	7	1.021	2	1.047	7	0.968	2
Short-term liabilities, thousand LVL	8	1.719	6	0.828	3	1.237	3
Certified (professional) employee quantity	9	2.055	4	1	9	1.333	2
Staff quantity	10	1.031	1	1.042	8	0.889	5
Administrative costs, thousand LVL	11	1.54	7	0.718	6	1.164	6
Leave and absence, person / day	12	0.843	6	0.72	5	0.889	5
Dismissed personnel, person	13	0.999	4	0.888	2	0.954	3
Error specific weight, %	14	0.951	5	0.805	4	1.212	4
Costs due to production errors, LVL	15	0.99	4	0.888	2	0.954	3
Charity, thousand LVL	16	2.384	2	1.798	1	1.046	0
Rank correlation coefficient for the deviations , Коткл		0.415		0.365		0.060	
Rank correlation coefficient for inversions , Кинв		0.333		0.267		0.017	
Effectiveness, P		0.472		0.432		0.351	

Degree of congruence of factual range row with planned calculated using formula

$$P = \frac{(1 + K_{\text{откл}}) \times (1 + K_{\text{инн}})}{4}, \quad (3)$$

shows total effectiveness. In fact, normative range row, i.e. etalon is a disclosure of politics and plans in transfer on new informational systems period by means of objective criteria, based on which effectiveness of system is evaluated.

After gaining final mark on effectiveness, its meaning must be explained. If coefficient of effectiveness changes from 0 to 1, explanation is as follows. For example, meaning of P-value = 0,472 could be explained as the efficiency of functioning of 47.2%. But, in this case, values of effectiveness are calculated on base of correlation coefficients, which values can be found in range from -1 to +1 – characterize negative and positive effectiveness, which values are separated by zero effectiveness.

To explain complete explanation of the volume content of the data with effectiveness coefficient positive compound of total effectiveness must be emphasized on interval [0.25; 1] by using following formula:

$$P^* = \frac{P_i - P_{\min}}{P_{\max} - P_{\min}} \cdot 100, \quad (4)$$

where P^* — secondary nomination of P_i ;

P_i — value of effectiveness coefficient, that belongs to secondary nomination;

P_{\max} and P_{\min} — maximal and minimal values of effectiveness coefficient on normalized interval, respectively [5].

Thus, positive effectiveness will take value 29.5%, not 47.2, and, respectively $0.432 = 0.243$ and $0.351 = 0.210$. It is obvious now that effectiveness of functioning system is only 29.5%, 24.3% and 21% in 2010, 2011 and 2012 years, respectively.

Obtained data of effectiveness are given as graph (Chart 1).

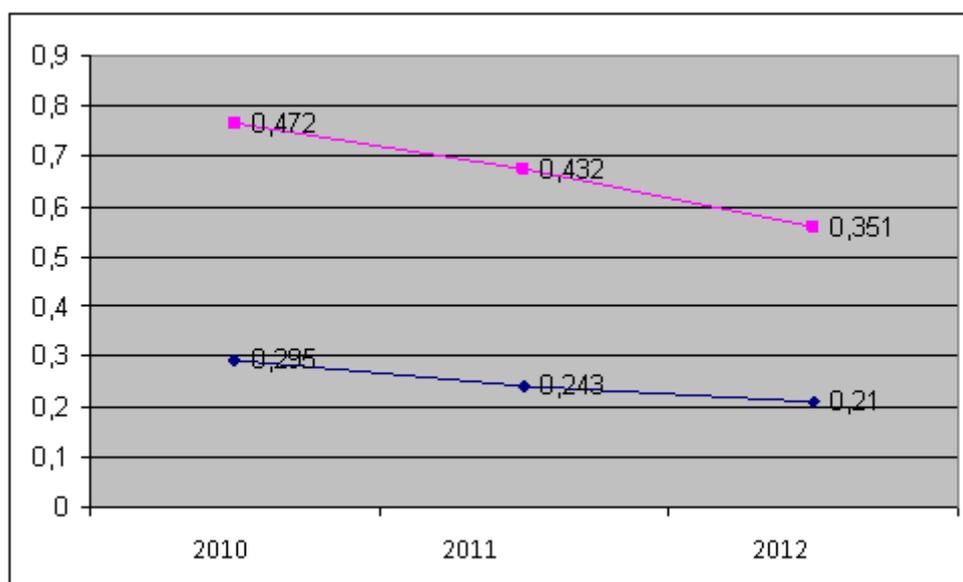


Chart 1. Data of effectiveness

For effective analysis is important not only to show deviation from the result, but also identify the causes that led to this problem. To visualize the influence factors and their detail, we used the Chart 2.

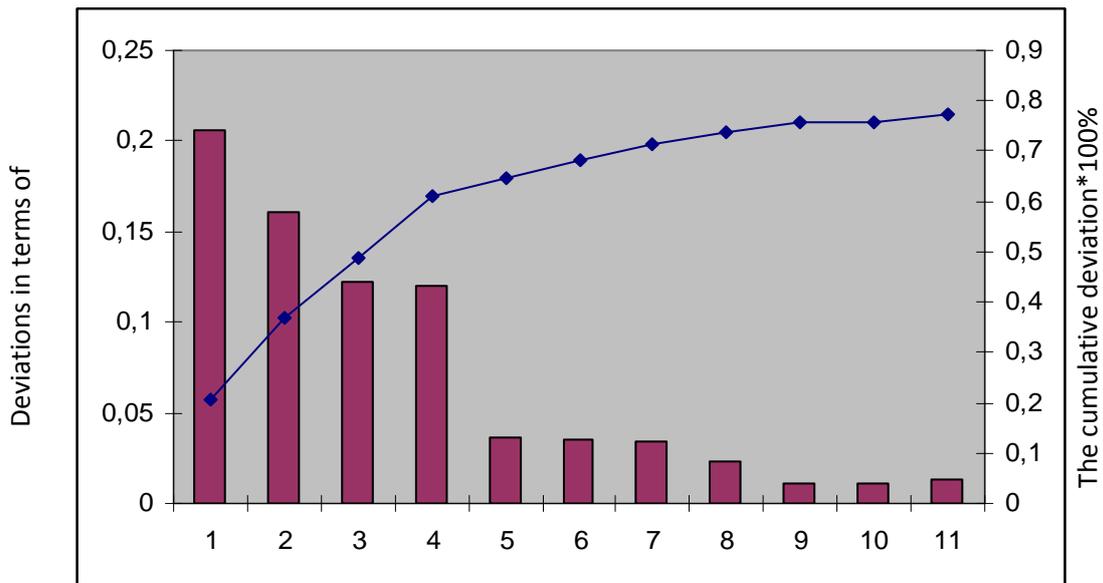


Chart 2. Performance indicators

The proposed model has identified critical areas in logistics and customs sphere, have a direct impact on performance. The model describes the level of achievement of the objectives as a condition for achieving the desired results in this area. This suggests that this model has all the prerequisites for the use on an ongoing basis as part of the management methodology to evaluate its effectiveness.

After numerous calculations was compiled matrix of performance management in the logistics sector.

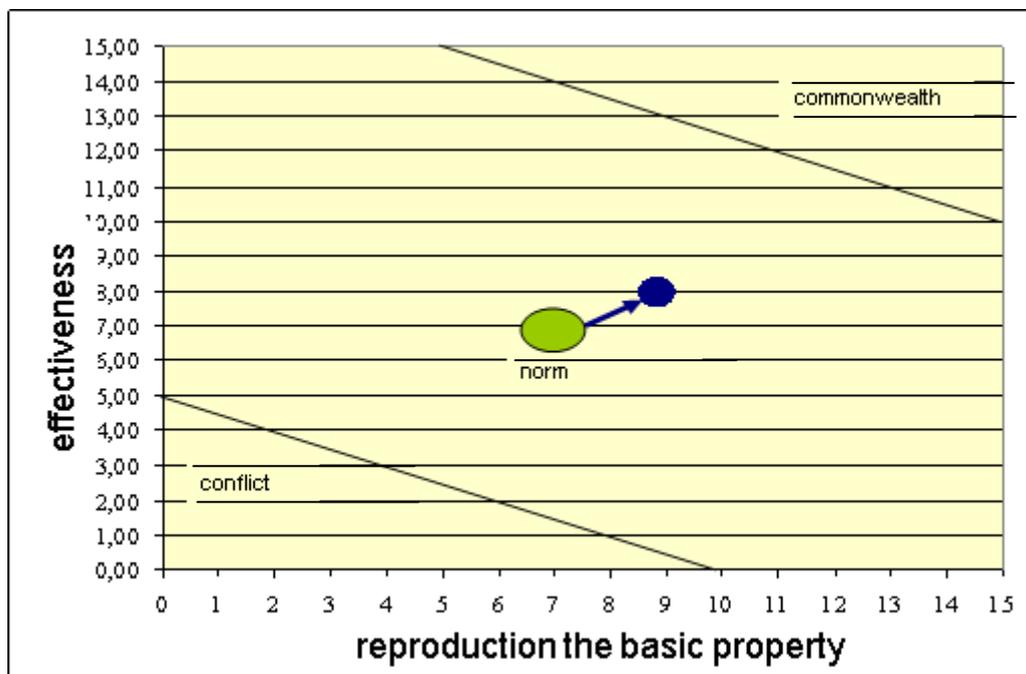


Figure 4. Matrix of performance management. Developed by the author

In removing the regulatory and contractual barriers reduced presence Human Factors and increases effectiveness.

One of basic internal factor of uncertainty for making administrative decisions in the field of framework of logistics is incomplete information on a current condition and on development prospects.

The solution of these problems demands formation of new approaches to management and use of tools which would help to modify organizational and informational structures. Single windows can be used as such concept.

The control system a single window helps not only to trace parameters, but also to change them and as helps to improve quality of the information. In fact objective of system – influence, and its direct improvement is not simple. Information technology is not just can reduce transaction costs; they can selectively affect their types. Therefore, it is a powerful catalyst for change in the forms of business organization [7,8].

That process of regulation of frame conflicts in logistical and customs area was not simply the term, and was the tool of actual process, it is necessary to learn for them to operate. Factors and mechanisms of creation of influence and pressure upon cost have been revealed, the practicable plan of management is developed, the factors influencing decrease transaction of costs are certain.

At all administrative levels it is necessary to be able to improve the entered parameters. The trajectory of movement to commonwealth without conflicts is speaks about correctness of decision-making and use of mechanisms of regulation at border crossing.

8. Conclusions

By investigating financial data business requirements that come from participants were taken into account. Given requirements set a sum of restrictions which can create frame conflicts. These frame conflicts are conditions of different type, which are applied to performance. For effective analysis it is important not only to analyse deviation from planned result, but also find reasons which lead to this problem.

Proposed model of “Single window” system allowed identifying critical areas in company performance which influence directly performance and effectiveness, which characterize level of achievement of aims, put conditions for attainment of necessary results.

This allows us to state that “Single window” system has all requirements for using it on a constant-basis in methodology for managerial evaluation of its performance.

Acknowledgements

„The article is written with the financial assistance of European Social Fund. Project Nr.2009/0159/1DP/1.1.2.1.2/09/ IPIA/VIAA/006. The Support in Realization of the Doctoral Programme “Telematics and Logistics” of the Transport and Telecommunication Institute”

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