Arkadiusz J. Derkacz

University of Social Sciences, Warsaw, Poland

aderkacz@san.edu.pl

ORCID ID: 0000-0003-1363-9551

General Concept of Neo-institutional Measurements of Business Processes

ABSTRACT

Objective: General concept of neo-institutional measurements of business processes is an approach developed by the author, which fits in with the practical search for appropriate methods and tools that would optimize effectiveness and efficiency of business process management. The objective of the following discussion is to prove the thesis that effectiveness of business processes that take place within a company depends on the quality of support of such processes that is included in the set of supporting factors, as well as on neo-institutional determinants of business processes.

Methodology: In the article, the author used primarily long-term observations of the functioning of enterprises, critical literature analysis and thought experiment.

Findings: The concept was based on long-term of author's experience in business management and it was essentially grounded in the model of the new institutional economics. On the basis of critical analysis of the literature and with the use of empirical research results from different industries and countries, it defines four hypotheses, which make ground for the concept in question. These are: hypothesis of rational change of condition, hypothesis of expected determinants of business processes, hypothesis of rational determinants of business processes and intensity of impact hypothesis.

Value Added: The concept presents a new holistic and behavioral method for business processes analysis.

Recommendations: The general concept of neo-institutional measurements of business processes may become a new economic approach concerning the issues of effectiveness and efficiency of business processes, but also it may become the ground for creation of a new catalogue of recommendations for managers, who, on a daily basis, make difficult managerial decisions.

Key words: internal organization, organizational behavior, transactions, transaction costs, firms

JEL codes: D230 Organizational Behavior; Transaction Costs; Property Rights; L220 Firm Organization and Market Structure; M210 Business Economics

Introduction

There are as many factors that determine high level of efficiency of business processes' implementation, as those that hinder and limit their (processes) efficient proceeding. Therefore, it is the role of managers to manage organisations in a way that would reinforce the former and diminish or eliminate the latter. It does not require further reasoning to state that modern organisations function in a very dynamic environment, which undergoes constant fluctuations, and factors that affect the way business processes are implemented create more and more extensive and dynamic catalogues of institutions and socio-economic determinants. Therefore, in this context, business management seems to be ineffective from the perspective of classic production factors, to say the least. Search for an accurate methodology that in terms of effectiveness and efficiency would allow optimal management of business

processes, is still a relevant topic, both among economists and managers. The author's work describes that search – and it is worth highlighting – it is from the point of view of managers who do academic research as well as those who actively perform business management.

The general concept of neo-institutional measurements of business processes presented in this work is an approach, which has been developed on the basis of many years of the author's experience in business management inside and outside Poland, but also on the basis of his academic research and the critical analysis of the extensive literature on the subject, in particular on the new institutional economics. It is difficult not to notice the very apparent neo-institutional approach of the author, which results in a very holistic and multi-faceted approach to the topic of management. Therefore, institutions presented as determinants, which on the one hand, support and, on the other limit actions of people who make contacts as part of business activities, are significant elements of the presented concept. This holistic approach to management also manifests itself in a comprehensive perception of institutions themselves. These include not only the classic production factors, but also the all-encompassing stream of socio-economic determinants. Therefore, contemporary managers are not only economists, but also a bit of psychologists, sociologists, culture experts, negotiators, strategists, humanists or even philosophers.

The general concept of neo-institutional measurements of business processes was developed on the basis of the contemporary issues of the new institutional economics and managerial experiences of the author. Its essence and purpose has been captured in the main thesis, which comes down to the following statement. Effectiveness of business processes that take place within companies depends on the quality of support for such processes included in a set of supporting factors, as well as on neo-institutional determinants of business processes. Neo-institutional approach to business process management creates opportunity to increase effectiveness of business processes. Measurements of such processes become

safeguards which control the quality of management of those processes. The hypotheses of the concept presented in this paper have, in a way, become a fundamental justification for the thesis. These are: the hypothesis of rational change of condition, hypothesis of expected determinants of business processes, hypothesis of rational determinants of business processes and the intensity of impact hypothesis. They have been discussed in detail in this article. The concept, although strictly theoretical by its nature, has also found its empirical foundations and explanation. They have been presented in the part of the article devoted to determinants of business processes in managerial practice, which is a presentation of the original empirical research carried out on a group of active and practicing managers from different sectors of the economy.

The general concept of neo-institutional measurements of business processes, as a theoretical construct supported by business practice and empirical research may become a new economic approach concerning the issues of effectiveness and efficiency of business processes, but also - or rather, first and foremost – it may become the ground for creation of a new catalogue of recommendations for managers, who, on a daily basis, make difficult managerial decisions. In this spirit, the discussion that reveals neo-institutional approach to business process management, has been presented below. By discussing the theoretical and empirical foundations of the concept – presenting results of empirical research, and revealing the basic assumptions of the concept – the author presents the most important, elementary hypotheses of the general concept of neo-institutional measurements of business processes. On that basis, conclusions and guidelines for managers have been presented and the most important measurements of business processes have been discussed to close the discussion.

Theoretical and empirical foundations of the concept

The general concept of neo-institutional measurements of business processes has been developed on the basis of many years of managerial experience of the author, the critical analysis of literature devoted, in particular, to the new institutional economics, as well as on the basis of empirical research carried out among managers. The first presentation of the concept took place in 2018 and it was titled "neo-institutional concept of measurements of business processes". Since then, the author has somewhat verified the initial concept, on the basis of extended interviews with managers, which resulted in development of the general concept of neo-institutional measurements of business processes.

The most significant theoretical background of the author's reflections is based on different concepts which fit into the stream of the new institutional economics. The theory of institutions, property rights theory, theory of transactional costs and the theory of contracts were those that were mainly used for the sake of development of this concept. In that field, critical analysis of, among others, the following authors was carried out: E. Brousseau and J. M. Glachant (Brousseau & Glachant, 2008), C. Menard and M. M. Shirley (Ménard & Shirley, 2008), P. Ollila (Ollila, 2009), E. Ostrom (Ostrom, 1990), R. Coase (Coase, 1937), J. Commons (Commons, 1931), G. Hodgson (Hodgson, 2006), S. Kirdina (Kirdina, 2003), P. G. Klein (Klein, 2000), D. C. North (North, 1991), O. E. Williamson (Williamson, 2007) or S. Rudolf (Rudolf, 2009). Of course, only some exemplary references have been listed, which enabled the author to create the theoretical basis for the reflections mentioned below. The way the author perceives and analyses theories that make up the new institutional economics is not without significance for the development of the general concept of neo-institutional measurements of business processes. It was presented in 2017 for the first time in the monograph that described the concept of optimisation of public investments in the context of the chosen

theories of the new institutional economics. The author suggested that the individual theories should be presented from the perspective of the order of the institutional economics, understood as a situation in which the number of different institutions determine sustainable economic development (see Derkacz, 2018b, pp. 37–38).

Along with the new institutional economics, the critical analysis of literature on theory of Petri Nets plays an important role in these reflections. Although operations that take place within enterprises are here seen from the perspective of process management, it was necessary to make such processes more dynamic for the sake of creating the general concept of neo-institutional measurements of business processes. Methodology used in the Petri Nets turned out to be useful here (see Ayar & Marechal, 2013, pp. 3–19). Without getting into details, it is enough to say that the structures from the Petri Nets comprise of two types of nodes, the so called places and transitions, which are interrelated in different ways (see Suraj & Grochowalski, 2017, p. 3). Places of business processes are static elements, which determine different states or conditions for a given operation. They have been reflected in the concept discussed in this article as conditions which support proper processes. On the other hand, transitions reflect active elements of the model and they refer to particular activity within a given business process. They are also often referred to as transitions. It is also valuable that this methodology differentiates between relations which function in the Petri Net model. We deal with relations that follow the place-transition and transition-place pattern (see Kurapati, 1995, pp. 36–40). Such differentiation does not exist in the methodology used for process management. In the BPM models there are only relations which tie the whole process to the antecedents and successors, which are particular operations in that process. Thanks to such differentiation of relations we are able to analyse particular business process from the perspective of input and output conditions. It will be quite significant for reflections on general concept of neo-institutional measurements of business processes, which shall be presented in the

subsequent part of this article. Another element, which makes the applied methodology stand out significantly from the rules of the process model, is the use of the so called tokens. They define particular resources or information, which are required for execution of operations. The tokens may also represent different physical objects or they can represent marking of a state or conditions for particular processes that take place within a company (see Peterson, 1981, pp. 10–18). The use of such a solution for defining the general concept of neo-institutional measurements of business processes enabled their (processes) analysis from a new, much broader, perspective than in the case of the much more commonly known methodology of business process management. However, it does not mean that the latter is not useful when it comes to management of organisations. Application of the Petri Nets theory should rather be treated as a kind of supplementation of the common rules of process management.

In the process of development of the general concept of neo-institutional measurements of business processes, the results of empirical research were as important as the critical analysis of the literature. At this point, it should be mentioned that the significant part of information and knowledge comes directly from the many years of experience of the author himself, as he manages to successfully combine academic work with his own managerial practice. It is impossible to deny that many years of his practice and the fact that he managed enterprises in different industries, and the fact that he had numerous conversations and debates with other managers, influenced the final shape of the general concept of neo-institutional measurements of business processes. Therefore, more extended interviews with people responsible for functioning of enterprises became an important cognitive element. Despite that, in order to develop this concept, a survey was carried out among managers of different rank. 160 managers participated in that survey. A questionnaire was sent via the Internet, and it was anonymous.

The questionnaire was divided into 5 blocks of questions. The first consisted of 6 questions which referred to the respondents themselves and to the

enterprises managed by those respondents. The second block of questions dealt with efficiency measurement of operations carried out within companies. Further part of the questionnaire was about the degree of significance of different measurements carried out by managers for optimisation of managerial decisions. Questions were asked about the significance of measurements of (1) outcomes of business operations, (2) necessary resources and support and (3) the method of execution of business operations. The fourth part of the questionnaire dealt with individual groups of determinants of business processes. They were divided into process factors, factors relating to the whole enterprise, as well as external factors, and the task of the managers was to define their significance for effective running of business activity and optimal management of an enterprise. In the final part of the questionnaire, the managers were presented with 28 different determinants, chosen by the author, and they were asked to assess their impact on efficiency of business processes in an enterprise. The respondents would assess individual determinants on a five-point scale, starting from very positive to end with extremely negative impact on the efficiency level.

Questionnaire questions were also supplemented with extended interviews with more than ten managers. The aim of those interviews was to make some information, collected during the survey, more precise. At this stage, the author wanted to obtain information about particular examples of the performed measurements of efficiency of operations. The managers talked about the used measurements of the sheer outcome of the operations, necessary resources and support, as well as the methods of carrying out of individual process operations. In that respect, also the examples of analyses of changes in the degree of efficiency in different periods of time were revealed in the context of questions concerning impact of different groups of determinants on efficiency of business operations. During the extended interviews the managers gave interesting examples of such determinants. They were grouped into factors (1) concerning individual operations carried out within a company, (2) factors concerning the whole organisation and (3)

external factors. That way, the theoretical material and the empirical data collected through the questionnaire and the extended interviews supplemented the critical analysis of the literature on the subject matter, which together determined development of the general concept of neo-institutional measurements of business processes.

## Determinants of business processes in managerial practice

The concept of neo-institutional measurements of business processes, although by its nature bears the characteristics of a theoretical approach of the author, supported by his own experience as a manager, was also supported by the empirical research. For that purpose, a questionnaire was developed, which was dedicated for managerial staff. It involved 160 managers of different rank, from different enterprises and countries. Most of the participants, 38%, were managers of a medium rank, and 25% were the owners of enterprises.
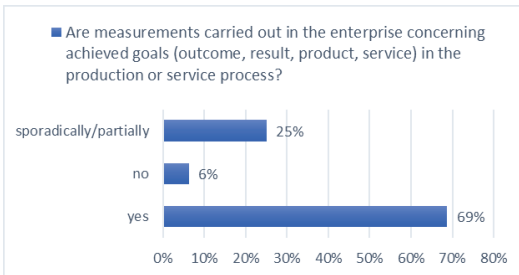
Figure 1. Respondent's job in an enterprise
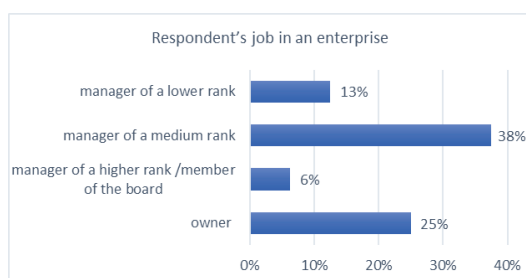
Source: own work.

Figure 2. Use of the rules of process management in the analysed companies
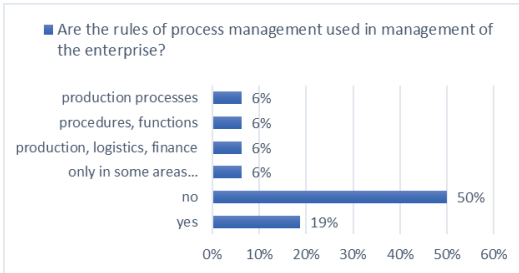
Source: own work.

Figure 3. Analysis of changes in efficiency of business processes
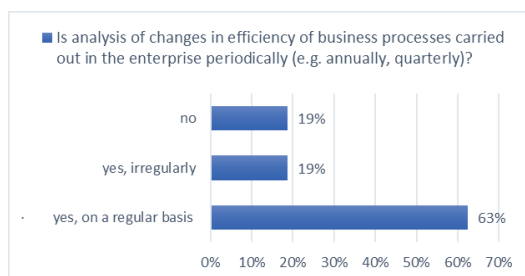

Source: own work.

The rest of the group of the managers who participated in the survey were managers of a lower rank (13%) and higher rank managers and management board members (6%) (see figure 1). The respondents were managers working for enterprises of different sizes. Most of them represented small companies (44%), next there were big companies (31%) and medium size enterprises (25%). Thus, because the survey was carried out in Poland, it seems valuable to note that 37.5% of the managers described their companies as international due to the area on which they operated. The rest of the companies (6.5%) limit their activity to the country of origin. In this context, the statistics of the analysed enterprises is also important from the perspective of the country of origin. The biggest group consists of Polish companies, which make up

50% of all the enterprises. The remaining companies were from Austria (13%), India (6%), England (6%), Ireland (6%), Germany (6%), the Czech Republic (6%) and Georgia (6%). Characteristics of the analysed enterprises were also presented in the answers to the questions about the application of rules of process management. It turned out that among the analysed enterprises 19% used this kind of solution for the full management scope, and 50% of the companies did not perform process management at all.

In the remaining enterprises the rules of process management were used only in some areas of their activity (see figure 2). From the answers to the next question from the questionnaire, on the other hand, it stems that in 19% of the enterprises rules of process management are about to be introduced in the next two years, and in 38% of the companies no decisions in that respect have yet been taken. Only 25% of the analysed enterprises were strongly against implementation of this form of management, and those were predominantly small enterprises.

Figure 4. Analysis of changes in efficiency of business processes

Source: own work.

Figure 5. Significance of the analysis of business processes
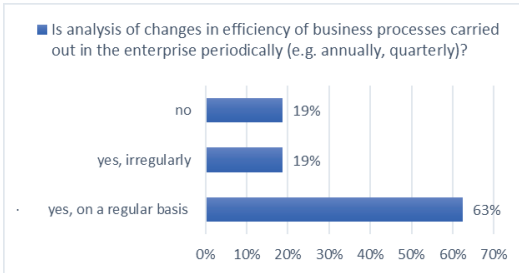
Source: own work.

Another group of questions dealt with measurement of efficiency of the operations undertaken in the analysed enterprises. As many as 69% of the managers gave a positive response to the question whether in their enterprise there were measurements carried out concerning achieved goals (outcome, result, product, service) in the production or service process. Negative response was provided by only 6% and 25% of the managers claimed that such measurements are carried out sporadically (see figure 3). The situation looks different in the context of measurements of necessary resources and support of production or service processes. Here, 44% of the managers gave a positive reply, 13% negative and partial measurements of support are carried out in 31% of the analysed enterprises.

Another question concerned the analysis of changes in efficiency of business processes. 63% of the managers who participated in the survey claimed that such analyses are carried out on a regular basis, once a quarter or once a year. 19% of the managers do not perform analysis of changes in efficiency on a regular basis, and the same percentage of them do no perform it at all (see figure 4). The last question concerning measurement of efficiency was about assessment of the degree of validity of measurements of the outcomes of business processes alone and the analysis of the ways they (business processes) had been executed. It turned out that 50% of the

managers think that each analysis is equally important for efficient business management. 19% of the managers thought that analysis of outcomes was more important, and another 19% also used analysis of outcomes of business process operations (see figure 5). The managers also described the importance of individual types of measurements for making optimal managerial decisions. Detailed analysis of outcomes of business processes is really crucial for 50% of the managers, and important for 44% of them. On the other hand, measurements of necessary resources and support of business processes are very important for 44% of the managers, and 50% consider them important. Measurements of the way the operations/business processes are carried out were assessed as very important by 63% of the managers and for 31% they were important.

Figure 6. Degree of impact the individual determinants have on efficiency of business processes
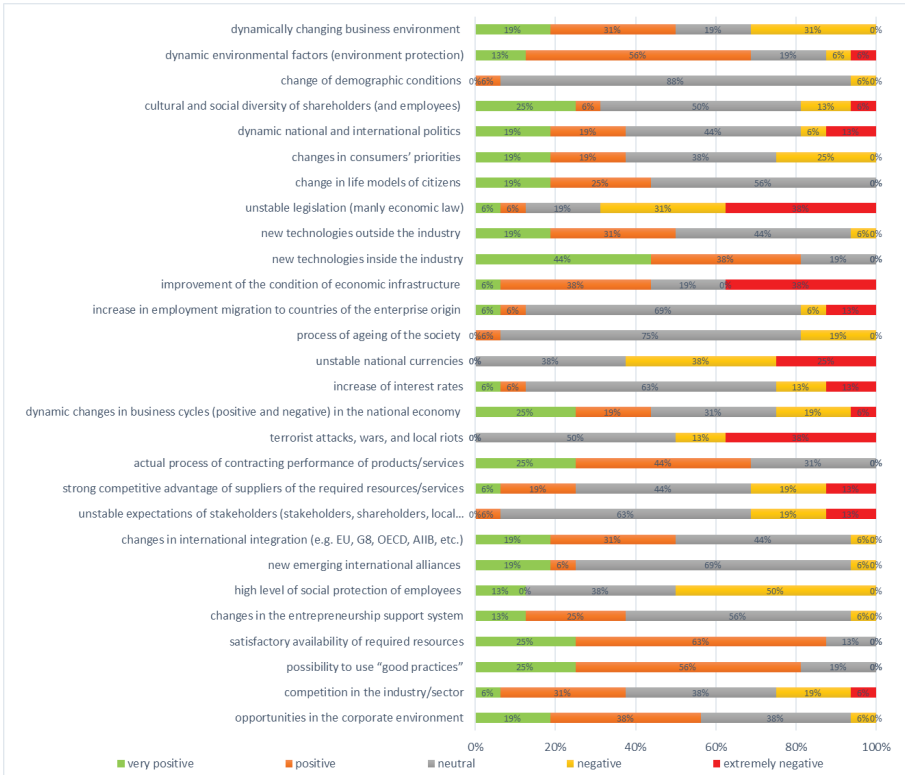
Source: own work.

Next, the managers gave answers to the questions concerning the importance of different factors and determinants, for efficient performance of business processes. They were divided into three groups. The first group involved determinants which directly influence particular business processes. It turned out that this group of factors is extremely important to 44% of the managers, and 19% of them considered them important. The second group of determinants were factors that concerned functioning of the whole enterprise. For 25% managers such determinants were very important, and 38% of the managers considered them significant for efficient functioning of an enterprise. The last group of determinants involved factors referring to phenomena that take place outside a company, which significantly de-

termine the way it functions. It turned out that for 38% of the managers they were very important, and 50% of managers considered them important. The managers who participated in the survey were presented with a list of 28 chosen determinants, defined by the author. They were asked to determine the degree to which a particular factor affects efficiency of business processes carried out in an enterprise. They could asses them on a scale from 1 to 5, where 1 meant an extremely negative impact, and 5 meant a very positive impact on efficiency of business processes. A detailed list of answers is shown in figure 6.

The basic assumptions of the concept of neo-institutional measurements of business processes

Any human activity undertaken to perform business tasks is determined by a broad spectrum of determinants. Those factors influence actors of those processes in various ways and create a causal institutional sphere [1] (institutional environment). For methodological clarity of the upcoming analysis, individual groups of institutional determinants of business processes should be defined.

The first group of determinants of business processes will consist of any type of factors that support a process (P_S). They should be perceived from the perspective of their operationalization. They will therefore, include all of the elements, which are responsible for the resource demand required by a business process. A set of factors supporting a business process can be presented in a form of a formula:

Formula 1

$$P_S = \sum_{m=1}^{\infty} p\, \underset{m}{\overset{s}{}}$$

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1. Causal institutional sphere (this term is based on the concept of a coherent causal sphere which is for the acting man a source of a broad stream of essential and subtractive institutions that on the one hand enable his/her activity, and, on the other hand, limit it). See Derkacz (2018a, pp. 4–5).

This means that factors that support a business process (P_M) make up s set of determinants (*m*) for a particular process (*T*). Number of factors and their characteristics will depend on definition and structure of a particular business process.

The second group of determinants are neo-institutional determinants of business processes (P_D). The main characteristics of those factors is that they make the actual environment, which determines the way the business processes are carried out. It also needs to be mentioned that these are expected factors, which find their reflection in defining and programming of business processes. Those factors reveal their neo-institutional character of process management and they also refer to the factors presented in the new institutional economics. Neo-institutional determinants of business processes make a characteristic set of different institutions which can be presented in a form of a formula:

Formula 2

$$P_D = P_P \cup P_O \cup P_E$$

It implies that the set of neo-institutional determinants of business processes consists of expected determinants of business processes, expected determinants of an organisation and expected determinants of the environment. The first subset consists of factors which are directly aimed

at a particular business processes within a company, and which have their source within an organisation. These can include, for example, factors related to work environment, infrastructure conditions in the facility, expectations of employees, need for motivation or organisation of information flow. The second subset consists of determinants which directly refer to the whole organisation, and their source lies within its boundaries. Here, we will find factors which are the result of the organisation's operations and which are vectored towards the way such organisation functions. The last subset of neo-institutional determinants of business processes are the expected determinants of the environment. The source of influence of such determinants should be sought in an extensive environment of an enterprise, however, effects of such determinism are present within a company. Each of the three subsets of neo-institutional determinants of business processes can be presented in accordance with the following formulas:

Formula 2a	Formula 2b	Formula 2c
$$P_P = \sum_{n=1}^{\infty} p_{P_n}$$	$$P_O = \sum_{n=1}^{\infty} p_{O_n}$$	$$P_E = \sum_{n=1}^{\infty} p_{E_n}$$

The factors presented above that support a process (P) and neo-institutional determinants of business processes (P) together create a complete set of determinants which is referred to as an input support (P_i) for a specific T process. This set can be presented in a form of a formula:

Formula 3

$$P_i = P_S \cup P_D$$

where:

P_i – input support of a T process

This means, that each activity of a person who is carrying out specific operations in an enterprise is performed under the influence of a broad spectrum of determinants and factors of business processes. This set creates a causal institutional sphere, which on the one hand enables, and on the other hand, limits particular actions that can be taken by people as part of business processes that take place in an organisation. This feature that characterises determinism of an institution, needs to be strongly highlighted. In the literature of the new institutional economics the limiting function of institutions is often mentioned (see North, 1991, p. 97). To start with T. Veblen, to end with the contemporary economists of this trend, it is said that institutions are the externally imposed formal rules or informal limitations, which create a distinct, imposed structure that determines all human activity (see North, 1990, p. 9). The author believes that just as important role of an institution is to enable or to make it easier to perform specific tasks and processes undertaken by people also within a company. Similar conclusions may also be drawn from the analysis of data that comes from the empirical research that was previously mentioned in this article. The conclusions shall be discussed more extensively in the further part of the article, which is devoted to conclusions arising from the general concept of neo-institutional measurements of business processes.

Hypothesis of rational change of condition

In this article all processes taking place in organisations shall be treated as dynamic input-output[2] or cause-and-effect systems. On the other hand, a person who works in an organisation is perceived in accordance with the concept of a contracting person[3]. In this context, any activity undertaken by

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2. The expression – input-output systems – comes from the Petri Nets methodology, which defines actions from the perspective of input and output conditions. The stress is largely put not only on the structure of action itself, but also on the structure of input conditions and of conditions of the outcome of operations.
3. The concept of a contacting person is based on the theory of contacts of the new institutional economics, where contacts constitute fundamental activity of companies (see Brousseau & Glachant, 2008,

a contracting person within an organisation, should involve operationalization of a broad stream of factors that are part of a supporting input condition (P_i) in the form of outcomes of a particular process P_R. Therefore, it can be said that here an organisation is defined as an entity, which comprises of a complex network of dependencies between contracting people, who are represented as multifunctional chains of added value. Such assumptions, that stemmed from the author's own observations and business practice, resulted in formulation of the hypothesis of rational change of condition.

Formula 4

$$\exists \bigcup \{P_D, P_S\} : s\big(P_j\big) = s(P_i) - In(P_D, T) - In(P_S, T) + Out(T, P_R)$$

where:

P_j – output condition of the outcome of a T process; $In(P_D, T)$ – supporting the T process with $P_{D\,factors;}$ $In(P_S, T)$ – supporting the T process with Ps factors; $Out(T, P_R)$ – corollaries of the implementation of the T process in a form of its P_R outcomes.

The hypothesis says that in the causal institutional sphere of an organisation, such sets of expected neo-institutional determinants of business processes (P_D) and factors that support them (P_S), coexist, which create a cumulative supporting condition (P_i). This implies that each business process that takes place in an organisation involves a changing of the input supporting condition (P_i) into its outcome (P_R) and finally into an output condition of a business process (P_j). Its optimal implementation is possible only with the use of all of the determinants and factors from the set of supporting conditions. In this light, the actual process displays properties of a concurrent *AND-join*

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pp. 37–40). For the first time this expression appeared in the context of economic policy and production system where a human being is treated as the main entity that implements economic policy tasks (see Derkacz, 2018a, pp. 3–4, 10–12).

transition[4], which results in a situation in which the outcome of a process (*Out (T, PR)*) depends on all the elements that are part of the process supporting condition (see Ayar & Marechal, 2013, pp. 78–90). Those co-dependencies have also been presented in the diagram above (see figure 7).

Figure 7. Sources of supports and determinants of business processes
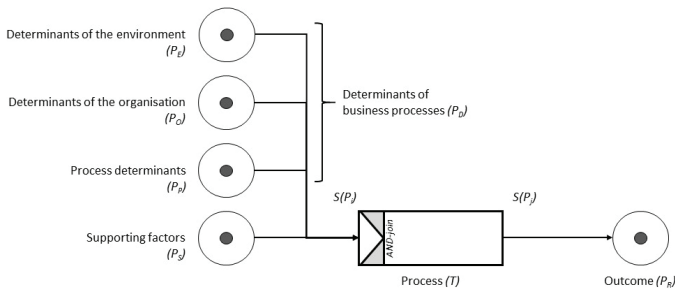
Source: own work.

At this point, two terms, which appear in the hypothesis of rational change of condition, need to be explained. The first one is the outcome of the process (P_R), the other one is the condition of the outcome (*s* (P_j)). At first glance, they seen to be identical. However, they differ significantly. The first one shows the added value generated through execution of a business process. The condition of the outcome, on the other hand, shows the reality that was created as a result of generation of that added value. Using the language of the new institutional economics it can be stated that the condition of the outcome of the operation defines a new field of causal institutional sphere for next operations and processes that will take place in the cycle of functioning of an organisation. The outcome of the process is therefore, the added value generated by a particular business process. Condition of the

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4. Concurrent *AND-join* transitions are the exemplary control flow of transitional conditions to operations (transition) of a concurrent characteristics. Such concurrency defines such operation, which, for its optimal execution, requires more than one support and that has only one output connection.

outcome constitutes all the benefits, which will be able to be "consumed" by next operations and processes that take place in an organisation.

The explanation of the differences between the outcome of a process and the condition of an outcome is enough to explain the hypothesis of rational change of condition presented in formula 4. From this it follows that, the expected outcome of the process is defined as an output transition condition [5] ($s\ (P_j)$), it is possible to obtain in an efficient way only if two requirements are completely met. The first one is the need for appropriate support of the process in a form of defined expected neo-institutional determinants of business processes ($In(P_D,\ T)$) and factors that support that very process ($In(P_S,\ T)$). These groups of determinants should constitute, at the time the particular process is ready to operate, an appropriate supporting condition (P_i). The second requirement that is necessary to obtain the expected outcome of the process, is the effective relation between its direct corollaries ($Out\ (T,\ P_R)$) and the input condition. This requirement concerns the moment in which the results of the proper process obtain the status of that process's outcome. Those two key requirements, which stem directly from the hypothesis of rational change of condition have a significant meaning for the concept of neo-institutional measurements of business processes. Due to them, three areas are created, in which it is possible, or even necessary to take control measurements. These will, therefore, include measurements of the supporting condition, measurements of the transition itself and measurements of corollaries of business processes.

Hypothesis of expected determinants of business processes

The hypothesis of expected determinants of business processes largely refers to approach of managers, who, among other things, should observe,

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5. Transition – this term comes from the theory of Petri Nets and it refers to a particular action.

diagnose and define the broad stream of determinants that shape the institutional environment of processes that take place in an organisation. In this context, introduction to these reflections, the expressions "expected" determinants of business processes suggests that there is a coexisting catalogue of such determinants, which may come across as unexpected. Based on observation of socio-economic phenomena that take place in enterprises and on the critical analysis of literature on the new institutional economics, it can be stated with all responsibility, that in the broadly perceived economic sphere, there is a huge number of different kind of institutions, which in a real way determine the way of functioning of business processes in organisations. However, the problem, comes down to the fact that not all of those factors are taken into account in the process of business process management. There are many reasons behind that. It is enough to list, for example, the lack of complete information, incomplete knowledge or even functional fixedness of managers[6]. Additionally, people responsible for an organisation cannot break certain barriers in the management process, and they focus their attention on stiff, or what is even worse, inappropriate methods of problem solving within a company that are not matched to the dynamics of the business environment (see McCaffrey, 2011, pp. 215–218). In this context, the notion of error of defining of determinants of business processes is introduced to the concept of neo-institutional measurements of business processes.

In reference to the above, while talking about the hypothesis of expected determinants of business processes, it needs to be clearly highlighted that the neo-institutional causal sphere is a set of numerous institutions, which in various ways determine processes which take place in an organisation. Such a situation is portrayed in formula 5a.

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6. The functional fixedness of managers means continued execution of the same activities although they do not add to improvement of how efficiently a company functions. It is a mechanism is about the perception of particular elements or functions or subjects, which are treated as their immanent ingredient, which limits the cognitive process (see Hudson, 1962, p. 196).

Formula 5a

$$\exists \bigcup \{\overline{P_D}\} : \overline{P_D} = P_D \cup \dot{P}_D$$

where:

$\overline{P_D}$ *– objective determinants;* P_D *– expected determinants;*
$\dot{P}_D$ *– unexpected determinants*

The formula above presents a situation, in which each organisation functions in a causal neo-institutional sphere, where real and objective determinants coexist, and which influence the processes that take place in it ($\overline{P_D}$). This set of neo-institutional determinants of business processes has been presented as a sum of those expected determinants which had been included in the definition of business processes (P_D) and determinants, whose impact on business processes had not been diagnosed by managers in the management process ($\dot{P}_D$). Unexpected determinants of business processes, however, have one very significant characteristic which is very important for the management processes of an organisation. To a great extent it results from observations of socio-economic phenomena that take place in enterprises, which was also confirmed in extended interviews that the author carried out. This characteristic can be expressed in the formula below:

Formula 5b

$$\exists P_D' \in \dot{P}_D : P_D' \cap P_D = \emptyset$$

*where:*

P_D' *-unexpected determinants which influence the T process*

A certain statement stems from this formula, namely, that in the set of factors not included in the definition of business processes ($\dot{P}_D$) there are certain determinants which have a real influence on the way in which busi-

ness processes are carried out within a company (P'_D). Arrangement of the above mentioned sets is shown in the diagram below.

Figure 8. Subsets of objective determinants of business processes
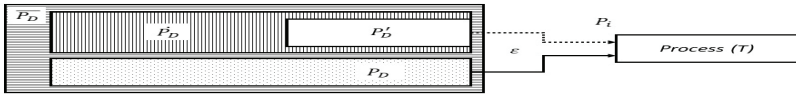
Source: own work.

The presented characteristics of the set of objective determinants of business processes suggests that it might be possible that certain errors might occur in a business practice. It comes down to managers' non-optimal or incorrect defining of catalogue of factors that determine the way business processes are carried out in a company. Conditions in which error of defining of determinants of a process T are presented in the following formulas:

Formula 5c

$$\forall \overline{P_D} \; \{P'_D > \emptyset \to \exists \varepsilon : \forall t : \varepsilon_{t+1} \to 0\}$$

Formula 5d

$$\varepsilon = P_i - P_D$$

where:

ε *- error of defining of determinants of a process T*

This formula should be interpreted in a way that the error of defining of a set of determinants of business processes appears once such factors are revealed, which in a real way influence business processes that take place in a company, which had not been included in the management process. There might be many causes of such state of affair, i.e. deliberate actions of competition, incomplete information, not-optimal competences or wrong approach of managers. The error understood this way may also be defined

as certain type of condition which will result from the difference between the required supporting input condition of a T process and the catalogue of expected determinants for that process (see formula 5d). However, at this point it needs to be added that after such error is revealed within time (*t*), managers take – in fact, they should take – certain corrective actions, which are aimed at elimination of lack of completeness of expected determinants of business processes (formula 5d). Such actions, on the other hand, enable reduction of the degree of error, which in the most positive scenario is reduced to zero (ε_{t+1}).

Reflections presented here force a certain type of supplementation of the hypothesis of rational change of condition (see formula 4). It results from the fact that the error of defining of determinants of business processes that take place within an organisation is revealed.

Formula 5e

$$\exists P'_D \in \overline{P_D} : s\big(P_j\big) = s(P_i) - In(\boldsymbol{P'_D}, \boldsymbol{T}) - In(P_D, T) + Out(T, P_R)$$

Therefore, the initial hypothesis of rational change of condition is supplemented with a statement that the final condition of the outcome of business processes is also governed by real determination through unexpected determinants of those processes ($In(P'_D, T)$).

Hypothesis of rational determinants

Another hypothesis which needs to be discussed as part of the reflections on the general concept of neo-institutional measurements of business processes is the hypothesis of rational determinants. It mainly concerns the same supporting conditions and the broad set of factors which determine the way business processes function in an organisation. All those – using the language of the new institutional economics – institutions create sort of a support plan for a business process (*s (P_D)*). It goes without saying that

this set consists of different types of factors, which have an actual impact on functioning of business processes in a company. However, the aim of this hypothesis is to show a certain kind of hierarchy of institutions, which here together create an objective supporting condition. This situation can be expressed in the following formula:

Formula 6a

$$\forall (P_P \cup P_O \cup P_E) \in P_D : s(P_i) = \text{In}(P_D, T)$$

where:

P_P – expected determinants of a process; P_O – expected determinants of an organisation; P_E – expected determinants of the environment

It follows that the group of expected determinants of business processes comprises of subsets of expected determinants of the process, organisation and environment. All the subsets that belong to the group of expected determinants of business processes together create a cumulative condition that supports that process. It means that support for an appropriate transition is possible only in a situation in which the number [7] of active tokens in the supporting condition ($s(P_i)$) is in line with the number of expected neo-institutional determinants of business processes ($In(P_D, T)$). Therefore, initiation of an appropriate process should be blocked, in a situation where at least one token of a given factor does not meet the defined input requirements for such a process.

It is nowadays a common claim that business environment consists of a huge number of factors and determinants. However, in the context of the hypothesis of rational determinants, this state of affairs has been described from the perspective of how they affect business processes. This has been expressed in the following formula:

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7. "Tokens" is an expression derived from the Petri Nets theory. In this context they will mean a certain resource or factor defined in a business process. Number of tokens in a given place shall mean the number of resources or determinants.
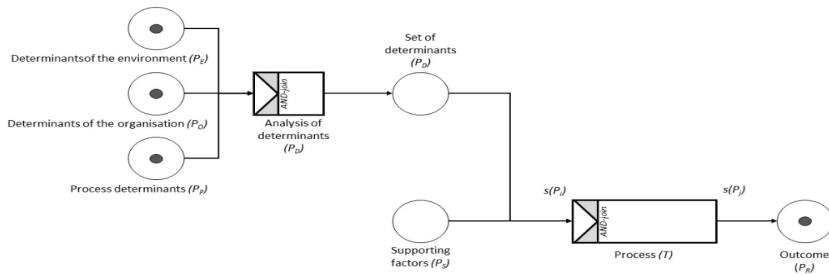
Formula 6b

$$\forall(P_D^+ \cup P_D^0 \cup P_D^-) \in P_D : s(P_D^+ \cup P_D^-) = \text{In}(P_D, \text{T})$$

where:

P_D^+, P_D^0, P_D^- – *expected determinants of the T process, respectively:*

positive, neutral, negative

Figure 9. System of supporting conditions for the hypothesis of rational determinants

Source: own work.

At the same time, from the formula 6b it stems that the individual factors that create the holistic set of expected neo-institutional determinants may affect a given business processes in a positive(P_D^+), neutral (P_D^0) or a negative (P_D^-) way. Such a claim gives certain presumptions to managers, from which it stems that supporting input condition for the transition should contain only those determinants whose influence will not remain neutral to the efficiency of business processes that take place within a company. It does not mean that neutral factors should be forgotten in time (*t*). It is not hard to imagine that in time *t+1* their character in relation to the proper business processes may change in a result of other determinants that appeared in the causal institutional sphere. The characteristics of determinants of business processes discussed here can also be presented using the Petri Nets notation (see figure 9). Each type of factors of business processes reaches a proper business processes through the concurrent *AND-join* transition, which will

involve processing of all expected determinants of neo-institutional determinants of business processes from the perspective of the character of their impact on a proper business process.

The above scheme shows that, apart from the set of expected determinants of a business process, there is also a set of supporting factors. Considering that a relevant business process (*T*) has been defined as a concurrent *AND-join* transition, the situation can be made more clear by presenting the following dependency:

Formula 6c

$$\forall P_S : \mathrm{s}(P_S) \geq \mathrm{In}(P_S, \mathrm{T})$$

In the context of the hypothesis of rational determinants discussed here it should be stressed that the set of the support of business processes (P_S) will be characterised by the fact that its input process condition should be smaller than the required number of supporting factors ($In(P_S, T)$). It means that at the place of the supporting condition there may be a greater number of active tokens (hence an exemplary number of 10 tokens presented in the diagram 10) which stand for particular factors that support the process. This might for example refer to management of supplies in a production process.

The intensity of determinants' impact hypothesis

Hypothesis of intensity of determinants' impact on business processes stems directly from the fact that this discussion is embedded in the trends of the new institutional economics. Every enterprise in the economy is therefore treated by the author as a contracting entity, that is embedded in a coherent institutional sphere. The critical analysis of literature on the new institutional economics brings a conclusion that a contacting person acts under the influence of a broad stream of limiting institutions, which create a particular background for such activity (see Brousseau & Glachant, 2008, p. 38). However, while making observations of the socio-economic phenomena that take place, it is impossible to ignore that statement. It does not require

further reasoning to state that in the holistic set of determinants which influence the way contracting people take decisions, there are institutions which, on the one hand limit, but on the other hand, enable and/or make such activity easier (see Derkacz, 2018b, pp. 24–25). Additionally, it should be stated that in such a holistic catalogue of institutions, two types of them can be observed. The key to their differentiation shall be the intensity with which they impact a contracting person. In this light, the neo-institutional determinants of business processes can be divided into essential and subtractive. The former are fundamental determinants for human activity, which shape the essence of such activity. Subtractive institutions, on the other hand, determine human activity in such a way that they affect it, but they do not change its foundation. Subtractive institutions compliment the full characteristics of operations, they are important and crucial for such activity. However, their absence shall not cause that such activity shall not be possible. They constitute institutional environment for economic activity, which has a smaller impact than essential institutions. Each of those institutions together create an institutional sphere which determines the character of human activity, the essential – in the essential realm – subtractive, on the other hand, on the peripheries of the institutional sphere. Division of factors that affect business processes has been presented in the scheme.

Figure 10. System of determinants according to the intensity of their impact on business processes
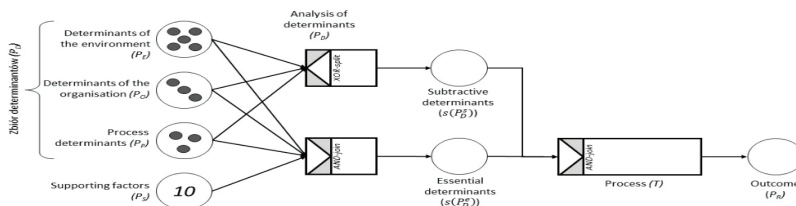
Source: own work.

On the ground of the original reflections of the author concerning neo-institutional determinism of actions of a contacting person, a hypothesis has been developed about intensity of determinants' impact of business processes that take place in organisations. It comes down to the statement that in the set of neo-institutional determinants of business processes (P_D) there coexist subsets of essential and subtractive determinants of a process, which with different intensity shape the final outcome of the operations related to the process. From this claim specific guidelines arise for managers who are in charge of organisations. Hence, essential determinants of business processes that are found in the supporting condition () should be used in full for their execution. On the other hand, subtractive determinants can be omitted in the flow of support of the process, which however, will require decisions of managing entities. It finds it expression in the use of *XOR-join*[8] type branching that shapes the final set of subtractive determinants for the proper process. However, that does not change the fact that this type of determinants of a process constitutes a supplement to the complementary conditions of execution of the outcome of the process. However, lack of support of the process in a form of subtractive determinants, will not affect the ability to obtain the outcome. However it may cause non-optimal realisation of such outcome. This hypothesis can be written down in accordance with the following formulas:

Formula 7a

$$P_D^e \cup P_D^s = P_D \quad \text{and} \quad P_D^e \cap P_D^s = \emptyset$$

where:

P_D^e, P_D^s – *expected determinants of the T process*, respectively: essential and subtractive

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8. *XOR-join* flow is a model flow that controls input conditions to operation (transition) that bears characteristics of an Alternative. Such a flow determines such operation, which for its optimal execution requires only one of many supports and which has only one output connection.

From the above formula it stems that the set of expected neo-institutional determinants of business processes includes subsets of essential (P_D^e) and subtractive (P_D^s) determinants. It is important to notice that the subsets do not have a common part but they are a coherent catalogue of factors that complement each other, and which together create cumulative set of expected determinants of business processes.

In this context, another issue needs to be discussed, that concerns dependencies between essential and subtractive determinants and how they are required for the realisation of business processes. It has been presented in the following formulas:

Formula 7b

$$\forall p_D \in P_D : \exists P_D^e : s(P_D^e) = \text{In}(P_D^e, \text{T})$$

and

$$\forall p_D \in P_D : \exists P_D^s : s(P_D^s) \leq \text{In}(P_D^s, \text{T})$$

From those it follows that there is a distinct difference in terms of how much certain groups of determinants are required for an optimal initiation of a relevant process in an enterprise. Effective proceeding of a business process is, therefore, only possible in a situation when all essential factors are provided. This dependency is expresses by the equation mark between the defined support of a relevant *T* process through the essential factors and the support condition itself. The situation is different when it comes to the requirements concerning subtractive determinants. This group of factors, although it comes from the catalogue of defined and expected determinants of business processes, may not be used in a *T* process. It does not mean that the process itself will not be initiated, it may however, affect fully optimal processing of the business operations in an enterprise.

Efficiency of business processes

In the discussion about the neo-institutional measurements of business processes the key question was how to optimise efficiency of economic processes? In the context of the above discussed hypotheses, the dependency needs to be revealed between the neo-institutional determinants of business processes and the efficiency of such business processes. The critical analysis of the scientific literature leads to a conclusion that efficiency of operational processes which take place in organisations is more and more frequently dependant on a very broad stream of factors, which originate outside those organisations.

It is not the subject matter of our article to discuss the topic of the methodology of calculation of efficiency of business processes, as it is broadly described in the literature on this particular subject (por Bukłaha, 2016, pp. 143–158). It is enough to mention the concept of the key success factors of the business process management (see Trkman, 2010), cost efficiency in the context of flexibility of an information system (see Gebauer & Schober, 2006), the *Towards Green BPM* methodology[9], or the method of the organisation management from the training and development of skills perspective (*Holistic Learning Factories*) (see Kreimeier et al., 2014). However, general dependency shall be presented between the outcome of a processes (P_R) and the costs incurred for a successful obtainment of the assumed outcome (*KT*). On the basis of the hypotheses discussed previously, a thesis can posed that effectiveness of business processes that take place within a company depends on the quality of support of such processes included in the set of support factors, as well as on the neo-institutional determinants of business processes. The key element here will be the dependency of the outcome of the process itself on the error of defining of business processes, which was discussed above. This dependency can be expressed in the following formula:

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9. cf. Constantin Houy et.al. (2011, pp. 501–510).

$$\sigma = \frac{P_R}{KT} * \frac{1}{\varepsilon} * w$$

and

$$\varepsilon = P_i - P_D \qquad \sigma_T = \frac{P_R}{K} \qquad \eta = \frac{1}{\varepsilon} * w$$

where:
P_R – outcome of the T; process; KT – cost related with obtaining of the outcome $P_{R'}$ w' – sensitivity coefficient of the degree of efficiency to an error ε; σ – efficiency of business processes

From that formula it follows that the overall efficiency of business processes (σ) depends on efficiency of operational activities of a transition (σ_T) as well as on the degree of error of determining of neo-institutional determinants of business processes. This error is the difference between the defined supporting input condition of the *T* process and the expected neo-institutional determinants of that process. Efficiency of a transition shows the relation between the outcome of the relevant process, which was achieved with the use of all the sets of factors that are included in the supporting input condition (P_i) and the incurred costs. On the other hand, the value of η shall constitute a multiplier of the neo-institutional efficiency for the efficiency of a transition. Its value shall be inversely proportional to the error ε and directly proportional to the sensitivity coefficient of the degree of efficiency to an error of determining of the neo-institutional determinants of business processes (w'). In the light of the above it can be claimed that efficiency of processes that take place within a company will depend on a broad stream of factors that support transition as well as on error of defining neo-institutional determinants of business processes. Therefore, the key conclusion may be

drawn for the above reflections grounded in a business practice. The key role, which has an essential meaning for the quality of business processes, is the role of a manager and the quality of managerial decisions that are taken. This is due to the fact that they are going to influence the degree of error of defining determinants of business processes.

Conclusions for managers that stem from the general concept of neo-institutional measurements of business processes

Reflections concerning neo-institutional measurements of business processes, by their nature, have a very conceptual character and they are strongly rooted in the theory of the new institutional economics. Content of this article has been also grounded in practice in a form of the empirical research that was carried out, as well as the extended interviews. Moreover, it has also been enriched with the author's experience in management of organisations. Such context for development of the general concept of neo-institutional measurements of business processes requires presentation of precise conclusions and findings, which could be applied both in the academic context of the new institutional economics, but also in the management practice. The division presented below is aimed at meeting those expectations or, at least, at initiating further academic research in that respect. Individual recommendations will, in a natural way, find theoretical grounds in individual hypotheses, which will be referred to relevant empirical research. (see table 1).

Table 1. Conclusions from the general concept of neo-institutional measurements of business processes

Conclusions from the hypotheses of the general concept of NMBP	Reference to the empirical research	Conclusions and recommendations

A. Hypothesis of rational change of condition		
1. Optimal implementation of business processes is possible only with the use of all the determinants and factors from the set of supporting conditions. 2. Expected outcome of a business process is possible to achieve once the following requirements are met (1) optimal support of such process and (2) efficient execution of its direct results to an input condition.	1. Are measurements of necessary resources and support of business processes carried out in the company? (yes 44, sporadically 31, no 13) 2. How important are the measurements of necessary resources and support of business processes? (very important 44, important 50, not important 6) 3. How important are measurements of the way business processes are carried out? (very important 63, important 31, not important 6) 4. How important are measurements of the outcomes of business processes? (very important 50, important 44, not important 6).	1. Three spheres of control measurements are created. These include measurements of the supporting condition, measurements of the transition itself and measurements of corollaries of business processes.
B. Hypothesis of expected determinants of business processes		
1. It is possible that the set of factors will occur that are crucial for a business processes, which have not been defined in the set of expected determinants of business processes.	1. Extended interviews with managers – problem with incomplete and uncertain information, difficulty with verification of information streams.	1. Role of managers will involve taking actions that will reduce the set of unexpected determinants of business processes.
C. Hypothesis of rational determinants		

1. Determinants of business processes form a cumulative condition supporting the processes which consists of factors of a process, organisation and environment. 2. Determinants of business processes may affect processes in a negative, neutral or positive way.	1. What is the importance of factors concerning business processes inside a company for optimal management of that company? 2. What is the importance of factors concerning the whole enterprise inside a company for optimal management of that company? 3. What is the importance of factors concerning phenomena outside a company for optimal management of that company? 4. The extent to which individual determinants influence efficiency of execution of business processes. (figure 6).	1. Managers in their work should analyse individual business processes that take place within a company from a very broad perspective, in a very holistic way. 2. Managers in their managerial processes should predict, analyse and look for those determinants which may turn out to be a source of added value and at the same time become factors that enable and/or facilitate execution of business processes in an efficient and effective way.
D. Intensity of determinants' impact hypothesis		
1. Determinants of business processes may be of essential or subtractive character for their effective execution. 2. Requirements concerning use of essential and subtractive determinants are different for different proceeding of a relevant transition.	1. Different perception by different managers of individual determinants that affect business processes (figure 6).	Analysis of a broad stream of determinants of business processes from the perspective of the intensity of their impact on functioning of a given enterprise is very important in the management process. Therefore, it will be of key importance to satisfy the needs of all defined essential determinants as well as the rational and optimal utilisation of essential factors.

Source: own work.

First and foremost, it is worth focusing on conclusions that stem from the hypothesis of rational change of condition. Two crucial elements need to be highlighted here. The first one is that it is necessity to use possibly all the determinants and factors from the set of the supporting condition in order to obtain optimal level of implementation of individual business processes.

The second conclusion that stems from this hypothesis is the claim that the expected outcome of a business process is possible to obtain though an overall fulfilment of conditions of optimal support of a process and effective execution of its direct corollaries to the output condition. Confirmation of this hypothesis can be found in the answers of the managers who partic- ipated in the empirical survey and extended interviews. Such extremely holistic approach to the management process was confirmed there in a very clear way. 75% of the managers who were asked about measurements of necessary resources and support of business processes, admit that such analyses are carried out in enterprises on a regular basis or in relation to some processes. Only 13% of them denied that such measurements were carried out in the companies they manage. On the other hand, 94% of the managers state that such measurements are very important or important for the efficiency of operations that are being executed in a company, and only 6% of them deny it. 63% of the managers when asked how important were the measurements of the way in which processes are executed, answered that they were very important, another group of 31% claimed that they were important for optimal management of an organisation. On the other hand, regular measurements of the outcomes of business processes that take place within a company are very important for 50% of the managers, and 44% of them consider them important for the quality. It's very clear that the conclusions drawn from the hypothesis of rational change of condition have been very strongly confirmed by the managerial practice.

Therefore, at this point, certain recommendation should be made for people who manage enterprises, which would stress the existence of three spheres for control measurements. They will include the measurement spheres of (1) the supporting condition, (2) a relevant business process and (3) the corollaries of such processes. When it comes to measurements of the first analytical sphere, measurements should be made of not only those resources which are used as supporting factors for carrying out of process operations. All types of institutions, which determine the way business pro-

cesses are carried out, turn out to be as important. In this context, the role of a manager will involve creation and constant updating of a catalogue of factors, that will be an actual, causal sphere of operations and processes that take place in an organisation.

The second of the discussed hypotheses concerned expected determinants of business processes. One key conclusion may be drawn from it. Among a very vast set of different factors, there are such determinants of business processes which, for different reasons, have not been taken into consideration by managers. Therefore, it is possible that a set of factors that are significant for a business process, that have not been determined in the set of expected determinants of business processes, will be revealed. There appears a problem with managers making errors. Their repercussions may result in a non-optimal execution of processes in a company. In this context, it is interesting that the managers who participated in the extended interviews, noticed that risk – but obviously they did not call it an error. The managers articulated a number of restrictions stemming from incomplete and uncertain information, or from the difficulty they had with optimal verification of the streams of information. Of course, some of those restrictions seem to be of an exogenous nature, the remaining, however, have their sources within a company or are even determined by the approach of managers themselves. However, it is safe to say that the degree of error of defining factors significant for business processes greatly depends on how efficiently managers work in the context of a very holistic approach to organisation management, but it also depends on the understanding of any type of determinism of socio-economic phenomena that take place both in a company, as well as in its environment.

Based on the above, another recommendation for all managers can be stated. The role of managers should involve taking such actions that will result in reduction or even elimination – in a positive scenario – of the set of unexpected determinants of business processes. Such actions, should equally relate to the space within an enterprise and to many areas outside an

organisation. Such a holistic approach to management will be characterised with a factual and substantive analysis of the coherent, causal sphere, which is the actual source of a great number of determinants that are significant for quality of business processes that take place within a company.

Another hypothesis showed rationality of determinants of business processes. In order to provide specific recommendations for managers, two key conclusions need to be drawn from it. The first one, it needs to be stresses, that the determinants of business processes create a cumulative condition that supports business processes, and which consists of factors related to processes, organisation and environment. In the second conclusion, attention is paid to the fact that determinants of business processes may influence those processes in a negative, neutral or a positive way. Theoretical conclusions that stem from the hypothesis of rational change of condition have also been confirmed by the empirical research carried out by the author. The managers were asked about the degree of importance of three groups of determinants for an optimal management of a company. It turned out that factors concerning business processes that take place with a company are very important or important for 63% of the managers, and 25% of them found such factors neutral. On the other hand, determinants concerning a whole enterprise are very important or important for 63% of the managers, the second group (37%) found them neutral. None of the managers considered this group as unimportant or having little importance. The third group of factors that come from outside an enterprise was considered very important or important by 88% of the managers. Another 13% of the managers found such factors neutral. Similarly to the previous factors, these also were not considered unimportant or having little importance. We obtain an interesting picture in the context of the hypothesis of rational determinants by analysing the responses the managers gave to questions concerning the degree of impact that the individual determinants have on the efficiency with which business processes are executed. It has been presented in detail in the diagram (see figure 6). It is enough to perform a single verification of the

scope of responses. Very positive and positive impact of individual deter-minants in on efficiency of business processes were referred to the set of determinants that have a positive impact, and on the other hand, negative and very negative to determinants that have a negative impact. Neutral factors were omitted in the analysis. On that basis, the following picture of deter-minants of business processes that affect those processes in a positive or a negative way, was obtained (see figure 11). Positive impact can be related to determinants which allow people to take actions, negative factors will be those that restrict such activity. The diagram very clearly shows that division of determinants of business processes, this division, however, can be very subjective from the point of view of a given enterprise or even a manager.

Figure 11. Division of determinants of business processes into those that enable or restrict operations

- determinants which enable/facilitate operations
- Determinants which restrict/hinder operations
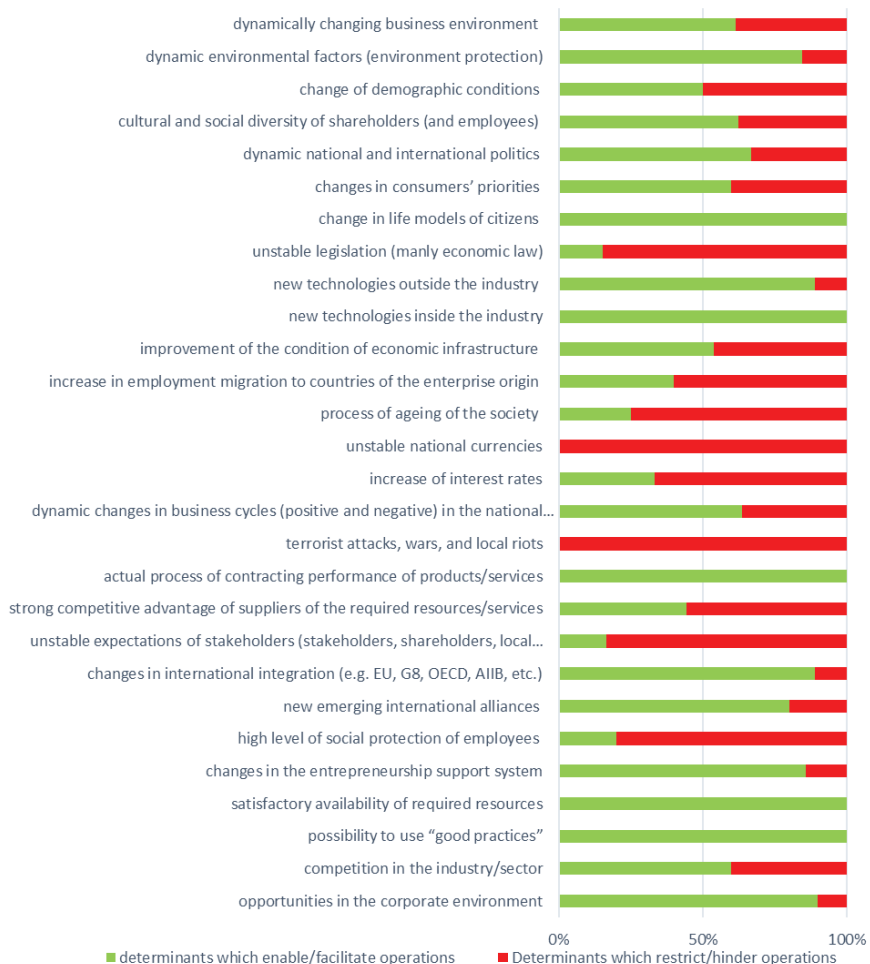
Source: own work.

On the basis of the above conclusions and comments that stem from the empirical research, a few recommendations for managers can be stated. To a large extent they will come down to attitudes of people who do the management job, which they adopt in the process of business management. It is worth to strongly stress that managers in their work should analyse individual business processes that take place within a company, from a very broad per-

spective, in a very holistic way. This is because it had turned out that efficiency of business processes is strongly dependant on many various factors. Among them, there are determinants which refer to processes themselves of whole enterprises, but they are also factors, which extend outside boundaries of companies, from their holistic environment. Another very important recommendation concerns the way managers approach such a broad stream of neo-institutional determinants. Practice (here in a very narrow scale) shows that certain group of managers while talking about different determinants, especially those concerning the so called micro environment, has in mind all factors which restrict the process of taking actions within an enterprise. The hypothesis of rational determinants, on the other hand, showed that this group of determinants is only a part of the complex set of determinants, which in different ways, affect efficiency of business operations. Therefore, at this point, managers should receive recommendations in their practice to predict, analyse and search also for those determinants, which may turn out to be a source of added value, and which at the same time, become factors that enable and/or facilitate carrying out of business processes in an optimally efficient and effective way.

The fourth hypothesis concerned intensity of impact of determinants of business processes. Two key conclusions can be drawn from it. First of all, it should be strongly highlighted that determinants of business processes may be of two different characters from the perspective of how strongly they affect previously mentioned process, as well as from the perspective of their efficiency and effectiveness. We are talking about essential and subtractive determinants. As it turned out, for instance in the results of the empirical research, such differentiation is extremely crucial and it is clearly correlated with quality of business processes. The second conclusion, that should be presented here stems directly from the first one. It should be equally highlighted that requirements concerning use of essential and subtractive determinants are different for different proceeding of a relevant transition. Characteristics of the determinants of business processes discussed in this

article have been partially confirmed in the results of the empirical research and extended interviews with the managers. This is reflected, for example, in the diagram 6, which shows the division of determinants into those that facilitate and restrict business operations within a company. None of the determinants suggested in the survey was evaluated in an ambiguous way by any of the managers who participated in the research. What is more, most of them, from the perspective of their impact on efficiency of business processes, were evaluated in extreme ways. It means that a given factor is very positive for some managers, while for the others it is extremely negative. For example, dynamic fluctuations (positive and negative) in a national economy, according to 25% of the managers those have a very positive impact, on the other hand 6% of the managers found this factor extremely negative. It is tempting to ask, who is right? Such dependencies, frequently subjective, are defined in the hypothesis of intensity of impact of determinants of business processes. Very precise recommendations for manages stem from it. In the management process it is very important to analyse broad stream of determinants of business processes from the perspective of the intensity of their impact on the functioning of a given enterprise. Therefore, it will be of key importance to satisfy the needs of all defined essential determinants as well as rational and optimal utilisation of essential factors.

Measurements of business processes in the process management

Economy and management sciences as well as for managers, it is very important that a measurement reveals all kinds of socio-economic phenomena (the sheer fact that they exist as well as their causes and effects) that take place in an enterprise and its environment. Additionally, those measurements should be one of the most important tools for taking managerial decisions at every ranks of management. That is why, the last chapter of this article is devoted to measurements of business processes, which can be confirmed

in the hypotheses presented previously. It is not the subject matter of the following discussion to provide methodological details of the measurements themselves. Therefore, it should be enough said that the measurements of business processes discussed here shall be treated as efficiency and effectiveness (see Dess & Robinson, 1984, pp. 265–273) measurements, as well as descriptive measurements. In the literature on this subject, new approaches to measurements and the ways in which they can be used in the process of an organisation management have emerged, such as, for example, two-dimensional classification scheme of measurements of business performance (see Venkatraman & Ramanujam, 1986, pp. 663–688). Measurements of business processes presented in this work have been strongly oriented towards the process-centred approach to functioning of organisations in the context of the hypotheses which had been presented above. It needs to be strongly stresses that the discussed measurements should be used in a complementary way in the management process, and their division presented below is only for the purpose of discussing them. Thus, measurements of business processes have been divided in accordance with the hypotheses, which are offer fundamental source and explanation for them (see table 2).

The first group of measurements of business processes refer to the hypothesis of rational change of condition. Here we are dealing with a measurement of a supporting condition, transition measurement and measurement of corollaries of business processes. The purpose of the first one is to show the actual state of all the factors and determinants which, in a direct way, will shape the way in which a given operation or process will be carried out. In the context of this discussion, it can be stated that this measurement will give a certain overall picture of institutional determinism of business processes, showing the holistic approach to organisation management. However, it is not only about supporting measurements, in the meaning of resources (e.g. time, material resources or human resources), which are necessary for carrying out of an operation, but about factors, in the institutional meaning, which have been discussed above.

Table 2. Measurements of business processes in accordance with the discussed hypotheses

Measurement of a business process	Brief description
Hypothesis of rational change of condition	
Measurement of supporting condition · $M(P_S)$	Measurement of the actual condition of all factors and determinants of a process
Transition measurement · $M(T)$	Measurement of the degree of effectiveness and efficiency of the T process itself.
Measurement of the processes' corollaries · $M(P_R)$ · $M(s(P_j))$	Measurement of the quality of the process corollaries from the perspective of the process itself and of its successors.
Hypothesis of expected determinants of business processes	
Measurement of expected determinants · $M(P_D)$	Quantitative and/or qualitative measurement of determinants defined at the stage of modelling of business processes.
Measurement of error of defining of determinants of the T process · $M(\varepsilon)$	Revealing of determinants of business processes in time t+1 which were not defined in the process of modelling of operations in the t time.
Model measurement · $M(P_i)$	Measurement of the actual quantitative, qualitative and descriptive state of measurements that are crucial for execution of a process.
Hypothesis of rational determinants	
Measurements of sources of expected determinants of processes, organisation and environment · $M(P_P)$ · $M(P_O)$ · $M(P_E)$	Quantitative and qualitative measurement of a broad stream of factors that affect business operations, sources of which are in the business processes themselves, inside organisations and in a broadly perceived environment.
Measurement of the way of impact of the expected determinants of T process · $M(P_D^{Wol})$	Measurement of the way of impact of factors on business operations – in a positive, negative or neutral way.

Hypothesis of intensity of determinants' impact	
Measurements of the intensity of impact of the expected determinants of T process • $M(P_D^{lol}$)	Measurement of determinants in terms of their essential and subtractive impact on the ways in which business operations are carried out.

Source: own work.

The second measurement applies to the same transition which refers to human activity that is a part of the undertaken operations. The task of this measurement is to show the degree of effectiveness and efficiency of the process itself, but also to reveal the actual quality of the operations carried out as part of that process. The last measurement, and to be precise, the last measurements, refer to direct corollaries of the undertaken business operations. The differentiation between the measurement of corollaries of the process, the measurement of the process outcome ()) and the measurement of () the condition of the outcome, has it justification in the way the generated added value is defined. It has been discussed in detail above. The first of the measurements is aimed at defining that added value as an immediate product of the execution of a business process. The other one, on the other hand, should reveal the condition of the outcome, which was created as a result of generation of that added value for next operations. It is safe to say that the measurements of corollaries of business processes point out to the quality of outcomes of operations, from two points of view. The first of them is the very process/operation, the second is the point of view of the so called successors in a logical string of operations of the whole business process. It needs to be highlighted that the outcomes of the process are not only the very products of a given operation (material and non-material), but also of all socio-economic phenomena which took place as its (process's) results. Such an approach is very strongly highlighted in this article, which is the result of the institutional and holistic character of organisation management, very strongly stressed here.

The second group of measurements of business processes was created on the basis of the hypothesis of expected determinants of business pro-

cesses. Here, we are dealing with a measurement of expected determinants, the measurement of error of determinants of *T* process and with the model measurement. Discussion about this group of measurements needs to start with the so called model measurement. (). It refers, in a direct way, to input supporting condition of a *T* process. The purpose of this indicator is to obtain the actual quantitative condition, qualitative condition and descriptive condition of all the factors, which at the stage of modelling of business processes have been defined as essential for carrying out of such a process. Therefore, they will be a resultant of specification of operations and a holistic picture of all the determinants which from the perspective of the same operation are necessary for its execution. This group of factors, somehow, includes time or quantitative norms that are currently known, which in a quantitative way refer to different resources, e.g. time necessary for execution of a task. Such a normative approach, however, is too narrow to satisfy effective and efficient proceeding of operations in line with the rules of institutional and holistic organisation management. Another measurement in this group is the measurement of expected determinants. It is used for quantitative and/ or qualitative measurements of those determinants which have been named and defined by the managers in the process of modelling of business processes. It reveals the actual state of conditions that support a given process, which allows initiation of that process in an optimal way in accordance with the modelled rules. Whereas, it needs to be kept in mind that this measurement should also be treated in an institutional and very holistic way, and that limiting of measurements that utilise this measurement for analysis of resources would be an unjustified departure from the rules of the concept in question. The third measurement in this group is the measurement of error of defining of determinants of the *T* process. On the one hand, this is quite an interesting measurement, on the other hand though, it can cause a lot of controversy. It can be stated that this measurement shows the error of a manager who incorrectly defined a catalogue of factors and determinants of business processes at the modelling and defining stage. However,

the essence of the general concept of neo-institutional measurements of business processes is not to point out to mistakes of the management staff, but rather to show the way in which business process management can be optimised. Therefore, this measurement of error of defining of determinants of a business process is aimed at revealing those factors of the *T* process, impact of which was revealed in t*+1* time. Therefore, it can be said that this measurement will be used as a kind of a tool to optimise functioning of business processes in time.

Another group of measurements of business processes has been created on the basis of the hypothesis of rational determinants. In that respect, we have measurements of sources of expected determinants of processes, organisation and environment. The main task of this group of measurements are quantitative, qualitative and descriptive measurements of all those determinants, which influence the way in which operations are carried out, taking into consideration – which is of key importance here – sources of their (determinants) origin. It is crucial in that sense that the qualitative and/or quantitative picture of determinants, which have their sources in the processes themselves, in an organisation or a broadly defined environment, could be a real guideline in business management process, especially when it comes to taking optimal managerial decisions. Another measurement, which has been defined on the basis of the hypothesis of rational determinants is the measurement of the way of impact of the expected determinants of a *T* process. Its main task is to show whether the analysed factor has an impact on a business operation in a positive, negative or neutral way. Revealing of such character of individual determinants of business processes has a crucial impact on managerial decisions. They may lead to weakening of the negative and facilitating of the positive factors of business operations. At this point, it is worth highlighting the fact of possible dynamics of change of the above mentioned characteristics of the analysed determinants. Those, which in *t* time were defined as positive, may in time *t+1* change their character to neutral or even negative. Those changes can take place in any

possible direction - positive, neutral or negative. Of course, the changes of defining the way of impact of a given factor on business operations will be dependant of fluctuation of the whole process environment, which finds its justification in the dynamics of changes of institutions (see North, 1990, pp. 10–13). However, from the perspective of an organisation management this issue is important enough to be continuously monitored. It may be taken for sure that the only thing that can be considered constant is the fact that everything undergoes continuous dynamic changes.

The last measurement, suggested as part of the general concept of neo-institutional measurements of business processes, has been created on the basis the hypothesis of intensity of impact of determinants of business processes. This is the measurement of the intensity of impact of the expected determinants of a T process. The character of this indicator shows a very strong relation with the above discussed measurement of the way of impact of the expected determinants of a T process. In this case, however, its main task is to measure only the intensity of the determinism in question, according to the essential and subtractive impact key. It is not an ordinary t measurement that shows, for instance, degree of importance of such determinism. Its role is to reveal whether an analysed factor affects the essence and foundation of a business operation, or whether it creates characteristic institutional environment, which will form socio-economic aura for the business operations undertaken by people also within enterprises.

The measurements presented above have one common purpose, which is the essence of the general concept of neo-institutional measurements of business processes. Its role is qualitative, quantitative and/or descriptive exposure of the broad stream of the institutional impact of many various factors and determinants on the way business operations are performed within an organisation. Management in the contemporary, dynamically developing world requires from managers not only the knowledge of economics, in the context of classically perceived production factors. However, treating the factors that are not included in the catalogue of resources of earth, labour

and capital, as exogenous, seems to be very irresponsible and harmful for an organisation. Partly because of that, this general concept of neo-institutional measurements of business processes was created, which is strongly based in the trend of the new institutional economics and it offers a very holistic approach to business process management.

From the above discussion, therefore, the following conclusion may be drawn. Effectiveness of business processes that take place within companies depends on the quality of support of such processes included in the set of supporting factors, as well as on the non-institutional determinants of business processes. On the other hand, the neo-institutional approach to business process management creates opportunity to increase effectiveness of business processes. The measurements of such processes, suggested above however, become safeguards that control quality of management of those processes. From the above statement it stems that in order to increase effectiveness of business processes in an organisation, a very holistic approach and neo-institutional approach to managements needs to be adopted. Such approach should oscillate around broad stream of factors and determinants of business processes, which in a different way affect the business operations undertaken by people. The general concept of neo-institutional measurements of business processes, therefore, becomes an original suggestion, mostly for managers who are looking for new areas of optimisation in enterprises are in charge of. The presented approach to the management of an organisation, on the other hand, may become a source of knowledge on the actual impact of different factors on an organisation or on the processes that take place within that organisation. From the point of view of the economic science and management science, the general concept of neo-institutional measurements of business processes may become a contribution for further academic search for optimisation of effectiveness of business processes.

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