

# Beyond resilience – new institutional economics, fragilities and indicators of unsustainability

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**Abstract:** Based on ideas and notions discussed in Nassim Taleb's books *The Black Swan* and *Antifragile*, in this article it is discussed how theories from the new institutional economics can contribute to research on sustainability issues in different areas as well as corporate social responsibility. While sustainability is often considered from the point of view of resilience, the increasing complexity of the world requires to be prepared for unexpected challenges and unpredictable challenges which may lead to crises or system ruin. The focus in this article is on the identification of fragilities as the bottom line of sustainable development – their elimination may prevent ruin and support system survival. This is based on the idea that not only policy for development may be senseless when the possibility of ruin exists. In general, it is also easier to identify problems than possible improvements. The theoretical framework of the new institutional economics will be used to outline some opportunities and challenges for identifying fragilities and creating indicators of unsustainability.

*Keywords:* sustainable development, sustainability, fragility, Black Swans, indicators of unsustainability, new institutional economics, transaction costs, property right, corporate social responsibility

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## 1. Introduction

Sustainable development often seems to be a concept about what should be done in order to achieve inter- and intra-generational equity. It is about the developmental needs of current generations, where a good life should be achieved by all members of the global society, not compromising the capabilities of future generations to decide about their own path of

development (WCED 1987; Rao 2000). The new institutional economics, grounded in transaction costs and property rights economics, is a helpful instrument in analyzing challenges in sustainable development. In order to do this, it needs to be developed from a theory focusing on, e.g., the efficiency of governance structures (Williamson 1985, 1998) and property rights for economic growth and efficiency (e.g., North 1990; Furubotn and Richter 1997) towards a theory considering the importance of transaction costs and property rights for creating society's capacity and the individual's capacity to live a good life in accordance with principles of sustainable development (Platje 2011).

The bottom line of sustainable development is survival. Probably the most important is the ecosystems providing food and energy needed for human survival (Costanza 2009: 20). The ecosystem, as well as other systems important for the functioning of society (e.g., the political system, economic system, social system) should be resilient in order to develop sustainably. The resilience of many systems is seriously threatened, and people consume more resources than the planet Earth can renew (see Rao 2000). Furthermore, due to the increasing number of goods and services and their heterogeneity, increasing trade and growing global interconnection, the world is becoming increasingly complex. As a consequence while unexpected and unpredictable challenges leading to the threat of different crises may become more and more important. In this article, ideas and notions discussed in Nassim Taleb's books *The Black Swan* (2007) and *Antifragile* (2012) (which have not been widely applied to issues of sustainable development yet (e.g., Bullen 2015)) are used to discuss how theories from the new institutional economics can contribute to research on sustainability issues and corporate social responsibility. As the bottom-line of sustainability is survival, the identification of fragilities which may lead to a crisis or collapse of a system is elementary. Part of policy for sustainable development should rather focus on what not to do, or what to eliminate, according to the logic that people tend more quickly to agree on what is bad than what is good, or on what may lead to a crisis than what will lead to development (compare Taleb 2012).

In this article, some ideas and theories from new institutional economics are used to outline some indicators of fragility. Some general ideas regarding direction of research regarding sustainability and corporate social responsibility are presented. First, some issues regarding efficiency and organizational sustainability are discussed. Then, some conceptual ideas for the identification of fragilities and indicators of unsustainability are presented.

## 2. Some remarks on efficiency and organizational sustainability

Often, in research on policy for sustainable development much attention is given to eco-innovation, energy efficiency and other efficiency-improving measures, which, while supporting economic activity, should prevent environmental deterioration (Burchard-Dziubińska 2015; Gądek-Hawlena, Wóbel 2015; Lambrechts et al. 2015; Piasecka-Głuszak 2015; Słupik 2015; Szołtysek 2015; Will et al. 2015; Zepada Quintana et al. 2015). However, efficiency improvements can lead to different fragilities in a system, and via different feedback loops and dynamic effects to increased unsustainability (Meadows 1998, 1999; Sterman 2000; Taleb 2012). The idea that increased efficiency can support sustainability is related to what Gladwin et al. (1995) call the techno-centric paradigm, needs serious reflection. The techno-centric paradigm is based on the assumption that growth will deliver necessary resources to deal with environmental and social problems, while technological development will enable society to solve environmental problems. An inherent assumption is that ecosystems are resilient and markets work properly. This paradigm requires serious reflection.

Although in ecological economics (Costanza et al. 1991) it is recognized that ecosystems are resilient to a certain extent, and that they are fragilizing due to human interaction, the non-linear crises that may appear in social and economic systems seem to be underemphasized in the sustainability discourse. While the inherent crises in the economic system and institutional reasons for decline of nations (Acemoglu, Robinson 2012) is the topic of, for example, Keynesian economics (Keynes 1935), institutional analysis (Acemoglu, Robinson 2012) as well as neo-Marxist theory (Bellamy Foster, Chesney 2014), the link between and comparison of different types of crises has not been of great scientific interest until now. While, for example, the impact of the capitalist system on the appearing environmental crisis is a topic of study (Rao 2000; Smith 2013), one could wonder why environmental crises are not compared with potential economic and social crises. Maybe an inherent reason for the techno-centric paradigm is that the moment economic growth declines, unemployment increases and government budgets come under pressure, which in turn may lead to social dissatisfaction, threatening the political stability of a country. In this context, an interdisciplinary approach needs to be used to analyze the background of the excessive fear for an economic crisis, which tends to attract more attention than the threat of a complete collapse of ecosystems as we know them due to climate change.

One explanation is that environmental threats are more long-term, indirect and invisible (Platje 2011) and featured by non-linearities (Rao 2000) which tends to be difficult to understand for many people. They may have a kind of blindness for fragilizing behaviour and have difficulties with understanding the statistical nature and nonlinearities of different threats appearing in different systems (Sterman 2000; Kahneman 2011; Taleb 2012).

However, deeper research is needed, as even when people are aware of long-term threats, and are sceptic about the techno-centric paradigm, they still may not change their behaviour for many reasons. Behavioural economic theory as developed by Daniel Kahneman and Amos Tversky (see Kahneman 2011) provides an interesting framework to investigate the different types of rationalities (at the individual, organizational and system level) which are influenced by problems of asymmetric and missing information leading to bounded rationality (Simon 1957). This needs to be elaborated in the context of a multilevel approach. While an interesting approach concerns socio-technological transformations towards a more sustainable society using a multilevel perspective (where different levels of organizations and stakeholders interact at different levels of governance - individual, organization, social and political system) (Grin et al. 2010), it is still based on the idea that intervention is needed for sustainability, while neglecting the power of subtractive epistemology – remove what we think is wrong (Taleb 2012).

Generally speaking, a fundamental problem is discussing organizational sustainability is that the organization as such cannot be sustainable when society's sustainable development is the aim. System sustainability requires the fragility (or mortality) of the units or elements making up the system, in order to remain adaptively efficient and strengthen itself (antifragility). Applying Nassim Taleb's (2012) ideas to the concept of sustainable development, this situation goes beyond resilience. Resilience enables a system to recover from, for example, outside shocks. However, in an ever complicating world, where more and more unknown and/or unobservable processes appear, it is necessary to create a system which is able to deal with the increasing uncertainties.

Processes of organizational learning and consequences of informational problems are well-known elements of agency theory (e.g., Molho 1997), evolutionary (e.g., Harford 2011) and New Institutional Economics (e.g., Williamson 1985, 1998; Furubotn and Richter 1997), informational economics (e.g., Akerlof 1970), etc. Most of the theories focus on the negative effects of informational problems on economic performance at the company level, the

functioning of markets, the existence of different types of governance structures (e.g., Williamson 1985) or poor performance at the macroeconomic level (Platje 2004). In other words, they mostly focus on efficiency issues which, as mentioned, may lead to fragilities as a side effect of the efficiency improvements. Well-known examples are theories of economic growth presented in standard economic textbooks, which do not consider environmental and social impacts of this growth.

It has been argued that radical efficiency improvements can be a basis for sustainable development (Von Weizsacker 1998). Efficiency improvements enable win-win solutions, which, in economic terms, would mean that Pareto-improvements, where someone increases his/her utility (satisfaction, income, profit) without making someone else worse off, would be the basis for sustainability. Of course, a reduction in costs of production by way of reducing resource intensity may reduce the negative environmental impact of economic activity on the environment. However, rebound effects where, for example, reduced costs (and in turn reduced market prices in case of competition) lead to increased demand for a product, leading to an increase total resource use are too well known (see Sterman 2000). Another issue is that such an efficiency approach seems to rely on the idea that there is only one, or at most a few, goals that can be achieved at the same time. These goals should be assessed in a dynamic context. Suppose improved energy efficiency and innovation is successful, and leads to a significant decrease in the demand for coal. This is a win-win situation from the point of view of the company (lower costs), the customers (lower prices) and the environment (lower CO<sub>2</sub> emissions and air pollution). It contributes to climate change prevention, which reduces the probability of climate related disasters of future generations.

However, employers and employees in the coal sector will rather lose out from such a development, in particular when it would take place quickly. Although a change towards a different type of economic activity and creation of new jobs may take place, a question is how quick this is likely to happen, and whether the region where coal was produced has other serious economic alternatives. Regions dependent on coal production tend to be fragile. A close-down of coal mines may lead to a long-term economic downturn (like many cities in Poland, such as Wałbrzych), while former coal miners become structurally unemployed (they do not have the skills to pick up another available job, while often there is just no productive base to create jobs). When considering sustainable development as a whole, there are many different goals in the

economic, social, environmental and institutional fields. It is very unlikely that all these goals can be achieved at the same time. In other words, sustainable development cannot be harmonious development, and it is also not a shock-free permanent increase of the standard of living.

The basic idea is that in order to be prepared for unknown and unexpected events, the elements of a system need to engage in trial-and-error processes, where the errors are relatively small, and learning from them provides information. These errors may lead to elimination of individuals or organizations, which can provide examples for others. For example, the first (wo)man eating a poisonous fungus, when dying from this action, provided the rest of the people with the information that eating such a fungus is lethal. The moment its units or elements are sustainable themselves, the system as a whole may become fragile as incentives for bottom-up innovations and improvements may weaken. Management of such a complex system by way of top-down intervention may lead to a wide range of “unexpected side effects”, creating threats to its sustainability. In the context of organizational sustainability, theoretical analysis should focus on the different levels of efficiency which may trade-off. This not only concerns more traditional trade-offs between social, environmental and economic aspects of sustainability, but also with long-run goals of the organization as such as well as the whole industry. A direction of investigation is whether the current approach towards, for example, corporate sustainability may have as a consequence increasing fragilities at a higher level in the system, while not necessarily supporting sustainable development as such.

### **3. Fragility and indicators of unsustainability – some conceptual issues**

From the evolutionary point of view, an organization as such cannot be sustainable. As Taleb (2012) argues, a system can only evolve when the unit is mortal. New mechanisms, characteristics, skills, etc. are needed to deal with new challenges that appear in a dynamic environment. For the market to be sustainable, its players need to be fragile, e.g., must face the threat of bankruptcy. When a company disappears because of making a mistake, this provides information for other companies on what not to do. When a company becomes too large, the effects of a mistake can be externalized to their contract partners. Like large supermarkets, being able to reduce their costs by forcing their suppliers to deliver “just in time” and in fact function as

storage capacity for these supermarkets. Another example is large transport companies, only contracting services from one-man companies possessing one truck, instead of employing their own truck drivers. This increases their elasticity in case of a change in demand, and allows to reduce fixed costs. In fact, they strengthen themselves by transferring the risk of failure to the one-man companies. The moment a large company becomes sustainable (or better, immortal), the market becomes more fragile while incentives for bottom-up innovations and improvements weaken. However, a company is likely to be sustainable only for a certain period of time, as there are so many unpredictable challenges appearing through a longer period of time, that one day an event may lead to the collapse of the company. This concerns what Taleb (2007) calls Black Swans, low probability and high impact events, that are difficult or impossible to predict in advance. For example, the IT revolution made many traditional business models outdated, leading to the disappearance of many traditional book stores, providers of publishing services, photography, copy services, etc.

When applying property rights theory, the issue of organizational sustainability needs deeper elaboration and reflection. Property rights should be considered as a bundle of characteristics, that can be owned by different economic units. The possibility to transfer such rights enables adaptation and change in organizations, and provides incentives for learning processes and innovation, required to deal with Black Swans. Elements of property rights are the right to access, exclusion, withdrawal, management and alienation (Honoré, 1961; Bromley, 1991; Schlager and Ostrom, 1993, 14-5; Furubotn and Richter, 1997). Without going into details, a change in the ownership of different elements, a change in the management rules, a change in access rights, etc. in fact creates a different organizational structure, which may create adaptive efficiency that supports survival. However, an important condition is low transaction costs in the form of, for example, access to information (transparency) combined with accountability and responsibility. Otherwise, learning effects from mistakes are probably small. Mortality is still important as a stimulant for learning processes. However, this mortality now concerns the different characteristics of property rights. The analytical attention shifts towards the fragility of elements of an organization.

Indicators should be developed in the context of the transaction costs hampering the identification of fragilities (a kind of indicator of unsustainability). Furthermore, it is elementary to identify which stakeholder (see Freeman, 1984) faces what level of transaction costs and

incentives for fragilizing behaviour. Asymmetries in information, power and incentives create room for opportunistic behaviour, while enabling individual agents or organizations to strengthen themselves while fragilizing the system in which they function. Incentives should be discussed in the context of theories of property rights (e.g., negative externalities, theories of public goods and club goods) enabling the analysis of behaviour putting costs and threats on third parties (Cornes and Sandler, 1996). Furthermore, an analysis of the importance of transaction costs for removing unsustainable and fragilizing institutions, behaviour and products should be provided.

In general, sustainability indicators assess performance (see Borys 2005). Many indicators are based on the implicit assumption that growth is good, as it increases the opportunities for society to deal with a wide range of problems (Platje 2011). However, in the sustainability discourse, the idea that growth is good has been widely challenged, as it tends to lead to many environmental problems like overuse and depletion of resources, increasing amounts of waste, pollution, etc. (e.g., Rao 2000). Also, growth and equality of income and possession of property do not go in pair (Castells 1996, 1998; Piketty 2014). It is quite common that theoretical discourses focus on what should be done to deal with a certain problem, than finding out there are different side effects and rebound effects of such a policy (Sterman 2000). While all policy measures have normative elements, it is likely that there is more disagreement on what should be done than on what we should resign from (Taleb, 2012). While in both cases disagreement tends to remain, if we identify errors and mistakes, this creates less subjective/more objective knowledge than when trying to predict what is good. Agreement is probably easier to achieve when considering the individual or organizational level than when analyzing a system as a whole. One reason is that in a system more determinants interact. An example is resigning from smoking or certain types of food (Taleb 2012). In general, peoples' health is likely to improve when quitting smoking, reducing excessive use of alcohol and different types of food. However, at a system level, the effects of quitting smoking may be disputable from the economic point of view. Suppose everyone would quit smoking. While smoking-related diseases are supposed to be reduced, statistically people tend to live longer. When, say, instead of 68 years living 74 years, this may be considered to be a good thing in itself. However, the economic consequences may be negative. First of all, the tobacco industry will disappear. Tobacco farmers need to change their production profile. The governments will receive less taxes. While money not spent on smoking may be spent on other consumption goods, the tax revenues for the government may be reduced



as the demand elasticity for tobacco tends to be low (people react relatively weak to a price increase), which makes it an attractive source of tax revenue. When, for example, being pensioned at 65, the number of years a pension has to be paid increases. Furthermore, when getting older, also expenses on health care increase. As the ecological footprint is already too large<sup>1</sup>, the contribution to the problem of overuse of resources is negative. Thus, what is good for the individual from the point of view of health, and increases average life expectancy, may paradoxically be costly from the point of view of the economic system and negatively affect the sustainability of development.

In order to develop a theoretical framework for identifying fragilities and creating indicators of unsustainability, among others, the theoretical framework of the New Institutional Economics, evolutionary economics, theories of social capital, transaction costs economics and property rights economics can be useful. These frameworks can be researched and applied in the context of a system approach (see Sterman 2000) and identification of leverage points - places where elimination of unsustainable or fragilizing activity is most effective (see Meadows 1999). Three theoretical aspects will be discussed - transaction costs, transaction-specific investments and trust.

Transaction costs concern frictions in the system that hamper organizational learning, the identification of fragility and the creation or strengthening of resilience. While transaction cost theory assumes that these costs should be reduced in order to facilitate economic transactions (Coase 1937; Williamson 1985; Platje 2013) and in turn increase companies' economic activity as well as economic growth at the macro-level, this approach may need a radical change in the context of sustainability and fragility. It depends on the type of transaction costs, as well as the transaction costs for different types of activities whether there will be a positive impact on sustainability. Generally speaking, low costs of access to information for a wide range of stakeholders may reduce the opportunities for economic actors (e.g., business) to overuse and pollute the environment and increase its profits at the expense of workers. Thus, when information costs for all players are low, transparency is improved, enhancing accountability and supporting good governance (see Leal et al 2016). Facilitating economic growth by way of reducing transaction costs may lead to increased use of resources and global ecological threats,

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<sup>1</sup> An ecological footprint of 1 means that a country, city or any unit exactly uses as much natural resources as it can produce itself. In 2010 the Global footprint exceeded 1.5) (Global Footprint Network, 2010).

such as climate change. It is tried to decouple economic growth from increased use of natural resources and increasing environmental problems by way of different types of innovation which is based on the idea that we should do more with less. However, the increase in efficiency cannot only lead to the increase of resource use due to rebound effects (e.g., lower resource use can lead to increased demand for a product due to lower prices, in turn increasing the resource use in time, but also lead to different other types of unexpected side effects, e.g., fragilities). An interesting direction of research is whether the paradigm of the possibility of sustainable economic growth by way of innovation (see Gladwin et al., 1995) and increased efficiency allowing to do more with less will lead to increasing fragilities at different levels (organization, industry, society) or individual organizations becoming elastic and more able to adapt to future challenges at the expense of the sustainability of the macro system. Or, it may be as Shapiro (1978) argues, we should change the paradigm and learn to do less with less.

Following the work of Ronald Coase (1937), Oliver Williamson (1985, 1998) uses, among other things, transaction cost theory and the notion of transaction-specific investment to determine the optimal governance structure for economic activity. The lower the transaction costs, and the less transaction-specific technology and investments are, the more feasible a market becomes. The moment that information and negotiation problems exist with trade partners (high transaction costs), while special-purpose technology is being used (production cannot take place without this technology), organization of production in a company, or ultimately by the government, becomes more efficient. Dependency on an employee, a source or technology which is difficult to substitute makes an organization fragile. For example, theoretically (assuming no government regulation), a company can use free-lancers and/or temporary workers. This makes the organization more flexible in case of changing amounts of customers and orders (no full time employee has to be fired in case of decreasing amount of orders or customers, while more free-lancers can be hired when an increase is observed). However, the moment specialist knowledge is required (a similar argument goes for technical and administrative staff), besides the issue of costs of hiring (finding a new employee) and firing, there is the problem that the number of specialists is limited. An employee with expert knowledge may be difficult to replace. When using only free-lancers, the loss of such an employee may threaten the quality of goods or services produced, which in turn may lead to a reduction in the number of orders and/or customers. While this is a simplified argument, requiring deeper elaboration, the employment of

experts which are scarce reduces the fragility of the organization. However, an issue for research is to what extent such a situation reduces the incentives to innovate, e.g., to develop new knowledge and carry out research, while experts can become stronger at the expense of others within the organization.

An interesting issue for research is whether a lack of general trust fragilizes or functions as a kind of safeguard. General trust, the trust that an unknown person is trustworthy and will do what he/she promised (not engage in opportunistic behaviour) as well as trust in the government and other public institutions (Raiser et al. 2001), is supposed to support the functioning of markets and social systems. As Fukuyama (1996), argues, general trust is an important factor in economic growth through the development of larger companies. These companies, through innovations and large scale production, have contributed to the general access to cheap TVs, fridges, washing machines, computers, etc. (Compare Schumpeter 1994(1942)). However, this mass production has also contributed to increased resource use as well as resource depletion. Small- and medium-sized enterprises (SME) due to repeated transactions with known partners thrive on process-based trust, while primary trust (trust in kinship and close friends) is the basis for the functioning of small companies. These companies rely on extensive networks in order to be successful, like in China or Northern Italy (Putnam 1993; Fukuyama 1996). However, primary and process based trust may lead to a kind of closed shops, not being adaptively efficient as outsiders with new, innovative ideas are not employed in the company. In order to develop indicators of fragilities, the following issues need deeper research. They show that a multilevel approach towards fragility and sustainability is needed, distinguishing individual and system fragility and unsustainability.

SME may be less adaptively efficient than large companies operating in an environment of high general trust. These large companies have access to a larger pool of human capital, face lower transaction costs of cooperation, improving their innovative potential, and making these companies more able to adapt to unexpected challenges in the future. A large pool of SME may make the local and national economic system less fragile. In case of an economic downturn, when a really large company bankrupts, this has a huge impact on the economy, while recovery may be difficult. In turn, the SME may have less exponential growth potential, but as such is more resilient, as when, say, 50% bankrupts, another 50% survives. Barriers to entry are lower in a market with many SME, thus while the surviving SME may absorb unemployment (by, for

example, employing family members), it is relatively easy to set up a new business compared to large enterprises. Furthermore, SME may learn from each other, and individuals may learn from mistakes, which may make the whole group of companies stronger after the crisis.

A question is what is the relation between general trust and the functioning of the government and government institutions. When there is trust in the government, this facilitates the implementation of policy. When this concerns policy for sustainable development, which would, e.g., prevent climate change, improve the quality of life, etc., this may be considered to be desirable. However, the moment the government would come up with ideas which would have disastrous effects (a problem which increases with the increasing complexity in the globalizing world), people may carry out this policy without critical assessment. At such a moment, lack of general trust may be a kind of safeguard for preventing an economic, social and political system to be destroyed. This is a theoretically complicated issue, as the question is what are the cause-consequence relation between the lack of general trust and the functioning of the government and other institutions. While there may be many reasons for a lack of general trust, it may be that experience with disfunctioning institutions is a reason. However, even when the institutions are poorly functioning, the distrust or lack of trust may prevent them from becoming even more dysfunctional.

#### **4. Concluding remarks**

Due to the multilevel aspects of sustainable development, the development of indicators of unsustainability and fragilities is a conceptually difficult issue. Indicators of business unsustainability exist, showing how business fragilizes the system in which they function. The unsustainable company is featured by (Schaltegger 2012): negative direct impacts (emissions of greenhouse gases and toxics in resource extraction and production processes, child labour, corruption, excessive debt), negative indirect impacts (health effects for consumers, persistent toxic compounds, old neglected areas/polluted areas), ineffectual management systems (misinformation about sustainability aspects, side-effects of decision making, insufficient implementation of actions), blind business model (inhibition of social and ecological innovations, favouring unsustainable production and consumption schemes) and the take-make-waste model.

Indicators of unsustainable development need to be developed, relating them to the idea that the fragility of agents is a condition for system sustainability, as it enables learning processes to take place. The following issues need deeper elaboration. The individual or company should be fragile in the sense that they face the consequences of mistakes, and, for example, may go bankrupt. As such, the three- or five-firm ratio can be an indicator of fragility in a market, as it is related to the opportunities for monopolists or oligopolists to influence the rules of the game, and fragilize the market in which they function. Furthermore, a well-known phenomenon is their ability to influence political processes. When governments rely on such companies, like in case of the banking system, the situation may become very dangerous. However, fragile individuals or SME should not automatically mean “end of game” in case of failure and/or bankruptcy, as this would hamper learning effects. Many entrepreneurs try different things, and through time some of them may work. Capabilities should exist (Sen 1999) in order to be able to find a new type of business and to obtain a source of income without negatively influencing the market, the economic system or the political system. One reason is that when threatened by irreversible loss, people tend to take excessive risks as the difference between “completely bankrupt” and the choice “completely bankrupt with a bigger debt” vs. “a small probability of survival” is that in the second case there is a little hope left (see Kahneman 2011). Furthermore, when not being able to re-enter the legal market, economic agents may start to operate in the informal market. When this phenomenon becomes more widespread, this not only undermines the functioning of the formal market, but also the functioning of the state. The resulting increasing information and power asymmetries is likely to have a negative impact on environmental protection and social development (social insurance, access to health care, protection of labour rights, etc.).

As the bottom line of sustainable development is survival, a methodology should be developed in order to identify fragilities, with the aim of assessing existing threats and to eliminate them. At the level of the organization this is useful, as it enables besides learning from mistakes, also the increase in elasticity and flexibility of the organization in order to be prepared for unexpected and unpredictable challenges appearing in the future. It should be emphasized that the ideas presented there are only a basis for further research on the issue.

Indicators of good governance related to transparency and different freedoms (political freedom, freedom of press, freedom of enterprise and organization, etc.) are the basis for the capability to identify fragilities and for learning processes to take place. They should be enriched

by indicators related to transaction costs and property rights. For example, ownership identification supports responsibility and accountability, while the currently developing inter-firm connections increase opaqueness, in turn increasing information asymmetries and strengthening incentives for opportunistic behavior.

Although these indicators are rather applied to administrative units, they also can be adapted to the level of markets and organizations. Also indicators considering the opposite of fragilities, like slack, redundancies and buffers are useful, as they show the ability of an organization or system to face unexpected challenges. While redundancies and buffers tend to be considered inefficient or a cost, their elimination may increase fragility. For example, an insurance purchased via an insurance agent may be more expensive than an insurance bought online. In case of standardized damage patterns, the intermediary may be not useful. However, it is the non-standard problems that may cause significant damage. A good insurance agent is able to significantly lower the transaction costs of the client by dealing with such damages, in particular when the insurance company is behaving opportunistically (e.g., not willing to pay for the whole damage). Of course, this is a simplified example. But it shows that an insurance agent may be a kind of instrument that dampens the effect of complicated unexpected problems when incurring damage. When this kind of Black Swan is neglected, resigning from the services from the intermediary may be considered to be an efficiency gain, while in reality increasing the fragility of the organization.

Clear indicators of unsustainability are, for example, an ecological footprint exceeding 1, resource depletion, pollution levels exceeding a maximum threshold, etc. Generally speaking, dependency on one source for production can be an indicator of fragility, threatening the sustainability of an economic unit or a system. While dealing with such issues is traditionally related to the idea of diversification and resilience, policy should go beyond this (Platje 2015) and consider what Taleb (2012) calls antifragility – the capability and capacity to become stronger after an unexpected shock while limiting the threat of irreversible damage. For example, dependency on fossil fuels in the transport sector is a sign of fragility. The number of suppliers as well as the type and number of substitutes available that can replace fossil fuels when depleting show the potential for sustainable transport (OECD 1996) and to deal with future challenges.

However, new technology may cause different side effects and rebound effects, which need to be expressed by sub-indicators. For example, the use of bio-fuel influences the world

market price of food products, which negatively impacts poverty. When producing corn for biofuel on an industrial scale, this can have negative effects on rural development (scale enlargement and specialization supporting de-population of rural areas) as well as the local environment. This is a fundamental problem in developing indicators in a world which is integrating and becoming more complex – each action will have side-effects as well as difficult to predict and unseen consequences. Maybe the subsidiarity principle underlying European Union policies should be applied – create a system that can be sustained at the lowest level of human organization. This concerns municipalities, cities, villages, provinces etc. and is related to the question whether people have the capability and administrative units the capacity to determine their own path of development. Just to give a few examples, indicators, besides the mentioned environmental ones, can concern:

- Dependency on advanced technology and technology which is difficult and/or expensive to replace and maintain. Technology which can be maintained easily reduces local or organizational fragility. An example may be providing farmers with snow plows that they can be attached to a tractor, and paying them for clearing the streets from snow. This reduces dependency service provided via administrative centres farther away, and enforces the service, as not only communication lines are shorter, but these farmers also may have a personal interest in making the streets free from snow (compare Ostrom et al. 1993). Dependency on the technology and / or knowledge can also be used to identify fragilities in environmental management systems and other elements of corporate social responsibility.
- Number of potential energy suppliers and available substitutes for the energy source currently used.
- Number of suppliers and customers of a company, and the share of the largest customers and suppliers in total sales and purchases. For an administrative unit this may concern the number of products being produced in and exported from the area (this is related to fragilities caused by monocultures).
- Share of the largest companies in production and employment.
- Share of the most efficient and/or experienced workers in total output of a company (or, loss in output when the most efficient and/or experienced workers would leave).
- Number of small and medium sized enterprises per 1000 inhabitants.

- Number and diversification of civil associations and clubs (institutional thickness (Amin and Thrift 1995)).

The indicators that need to be developed go beyond traditional indicators of economic and sustainable development. For example, the number of cars per 1000 inhabitants can easily be considered an indicator of development. However, this may be not sustainable, as it is not only related to high resource use in the production process and use of the car, accompanied by negative effects on the environment. Infrastructure needed for car use has a limited capacity, and an increase in the possession and in turn use of cars not only reduces access possibilities for other travelers, but also reduces the opportunity for developing other modes of transport (tram, bus, taxi, bicycle, motor, etc.). A more useful approach may be the level of use of roads, parking space, public transport, etc., taking buffers into consideration in order to be able to deal with unexpected future development and the threat of excessive use. For example, a maximum number of parking lots for cars can be established in a city. Then, the level of acceptable use should be set. Let's assume that on an average working day during peak hours this level is estimated on 80 or 90%. This allows to deal with occasional higher demand without causing real problems with finding a place to park (a similar argument goes for the number of cars in a city, where, as Taleb (2012) argues, after exceeding a certain threshold additional cars may quickly lead to a non-linear increase in traffic jams). When exceeding this threshold, the price of parking may be increased. A question is whether this policy should go in pair with developing the capacity of other modes of transport in order to maintain the accessibility of cities. This is related to the idea that there are limits to growth (see Meadows 1972) and the question whether a system, in this case a transport system, can expand continuously.

That a multilevel and system approach is required in the development of indicators of fragilities and unsustainability was discussed in this paper on the example of trust. This needs serious deeper research and reflection as, while a high level of generalized trust in laws, regulations, government institutions, etc., support economic growth, this growth may lead to different unsustainabilities. Such trust, while supporting good governance, may also support bad policy decisions regarding social and environmental policy. At the organizational level, primary and process-based trust may make the organization manageable (lower costs of coordination), but adaptively less efficient when not open to new ideas and partners. However, the companies



remain small and make the whole system more adaptively efficient and in turn more sustainable. A question is how this influences the ability to find new partners to reconfigure characteristics of property rights to remain adaptively efficient. General trust may make this easier. However, when there is process based trust in a situation of low general trust, people are more careful with selection. As a consequence, they may not catch all the upsides, but prevent disastrous downsides.

Concluding, indicators of fragilities need to be connected with positive and negative effects as a start for a system analysis. For each (sub-) indicator the question is – does it fragilize, and can it lead to irreversible damage at what level? When we eliminate something, will the improvement be unquestionable? The ideas presented in this paper need deeper elaboration, and externalities need to be included in a set of indicators in order to prevent that some fragilities are identified and reduced, while causing new fragilities somewhere else.

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*Poza prężnością – Nowa Ekonomia Instytucjonalna, kruchość oraz wskaźniki nietrwałości*

*Streszczenie*

W niniejszym artykule, opierając się na ideach oraz pojęciach zasygnalizowanych w książce Nassima Taleba „Czarny Łabędź” oraz „Antykruchość”, podjęto próbę odpowiedzi na pytanie jak prawidłowości stosowane w Nowej Ekonomii Instytucjonalnej mogą oddziaływać na badania dotyczące zrównoważonego rozwoju. Mimo, iż zagadnienie trwałości jest często rozważane w odniesieniu do wytrzymałości i prężności, to jednak wzrastająca złożoność współczesnego świata wymaga, aby w każdym momencie być przygotowanym na nieoczekiwane i nieprzewidywane wyzwania, które prowadzić mogą do kryzysów. W artykule skoncentrowano się na identyfikacji kruchości jako zasadniczej kwestii zrównoważonego rozwoju – jej eliminacja bowiem może zapobiegać kryzysom oraz wspomagać przetrwanie systemu, tym bardziej, że polityka na rzecz zrównoważonego rozwoju może być bezwartościowa kiedy istnieje prawdopodobieństwo wystąpienia kryzysu. Na ogół, dużo łatwiej jest zidentyfikować sam problem aniżeli zaproponować działania usprawniające. W artykule wykorzystując założenia Nowej Ekonomii Instytucjonalnej zarysowano możliwości rozpoznania kruchości oraz tworzenia wskaźników nietrwałości.

*Kluczowe słowa:* zrównoważony rozwój, trwałość, kruchość, Czarny Łabędź, wskaźniki niestabilności, Nowa Ekonomia Instytucjonalna, koszty transakcyjne, prawa własności, CSR

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