

Concepts of Strong Comparability and Commensurability Versus Concepts of Strong and Weak Sustainability

Remigijus Čiegis¹, Raimondas Čiegis², Edmundas Jasinskas¹

¹ VU Kauno humanitarinis fakultetas
Muitinės g. 8, LT-44280, Kaunas

² Vilniaus Gedimino technikos universitetas
Saulėtekio al. 11, LT-10223, Vilnius

The possibilities to evaluate sustainability are essential for sustainable development. In this article some theoretical concepts, essential for evaluation of sustainability, are analysed. As the objectives, for this the content of concepts of strong comparability and commensurability and strong and weak sustainability are critically investigated. First, the essence of the sustainability concept is discussed. Then the role of strong comparability and commensurability concepts in evaluation of sustainability are analyzed. The role of capital factor in strong and weak sustainability concepts is elaborated. As the methods of the research, logic abstraction, which encompasses generalisations on theoretical systems analysis of the problems of sustainable consumption and production, according to the conclusions and reasoning of scientists from other countries was used in the article.

Keywords: *concepts of strong comparability and commensurability, concepts of strong and weak sustainability.*

Introduction

The Problem. Sustainable development philosophy, based upon the relationship harmonization of people, society and nature, (which should act as the future guarantee of the world's population), agrees that the priority should be given to real income growth. But it also emphasizes that the latter growth might be unsustainable, if it is achieved by the huge costs of environmental damage. By giving considerable attention to environment, *the sustainable development concept – approach, enabling the on-going improvements of today's life quality, achieved by utilizing natural resources with less intensity, and reserving the scope of resources or even amplifying them for the future generations*, has a better ability to disclose the comprehension of natural and artificially created functions (to people and all living-forms of the Earth).

It should be noted that sustainable ecological development requires a qualitatively new economics, acknowledging biosphere evolution processes and limitations, and preserving the balance of economic and ecological systems. And we must evaluate our path to sustainability. But it is a very complex task, because every society can be described as comprising four dimensions, the economic, social, environmental and institutional one, and each of them is a complex evolving entity in its own

right. The co-evolution of the economy in its natural and anthropogenic environment must be discussed too. In this context, the economic, social, environmental and institutional sustainability of economy must be defined and the criteria for assessing it can be derived.

The Research Objects. The main attention in the article is given to the analysis of the concepts, which can be useful to assess sustainable development.

The Objectives. The content of concepts of strong comparability and commensurability and strong and weak sustainability is critically investigated in the article.

The Tasks. In order to fulfill these objectives, the following research tasks had to be accomplished:

- To analyse the essence of the sustainability concept.
- To analyse the role of strong comparability and commensurability concepts in evaluation of sustainability.
- To analyse the role of capital factor in strong and weak sustainability concepts.

The Methods of the research. *Logic abstraction*, which encompasses generalisations on theoretical systems analysis of the problems of sustainable consumption and production, according to the conclusions and reasoning of scientists from other countries was used in the article. The main scientific works, related to the problem have been reviewed and thoroughly analysed.

The essence of the sustainability and role of strong comparability and commensurability concepts

Huge contrasts between developed and underdeveloped countries and the obvious connection between poverty and environmental protection problems inspired by *Brundtland Commission* report “**Our Common Future**” (1987) with specific *nominative* content of **sustainability** concept. The core of arguments lies in *fair distribution of natural resources among different generations, as well as among the current generation of the first, second and third world population and the founding of the positive consensus between dimensions of economic and social development*.

It can be noted that the definition of *sustainable development* used in the report “*Our Common Future*” was, in fact, a specific turn-point from the previously dominating attitude “*growth or environment*” towards a possi-

bility of – which is the essential contribution of *Brundtland Commission* report – complementing each other – *economic growth and environment* (Čiegis, 2004).

Most scientists admit that the *ecological sustainability* concept is clearer and more explicit than the *sustainable development* definition. *Sustainability* can be defined as “interrelationship between dynamic, human economic systems, where: (1) the human existence can last infinitely, (2) human individuals can thrive and (3) human cultures can evolve. But the effects of human activity should remain restrained to a limit not to endanger the diversity, complexity and functionality of ecological life-support systems” (Costanza et al, 1991). Therefore, to be *sustainable means*: 1) every process to be ecologically safe (following the *ecological compatibility* condition); and 2) every process should provide the society with the appropriate amount of production (following the *economic compatibility* condition).

The sustainable development can be viewed as the process, comprising *two* stages. In Stage One, the global human society develops *towards* sustainability; while in Stage Two, the society further evolves *not breaking* the defined limits of sustainability. On the other hand, the society confronts such a huge variety of short-term needs and long-term objectives on a global scale that it seems unjust to propose the one and only *universally feasible* way of sustainable development or to anticipate that the plan of sustainable economic behaviour is going to be prepared. Besides, the transition to sustainability might acquire different trajectories in wealthy and poor countries. Sustainability cannot be obtained once and for all. Every society will shape its sustainability after their own scenario in time and space, but none of them would guarantee absolute sustainability. After all, sustainability is not something fixed or the destination to be reached. It is a *mobile goal*, changing in accordance with knowledge, skills, individual and social values and given priorities.

It could be added that sustainability is more of a **nominative ethical principle** for further social development, discussing not what *it is*, but what *should it be*. It should also foresee the need for the constant critique of human activity and activity algorithm, which allows *sustainable to view development as ethical ideal* (Kothari, 1994). It is necessary to emphasise that the *ethical dimension* of sustainable development is receiving more and more attention in economic and management literature (see H. Daly and J. Cobb (1989), J. R. Engel and J. G. Engel (1990), S. Rockefeller and J. Elder (1992), D. Brown (1994), J. R. Engel and J. Denny-Hugher (1994), H. Skolimowski (1990)).

Appropriate evaluation of capital is quite essential to the *sustainability* approach. As shown by D. Pearce and R. Turner (1991), in order to secure society sustainable development *it is essential to preserve constant resources of nature’s capital* (*Kn*). It is still not clear how all supplies of natural resources can be characterized by a single digital constant (*Kn*)?

We inevitably approach the nature’s capital evaluating problem when the attempt is made to use the criterion of “*constant nature’s capital*”. There are two theoretical ways to measure the nature’s capital: to analyse the **phy-**

sical amount of nature’s capital or to evaluate this capital in **monetary** units. To use the first method, we should have tools to exercise the summing up of *physical* supplies but the lack of them disables us to calculate the physical quantities of different (unequal) origin. This argument could be a strong invitation to apply *monetary* expression in identifying nature’s capital constant. But usually we do experience difficulties in the process of calculating “the right price” for nature’s equity, which is not traded in markets; here we face the fundamental problem of sustainability: *we do not hold any methods of how future generations would evaluate certain components of natural resources*. It is clear that applying the monetary evaluation of nature’s capital another problem arises – that of sharp price take-off in case of nature’s capital decreasing power. This problem is fortified by general problem of resource economy: *it is possible to have a theoretically optimal solution, which could evoke unsustainable consequences of environmental protection at the same time*.

The above-stated arguments permit us to conclude that the definition of “nature’s capital”, serving as a useful metaphor for attracting attention to the significance of sustainable development, cannot be used as a practical instrument for scientific and political efforts to secure development with an ecologically sustainable content.

In economics, sustainable development is most often described as the need to maintain permanent income for humankind, generate from non-declining capital stock (*Hicksian income*). (Spangenberg, 2005) Thus in this perception at least constant stocks of human, man-made, natural and social capital (Serageldin, 1997) are considered a necessary and often sufficient criterion of sustainable development (Pearce et al., 1990; Pearce, Atkinson, 1993, Pearce, Barbier, 2000). Much of the economic debate has risen about the question whether each capital stock has to be maintained independently (Daly, 1991a), or whether the sum of all four capital stocks has to be non-declining (Pearce, Turner, 1991).

Sustainable development, as entity having four dimensions, the economic, social, environmental, and institutional one, is system of tremendous complexity. But this level of complexity is beyond the scope of current economic theories, mostly dependent on assumptions of *strong commensurability* or at least *strong comparability*. As shown by J. H. Spangenberg (2005), the mentioned dispute assumes *strong comparability* (i.e. the existence of a common characteristic, for instance, ‘utility’) and focuses on the question of *strong* or *weak commensurability*, i.e. the existence of a common unit of measurement, like monetary value. Strong commensurability implies substitutability, but it is an open question in the economic discourse to which degree the different forms of capital can be substituted against each other, and to which degree they are complementary. And due to the incommensurability of all four capital stocks, real substitution is hardly imaginable. In total, the weakness of strong commensurability, postulating the validity of the economic logic and numeraire outside the economic system, is obvious and has been broadly discussed (for instance in Ecological Economics, 1998).

It should be mentioned that indeed market value is

one criterion amongst other, which can be applied (with all the methodological difficulties known) to all four capital stocks to assess their economic sustainability. And from the scientific point of view, there cannot be such a thing as one comprehensive measure or index of sustainability. On the other hand, the understanding of capital stocks as dynamic systems and their interactions as essential for sustainable development can help to extend the perspective and to shed new light on some of these controversies.

But, as mentioned by J. H. Spangenberg (2005), not only the assumption of strong commensurability is the problem; it begins already when assuming strong comparability (combined with strong or weak commensurability). The sustainability criteria imply that the same characteristic is decisive for the sustainability of all four dimensions. However, as far as we know there is no common factor decisive for social cohesion, human satisfaction and the integrity of ecosystems. These criteria, at least as crucial to sustainable development as monetary value have to be monitored with their own yardsticks, and must be measured with their specific numeraires. And an economic theory insisting on strong comparability remains helpless when trying to understand economically relevant environmental and social processes.

Strong and weak sustainability concepts and a capital factor

Interpretations of *strong* and *weak sustainability* can also be justified by studying the possibilities of substituting supplies of *nature's* and *economic* capital or complementing each other.

Strong sustainability requires *both* types of capital not to decrease for the benefit of one of significant indicators. In other words, according to *the law of strong sustainability, the aggregate physical quantity of nature's capital or general nature's capital (despite its type) and its value should not decrease and should be preserved for future generations.* (In a more stringent version of **very strong sustainability** stationary limitations should be already defined in the macro-economic level (Daly, 1991)). In addition, according to criteria of strong sustainability, a supposition is made that nature's and economic capital are *complementary* in the production process rather than *substituting* (Costanza, Daly, 1992). Actually, it is recognised that some natural resources and services cannot be totally substituted as these forms of nature's capital supply vital services for all life-supporting environmental systems.

The version of **weak** sustainability is more acceptable for dominating economic theories, oriented towards securing the status where "wealth does not decrease in the time lag" (Pearce, 1993). (In case we apply a more narrow approach of **very weak sustainability**, then productivity potential of common economy would resume untouched to ensure constant consumption per person in a given time (Solow, 1986)). The version of *weak sustainability* contains (making an unrealistic assumption about the perfect substitution of nature's and man-made capital) the sum of the forms of both capital – nature's and economic capital – or any other aggregated unit of

measurement (for example, the "green" GNP), and requires that it not decline all the time. *So there is orientation to the stock of the capital, which we are living for the future generations, expecting that this capital stocks must be not lesser as have our generation* (Pearce, Atkinson, 1993).

In fact, the foundation of weak *sustainability* was made by J. Hartwick (1977; 1978) and his proposed idea of *compensation*, elaborating on nature's capital and its loss, which should be compensated by the additional man-made capital or by the combination of man-made capital and nature's capital. If we mark the letters K_t , H_t and R_t as resources of physical, human and nature's capital respectively in time period t , the net value of changes in general capital stock will acquire the following expression:

$$I_t^N = \frac{dK_t}{dt} + \frac{dH_t}{dt} + \frac{dR_t}{dt}$$

If $I_t^N = 0$, then the country reserves its general capital stock and it is capable of securing its consumption level. This result was named after J. Hartwick as "*the Hartwick law*". It postulates that economic growth can be considered "sustainable", if the level of investment is higher than the value of extracted resources, constituting the *scarcity rent*, i.e. if $I_t^N > 0$.

When we speak about "weak" and "strong" sustainability, it must be noticed, that the "weak" sustainability with its narrow version of sustainability started to use, when was noticed that "strong" sustainability is impossible to use in practise. T. Tietenberg (1984) defined sustainability as "*relentless utility*". Then, applying the concept of "weak" sustainability, sustainability might denote securing people's welfare in order it could thrive or at least would remain stable. Considering such interpretation of sustainability, it equals the prerequisite to ensure people's wealth not to decrease in the period of time.

Today all these debates about weak sustainability tend to focus on increasing the stock of man made capital and the degree to which other capital stocks may be reduced for this behalf (OECD, 2001). As shown by J. H. Spangenberg (2005), in other words, **sustained growth** is – often implicitly – assumed to be part of the concept of sustainable development of the economy by most authors, and only small fraction of ecological economists disagrees. From other side, substitution between different capital stocks as discussed by economists mainly refers to the function of these capitals as **production factors**. If under changing factor constellations the product is equivalent (often in monetary terms), substitution is considered possible. Unfortunately, this analysis refers only to one criterion; utility production measured in monetary terms, and completely neglects all other aspects of the economic sphere and the unavoidable interaction of all four capital stocks (i.e. *the trade offs* that occur to other functions of the respective capital stocks). In this situation, instead of simple substitution decision following a single criterion, a systematic or intuitive multi-criteria assessment of trade offs would be (and in real life is) performed.

Conclusions

1. To be *sustainable means*: 1) every process is ecologically safe (following the *ecological compatibility* condition); and 2) every process should provide the society with the appropriate amount of production (following the *economic compatibility* condition).
2. Sustainability is more of a *nominative ethical principle* for further social development, discussing not about what *it is*, but what *it should be*.
3. It is possible to have a theoretically optimal solution, which could evoke unsustainable consequences of environmental protection at the same time.
4. In economics, sustainable development is most often described as the need to maintain permanent income for humankind, generate from non-declining capital stock (*Hicksian income*), much of the economic debate has risen about the question whether each capital stock has to be maintained independently, or whether the sum of all four capital stocks of human, man-made, natural and social capital has to be non-declining.
5. This dispute assumes *strong comparability* (i.e. the existence of a common characteristic like for instance 'utility') and focuses on the question of *strong or weak commensurability*.
6. Interpretations of *strong and weak sustainability* can be justified by studying the possibilities of substituting supplies of *nature's* and *economic capital* or complementing each other.
7. According to the law of strong sustainability, the aggregate physical quantity of nature's capital or general nature's capital (despite its type) and its value should not decrease and should be preserved for future generations.
8. The version of *weak sustainability* contains (making an unrealistic assumption about the perfect substitution of nature's and man-made capital) the sum of the forms of both capital – nature's and economic capital – or any other aggregated unit of measurement (for example, the "green" GNP), and requires that it not decline all the time.
9. Instead of simple substitution decision following a single criterion, a systematic or intuitive multi-criteria assessment of trade offs would be (and in real life is) performed.

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Remigijus Čiegis, Raimondas Čiegis, Edmundas Jasinskas

Stipraus palyginamumo ir sulyginamumo koncepcijos prieš stipraus ir silpno darnumo koncepcijas

Santrauka

Galimybės įvertinti darnumą yra esminės įgyvendinant darnaus vystymosi koncepciją. Šiame straipsnyje nagrinėjamos svarbios teorinės darnumo įvertinimo koncepcijos. Pirmiausia trumpai aptartas darnumo koncepcijos esmė. Toliau išnagrinėtas *stipraus palyginamumo* ir *sulyginamumo* koncepcijų vaidmuo įvertinant darnumą, aptartas *kapitalo* veiksnio vaidmuo formuluojant *stipraus* ir *silpno darnumo* koncepcijas.

Milžiniški kontrastai tarp išsivysčiusių ir besivystančių pasaulio šalių, aiškus ryšys tarp skurdo ir aplinkosaugos problemų inspiravo *Brundtland komisijos* pranešimo „Mūsų bendra ateitis“ specifinį

norminį darnumo koncepcijos turinį.

Dauguma mokslininkų sutinka, kad *ekologinio darnumo* koncepcija yra gerokai aiškesnė ir tikslesnė negu *darnaus vystymosi* samprata. Tam, kad būtų *darnus*: 1) kiekvienas procesas turi būti ekologiškai saugus (turi būti išlaikyta *ekologinio suderinamumo* sąlyga), 2) kiekvienas procesas turi tiesti visuomenei tam tikrą produkcijos kiekį (turi būti nepažeista *ekonominio suderinamumo* sąlyga).

Darnų vystymąsi galime įsivaizduoti kaip procesą, susidedantį iš *dvių* fazių. Pirmojoje fazėje globali žmonių visuomenė plėtojasi *link* darnumo; antrojoje fazėje visuomenė toliau evoliucionuoja *neperžengdama* darnumo nubrėžtų ribų. Antra vertus, visuomenė susiduria su tokia didele trumpalaikių poreikių ir ilgalaikių tikslų įvairove pasauliniu mastu, kad net neįmanoma kalbėti apie vienintelį *universaliai teisingą* darnaus vystymosi kelią.

Be to, galima sakyti, kad darnumas daugiau yra **normatyvinis etinis principas**, bylojantis daugiau ne apie tai, kaip *yra*, bet apie tai, kaip *turėtų būti*, ir numatantis nuolatinės žmonių santykių ir veiklos algoritmų kritikos reikmę, kas leidžia apibūdinti darnų vystymąsi kaip *etinį idealą*.

Darnumo sampratai labai svarbus tinkamas kapitalo įvertinimas. Norint užtikrinti darnų ekonomikos vystymąsi, **būtina išsaugoti pastovias gamtinio kapitalo atsargas** Kn. Betgi labai neaišku, kaip būtų galima visų gamtos išteklių atsargas apibūdinti viena skaitine konstanta Kn?

Su gamtinio kapitalo įvertinimo problema neišvengiamai susiduriame, kai bandomė taikyti „*pastovaus gamtinio kapitalo*“ kriterijų. Teoriškai gamtinį kapitalą galima išmatuoti dviem būdais: nagrinėti **fizinį** gamtinio kapitalo kiekį ir įvertinti šį kapitalą **pinigine** išraiška. Bet neturime jokių būdų, kaip sumuoti skirtingus fizinių atsargų kiekius. Visa tai galėtų būti tvirtas argumentas naudoti **pinigine** išraišką gamtinio kapitalo pastovumui identifikuoti. Bet, be didžiulių sunkumų apskaičiuojant „teisingas“ gėrybių, kuriomis neprekiuojama rinkose, kainas, čia susiduriama ir su fundamentalia problema darnumo požiūriu: *neturime jokių būdų sužinoti, kaip atskirus gamtos išteklių atsargų komponentus vertins ateities kartos*.

Darnus vystymasis, nagrinėtinas kaip darinys, turintis keturias dimensijas – ekonominę, socialinę, ekologinę ir institucinę, yra labai sudėtinga sistema. Bet tai lieka už ekonomikos teorijos, besiremiančios *stipraus sulyginamumo* ar bent *stipraus palyginamumo* prielaidomis, ribų. Bet faktiškai neįmanoma sulyginti visų keturių kapitalo rūšių (žmogiškojo, sukurto, gamtinio ir socialinio) atsargų.

Darnumo kriterijus numato, kad apibrėžiant visų keturių matmenų darnumą turėtų būti taikomi tie patys rodikliai. Bet, kaip žinome, nėra vieno bendro rodiklio, kuris tiktų socialiniam bendrumui, žmogiškajam pasitenkinimui ir ekosistemų integralumui. Šie kriterijai, tiek pat svarbūs kaip ir pinigine vertė, turi būti stebimi ir matuojami savais dydžiais. O ekonomikos teorija, besiremianti *stipriu palyginamumu*, mažai tepadeda suprasti ekonomiškai svarbius ekologinius ir socialinius procesus.

Stipraus ir *silpno darnumo* interpretacijos taip pat gali būti grindžiamos *gamtinio* ir *ekonominio* kapitalo atsargų pakeičiamumo ir vienas kito papildymo galimybėmis. **Stiprus** darnumas reikalauja, kad *abu* jie nemažėtų kurio nors svarbaus indikatoriaus atžvilgiu. Tai yra, laikantis *stipraus darnumo taisyklės*, reikalaujama, kad *visuminis gamtinio kapitalo fizinis kiekis arba bendro gamtinio kapitalo, neatšizvelgiant į jo tipą, vertė nemažėtų ir būtų išsaugota ateinančioms kartoms*. (Dar labiau suvaržančioje **labai stipraus darnumo** versijoje pasisakoma už stacionarių ribojimų nustatymą makroekonominiam lygmenyje.) Kartu, vadovaujantis stipraus darnumo kriterijais, skirtingai nuo silpno darnumo koncepcijos, daroma prielaida, kad gamtinis kapitalas ir ekonominis kapitalas gamybos procese daugiausiai yra vienas kitą *papildantys*, o ne *pakeičiantys*. Tiesa, pripažįstama, kad kai kurie gamtos ištekliai ir paslaugos negali būti visiškai pakeisti, nes šios gamtinio kapitalo formos turi esminę reikšmę visos gyvybės palaikančios aplinkos sistemos funkcionavimui.

Vyraujančioms ekonominėms teorijoms atstovaujantiems ekonomistams priimtinesnė yra **silpna** darnumo versija, orientuota į būklės, kuriai esant „gerovė nemažėja laikui bėgant“ užtikrinimą. (Jei taikomas dar siauresnis **labai silpno darnumo** požiūris, tada tereikalaujama, kad bendras ūkio gamybinis potencialas būtų išlaikomas nepaliestas, toks, kad laikui bėgant užtikrintų pastovų vartojimą, tenkantį vienam gyventojui.) *Silpno darnumo* versija apima (darant nerealią prielaidą apie tobulą gamtinio ir žmogaus sukurto kapitalo *pakeičiamumą*) abiejų kapitalo formų – gamtinio ir ekonominio kapitalo – sumą ir reikalauja, kad jis laikui bėgant nemažėtų.

Faktiškai *silpno darnumo* versijos pagrindas yra *J. Hartwick* pasiūlyta *kompensavimo* idėja, teigianti, kad gamtinio kapitalo praradimas turi būti kompensuojamas papildomu žmonių sukurtu kapitalu ar žmonių sukurto ir gamtinio kapitalo kombinacija.

Kalbant apie „*silpną*“ ir „*stiprų*“ darnumą, pažymėtina, kad prie „*silpno*“ darnumo versijos, siaurai traktuojančios darnumą, buvo pereita tada, kai paaiškėjo, kad „*stipri*“ darnaus vystymosi koncepcija yra aiškiai *nepraktiška*. *T. Tietenberg* darnumą apibrėžė, kaip „*nemažėjantį naudingumą*“. Tada, taikant „*silpno*“ darnumo koncepciją, darnumas reikštų žmonių gerovės palaikymą tokiu būdu, kad ji galėtų augti ar bent jau neprastėtų. Tai tolygu reikalavimui, kad gerovė ilgainiui nemažėtų.

Kartu dauguma ekonomistų *darnų augimą* laiko darnaus vystymosi koncepcijos dalimi, ir tik tie kurie laikosi ekologinės ekonomikos teorijos požiūrio, su tuo nesutinka. Kita vertus, aptardami skirtingų kapitalo rūšių pakeičiamumą, tradicinių pažiūrų ekonomistai į kapitalą paprastai žiūri tik kaip į **gamybos veiksnį** ir taiko tik vieną kriterijų – naudingumą, išmatuotą piniginiiais vienetais, ir visiškai atmeta visus kitus ekonominės sferos aspektus ir neišvengiamą visų keturių kapitalo rūšių sąveiką. Šioje situacijoje vietoj paprasto pakeitimo sprendimo, paremto vieninteliu kriterijumi, turi būti (ir yra) vykdomas intuityvus daugiakriterinis skirtingų sričių teigiamybių ir neigiamybių įvertinimas.

Raktažodžiai: *stipraus palyginimo ir sulyginimo koncepcijos, stipraus ir silpno darnumo koncepcijos*.

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