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RATIONAL TECHNOLOGY ASSESSMENT IN NEED OF A PHILOSOPHICAL FRAMEWORK

Abstract. Armin Grunwald sketched a program of rational technology assessment (RTA) which binds TA and ethics of technology in order to secure both an empirical dimension and a normative dimension of judgments evaluating technology. The paper suggests a way of radicalizing that program. Against the background of basic presuppositions of TA, first Grunwald's program is presented, and then it is argued that in order to fullfil its task of issuing value-judgments and recommendation for decision-makers, RTA needs to be imbedded in a philosophy which grasps a normative structure of reality. Only the those value-judgments obtain rational justification. Seeing value-judgments as judgments optimizing various values involved in technology or as "if-then" judgments (thus, ultimately descriptive judgments value-neutral) does not respect cognitive, practical and evaluative rationality which Grunwald required for his RTA. At the end a hypothesis is posed that classical philosophy developed by the Lublin School of Philosophy is a promising paradigm for RTA.

Keywords: rational technology assessment, rationality cognitive-practical-evaluative, value-judgments, normative structure of reality, rational justification of value-judgments

O POTRZEBIE DOSTARCZENIA RAM FILOZOFICZNYCH DLA RACJONALNEJ OCENY TECHNIKI

Streszczenie. Armin Grunwald zaproponował program racjonalnej oceny techniki (*RTA*), łączący etykę techniki i TA, tak by zapewnić zarówno empiryczny, jak i normatywny wymiar sądów wartościujących technikę. Niniejszy artykuł przedstawia sposób radykalizacji tego programu. Na tle podstawowych założeń TA zostaje naszkicowana propozycja Grunwalda, a następnie pokazane, że zrealizowanie celów RTA – formułowanie ocen i rekomendacji dla decydentów – wymaga osadzenia RTA w filozofii, która uznaje normatywną strukturę rzeczywistości. Dopiero wtedy sądy wartościujące i płynące z nich rekomendacje RTA uzyskają racjonalne uzasadnienie. Traktowanie tych sądów albo jako sądów optymalizujących rozmaite wartości obecne w technice, albo jako sądów typu

"jeżeli-to" (a więc ostatecznie jako sądów opisowych aksjologicznie neutralnych) nie respektuje wskazanych przez Grunwalda wymiarów racjonalności (kognitywnego, praktycznego i ocennego). Zostaje postawiona hipoteza, że filozofia klasyczna, rozwijana przez lubelską szkołę filozoficzna jest dla RTA obiecującym paradygmatem.

Słowa kluczowe: racjonalna ocena techniki, racjonalność kognitywna-praktyczna-ocenna, sądy wartościujące, normatywna struktura rzeczywistości, racjonalne uzasadnienie wartościowań

Rational Technology Assessment in need of a philosophical framework

Almost 20 years ago Armin Grunwald sketched a program of rational technology assessment (RTA), which combined technology ethics and technology assessment[1]. In my paper I will radicalize that program. I claim that rational technology assessment requires embedding it into a philosophical framework, as without such a framework there is no rational justification for value-judgements and recommendations which RTA is suppose to provide for various decision-makers. The lack of a philosophical framework might be a hidden reason of shortcomings in the TA methodology. As Jan Kaźmierczak rightly observes, „'Technology Assessment' possesses its general philosophy, terminology and certain institutional forms. Yet, it still lacks – both in the area of research and of application – a consistent methodology which would enable to fulfill tasks of TA; and this maybe is a challenge to scientific environment open to new demands"[2]. I will argue for my thesis in three steps. I first discuss some presuppositions on which TA (and technology ethics) work, and secondly I present A. Grunwald's project of rational technology assessment. In the third step I will show that Grunwald's project cannot be completed, unless we accept certain philosophical theses. In conclusions I suggest what philosophy can serve as a general framework for RTA.

1. Basic presuppositions of Technology Assessment

Let us start from an analysis of the term itself. In its primary sense the term „technology assessment" denotes an activity: assessing a certain kind of beings called technology. The term „technology" is here ambiguous. If the term is taken in a distributive sense, it may denote either a concrete type of methods of producing something (realized in processes) or a concrete type of artifacts; it may even denote certain knowledge and skills (called „technical"). I will not analyze the activity of assessing of the two latter objects. However, the term „technology" can

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[1] Grunwald A.: Technology Assessment or Ethics of Technology. "Ethical Perspectives", Vol. 6, 1999, p. 170-181.
[2] Kaźmierczak J.: Ocena oddziaływań społecznych innowacyjnych produktów i technologii. Technology Assessment, [w:] Knosala R. (red.): Innowacje w zarządzaniu i inżynierii produkcji. Oficyna Wydawnicza Polskiego Towarzystwa Zarządzania Produkcją, Opole 2013, s. 124-137.

also be understood in a collective sense and in this case it denotes a domain of culture. We may then assess technology as a whole and also its development.

When we talk about technology assessment probably the most important presupposition is that technology is value-laden. Value-ladenness refers both to methods (processes) and to artifacts; moreover, the direction of technological development is also value-laden, as – for example – it may promote and allow to realize easier certain values as well as make their realization more difficult. The discussion concerning value-ladenness of technology is nowadays vivid and it is not easy to determine what the value-ladenness consists in and how it manifests itself[3]. Three things are nevertheless clear. First, technology – or at least modern technology – is not a passive and neutral tool, waiting to be used by a human being for one's purpose, but its existence and use restructures human action, individual life, and even society as a whole; secondly, restructuring with all its consequences does not appear in result only of indented actions or of immoral use; it appears also in result of its very existence and of its proper use[4]; third, values with which technology is laden are of various kinds: economical, technical, esthetic, ethical, social, personal, political, etc. If this is the case, introducing a new technology (in any sense of that term) restructures to a lesser or greater degree our life, activities and society. We can then evaluate effects of that restructuring, taking into account our values and interests. For restructuring may mean that certain needs are satisfied, certain values promoted, certain actions made possible etc, but it may also mean that certain interests are threatened, certain values are in peril, certain professions needless... Of course, introducing a technology requires that it is designed, produced, used and disposed – and evaluation may concern any of those phases. Thus, introducing a technology into the world requires decisions of relevant actors, but in order to make such decisions in a responsible way they need "orientation knowledge", which would help them (policy-makers are just one of the group which needs such knowledge). Such knowledge is needed, for there are value-conflicts of both an internal and an external character. There are inner value-conflicts, as in the majority of cases one cannot design and produce a technology, maximizing all values at stake. After all if one wishes to maximize efficiency of an instrument or its esthetics, usually one cannot make it cheap... And there are external value-conflicts, when the existence and use of a valuable technology threatens some other values. Social protests against genetically modified organisms (which are artifacts) can serve here as an example: possibly future security is in conflict with economic and social (war against hunger) values. Thus, what is at stake in TA is also finding rational means of solving value-conflicts.

TA is to provide a kind of expertise for decision-makers, facing technology value-ladenness and value-conflicts. "Orientation knowledge" should therefore include both descriptions and recommendations. TA may be then defined as a field of research which: (1) analyses – both *ex*

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[3] See: Lizut R.A.: Technika a wartości. Spór o aksjologiczną neutralność artefaktów. Wydawnictwo Naukowe Academicon, Lublin 2014.

[4] A good example can be found in: Morrow D.R.: When Technologies Makes Good People Do Bad Things: Another Argument Against the Value. "Neutrality of Technologies, Science and Engineering Ethics", Vol. 20, 2014, p. 329-343.

post and in an anticipatory way – technical innovations and consequences of their coming into being (design and production) and of their being used (consequences of introducing into society and of utilization) with respect to relevant values; (2) develops alternative paths of development; and (3) makes recommendations to decision-makers. Thus, TA plays a role of a guide which among many possible innovations helps to choose those that are desired and to slow down progress where it could be dangerous. The above definition of TA gives rise to further questions. As J. Kaźmierczak rightly observes, when analyzing a given activity, we should complement the question „know-how?" with other questions: „know-who?" (subject of activity and recipients of outcomes of activity), „know-what?" (the nature of activity), and „know-why?" (aims of activity)[5]. TA is no exception and these four questions should be posed with regard to that activity. The question "know-what" is here crucial, as answering the other questions depends on the analysis what is a given activity and what are its expected outcomes. A powerful answer to that question was given by Armin Grunwald in his project of Rational Technology Assessment (RTA). In what follows I will present main theses which constitute Grunwald's project and then analyze whether the project is sufficient to fulfill aims of TA.

2. Armin Grunwald's project of Rational Technology Assessment

Armin Grunwald wrote his paper in 1999 and this might be a reason why the issue of the value-ladenness of technology is not there explicitly discussed. Nevertheless he accepts the ambiguity of technology in the sense that the development of technology does not automatically lead to human and social progress but it might threaten that progress, or at least it creates risks along with benefits. This in turn creates the need of "early warning" with respect to risks and potentials of new technologies. "Technology policy pursued by parliament or government therefore – Grunwald claims – is in need of scientific consultation"[6]. He however observes, that scientific discussion on how to acquire and establish orientation knowledge for decision-makers is sectoralized in two branches: the ethics of technology, and Technology Assessment. Ethics stresses the importance of normative implications of policy decisions as well as the importance of moral values and of moral conflicts; Technology Assessment takes a descriptive approach and relies on economic and sociological research. The two branches are based on different assumptions on what constitutes relevant operational knowledge and how it should be obtained. Grunwald sees such a sectoralization as artificial, for two aspects should be included in orientation knowledge: normativity (what should be done) and operationalization (recommendations taking into account how the world really is). Thus, Grunwald concludes: „if scientific consultation on technology policy is to be successful then it must be operational as

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[5] See: Kaźmierczak J.: op.cit., p. 125.
[6] Grunwald A.: op.cit., p. 170.

well as normative"[7]. Ethical considerations must be practically relevant and practically relevant ethics should not be *only* appelative but also advisory. This means that ethical considerations should be developed in a specific context and with regard to processes of technological development and their outcomes. TA deals with facts and provides early warnings with respect to risks resulting from new technologies, develops possible consequences of various decisions as well as shows alternative options. Yet, it does not give recommendations what should be done, but only information what could be done. I conclusion Grunwald claims that we need an integrated approach which would overcome both normativistic misconceptions and naturalistic misconceptions. The former means that the ethics of technology produces norms and recommendations without any connections to societal practices. The latter means that descriptive investigation on risk perception and risk acceptance is not able to show that this is what *should* be accepted, for factual acceptance of values is not sufficient to make conclusive decisions as to the normative acceptability – in other words, the question is whether certain decisions are right decisions, not whether those decisions are simply accepted by parties involved. In fact – Grunwald claims – the ethics of technology and technology assessment are rather complementary than contradictory, for "the scientific deliberation of political institutions of the public must be normative (at least in questions affecting moral conflicts) as well as operational if it is to be successful"[8]. Taking them separately is not very helpful for creating adequate orientational knowledge for technology policy.

The project integrating the ethics of technology with technology assessment A. Grunwald calls Rational Technology Assessment (RTA). The basic term here is rationality. Grunwald criticizes a reductionistic view of rationality which sees rationality as applying only toa description of facts and leaving the question of evaluation and prescription to a decisionistic procedure. Yet – Grunwald claims – evaluations and prescriptions can be rationally handled, when we ask questions of whether or not setting certain aims is rationally justified. In short, TA as it is accepts instrumental rationality and overlooks practical rationality. Here Grunwald appeals to the concept of rationality developed by Nicholas Rescher. Rescher distinguishes three types of rationality. Epistemic (cognitive) rationality is concerned with beliefs – rejecting false statements and accepting true statements. Practical rationality (often call instrumental rationality) concerns actions: finding effective means to a chosen goal (maximization of expected utility). Evaluative rationality concerns the choice of goals and values – finding what values are in themselves worth achieving[9]. In this perspective any rational decision takes into account all three rationalities.

RTA starts from a presupposition that the setting of aims for political, societal and technological actions is the most important factor for assessing technology, not just highlighting

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[7] Ibidem, p. 171.
[8] Ibidem, p. 176.
[9] See: Rescher N.: Rationality: A Philosophical Inquiry Into the Nature and the Rationale of Reason. Oxford University Press, Oxford 1988.

negative consequences of technology development. RTA then accepts a perspective of shaping the future by technology, instead of a perspective of predicating future consequences of technological progress. Thus, an assessment of any technology requires balancing expected negative consequences against goals and purposes. The level of goals is however more fundamental, for any evaluation of consequences as negative is done in the perspective of goals and values. From goals and purposes set for societal and technological progress orientational knowledge can be obtained by the so-called backcasting. The assumption behind this method is that after having identified the strategic objectives in a particular future, it is possible to work backwards to determine what policies should be implemented to guide a particular sphere or a society in general in its transformation towards that future. The purpose of backcasting is not to prepare blueprints, but to show relative feasibility and implications (environmental, social, political etc) of different futures on the assumption of a clear relationship between goal setting and policy planning. Moreover, backcasting is not only about how a desirable future can be attained, but also about analyzing the degree to which undesirable futures can be avoided or responded to. Also desirability or undesirability of future is determined, as visions themselves can be analyzed and assessed[10]. Thus, this approach takes into account evaluative, practical and cognitive rationality as explained above. Yet, as Grunwald rightly observes rationality itself is an evaluative concept. That is, we *judge* certain things as rational: beliefs, decisions, attitudes etc. Moreover, it is a lauditive concept, for by judging something as rational, we praise it that it is as should be. Thus, the criteria of rationality become a crucial issue.

How are we then determine the criteria of rationality, necessary for rational technology assessment? According to Grunwald, "the criteria of rationality are to be justified by reviewing and reconstructing normative structures of societies"[11]. The appeal to the normative structures of societies – he claims, following J. Habermas – is to secure the practical relevance of normative ideas. Especially "it is necessary that the rationality assessment be based on a factually accepted pre-discursive agreement as the basis for communication and consensus"[12], for without such an agreement there would be no rational basis for resolving conflicts and discussions on long-term issues. Since pre-discursive agreements are relatively stable and related to "the real world of life", the reference to their acceptance while assessing possible futures and technologies frees us from any dependence on short-term and chance event. Thus, RTA – on the basis the normative structures of societies – is able rationally "to formulate well-founded, long-term and reliable perspectives for science and technology policy. Its prime aim should be to make it possible to cope rationally, efficiently and productively with foreseeable uncertainties in decision making"[13]. Yet, science and technology are also subjects of social conflicts in which models of future compete with one another. What we need are rational ways

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[10] See: Grin J., Grunwald A.: Vision Assessment, Shaping Technology in the 21st Century: Towards a Repertoire for Technology Assessment. Springer Verlag, Berlin 2000.
[11] Grunwald A.: Technology…, op.cit., p. 177.
[12] Ibidem.
[13] Ibidem.

of coping with conflicts and those rational ways – criteria of rationality are to be built upon normative structures of societies – are a precondition for long-term reliable policies, also policies for science and technology. Here ethics enters into considerations, as ethical considerations serve to maintain and develop rational practices in the face of normative conflicts. We may even add – following Grunwald – that respecting rationality is itself an ethical norm. RTA should then be able to assess consequences of science and technology in the light of normative models of future, as well as to search for alternatives and preventive measures to avoid ruinous investments or blind alleys in research and in the science and technology policy.

We need however be aware Grunwald continues – that decisions in the science and technology policy shape societies and their future by opening certain paths and closing some others from a variety of possible opportunities of future development. The evolution of a given society is then directed to an intended future, and the space for future decision-makers is shaped. In the case of technology policy decisions create framework conditions in which any future development of technology will take place. This has to be done reflectively and rationally. It might then be understood as planning, although not planning of detailed actions or designing algorithmic procedures to reach a predetermined final state. Rather it should be first of all planning at the level of goals and objectives. And it is always acting under risk of a failure. The depth of planning and set of goals – and thereby influencing the framework for current technology development and current technology market – are themselves a subject of reflection. Taking into account various values, decentralization of society as well as the restriction on resources, decisions building that framework have to be "optimal" with respect to justified criteria and in this sense rational, not only on the level of means but also on the level of goals, as they are directly connected to values, moral values including. „Varying moral ideas – Grunwald states – are to be processed with the available resources of rationality in order to make ethical judgments on the desirability or acceptability of the consequences of science and technology. Especially it is necessary to look carefully at the field between empirically controllable acceptance on the one hand and normative acceptability, relying on implicit normative presupposition in society"[14]. Grunwald concludes: "Reflecting on the framework conditions for technology development […] using criteria of rationality in this sense is the main task for rational TA"[15]. RTA should incorporate that permanent reflection under the aspect of practical, evaluative and cognitive rationality. This approach claims to be at the same time operational and normative. The quality of policies is judged by practical and cognitive rationalities with respect to the means-ends relationship, and by evaluative rationality with respect to purposes chosen (including their ethical justification). Yet, the situation is even more complicated. Grunwald claims that „rationally steering technology […] include flexible elements and has to remain provisional: provisional with respect to normative premises (in the sense of a moral provisoire), to the knowledge taken into account, to social priorities and values and to the pursued aims […], supplemented, however, by the statement that modifications are

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[14] Ibidem, p. 176.
[15] Ibidem, p. 178.

not only required in the case of error but also in the case of the change of purposes and framework conditions or other terms of reference."[16] Thus, we need permanent reflection, as elements that build the framework for technology development are changing. Is such RTA analysis sufficient to provide recommendations for decision-makers? In order to answer this question we need to consider the status of RTA judgments. I will then show inself that taking into account a normative stricture of society is not enough – we need a normative structure of reality.

3. In search of a normative structure of reality

I fully agree with Grunwald's claim that what is needed – facing the speed and quality of technological development – is the integration technology ethics and technology assessment. As a matter of fact with technology assessment we need to integrate not just ethics but the axiology of technology, taking into account the whole range of values involved[17]. I also agree that the division between normative ethics and descriptive TA is artificial – such a division would require a value-neutral language which is impossible to achieve, at least in social sciences. For social sciences are laden with terms that ignore the fact/value dichotomy. To give examples: cruelty, unemployment, pathology, security – they are both descriptive and evaluative[18]. I also recognize that Grunwald's RTA program satisfies a general social and political need to base policies on rational and ethical foundations. A recent document entitled *Ethics & Principles for Science & Society Policy-Making. The Brussels Declaration* states: "We call upon all stakeholders – governments, scientists, industry and the public at large – to cooperate in a joint effort to ensure reliable, evidence-based policy-making for the benefit of society as a whole. The alternative, in our view, is a continued dangerous slide into the realm of policy-biased evidence"[19]. The RTA program is a good response to that call. Yet, it is not radical enough.

Suppose a RTA person is called to provide an expertize for policy-makers. As noted earlier, RTA takes a perspective of shaping future and in this perspective assessing a technology amounts to balancing negative consequences of introducing that technology into society and values/goals set for the future. The assessment needs to be done within the normative structure of society which determines a framework for communication and gives criteria of rationality.

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[16] Ibidem.

[17] See for example: Echeverria J.: Science, Technology, and Values. Towards an Axiological Analysis of Techno-scientific Activity. "Technology in Society", Vol. 25, 2003, p. 205-215.

[18] For further analyses of this issue see for example: Lekka-Kowalik A.: Odkrywanie aksjologicznego wymiaru nauki [Discovering the axiological dimension of science]. Wydawnictwo KUL, Lublin 2008; Putnam H.: The Collapse of the Fact/Value Dichotomy and Other Essays. Harvard University Press, Cambridge MA and London 2002.

[19] Ethics & Principles for Science & Society Policy-Making. The Brussels Declaration, https://www.knaw.nl/nl/actueel/nieuws/BrusselsDeclaration.pdf, 16.04.2017.

And the assessment should be a synthesis of some knowledge of facts (cognitive rationality), of recognition of the means-goals relationships (practical rationality), and of the judgment concerning values/goals which a given policy is to serve (evaluative rationality). What is then expected from a RTA expert? It seems that ultimately the so-called technology assessment is a kind of a rational judgment from which a recommendation somehow follows for policy-makers.

I will not consider an interesting question of how to move from such assessment judgments to recommendations. My point now is to understand „know-what" of the RTA through answering the question of what status those rational judgments possess. In the most general form a RTA judgment would be: X is good (good stands here for ascribing a value to X-technology which is an object of consideration in the technology policy) and therefore X should be done (implemented, produced, financed, etc). How can we interpret that judgment? There are three options. The first one sees it as an optimalization judgement. An idea of an optimalization judgment was developed by Evandro Agazzi in the context of science ethics. According to Agazzi one arrives at such a judgment by dialectical comparizon of various possible decisions and this should result in determining in an objective and rational way mutual relations between various values and obligations in a concrete situation[20]. Yet, there are two problems in treating evaluative judgments of RTA in this way. The first issue is that optimalization judgments might vary from one RTA-expert group to another. We need then either an algorithmic procedure for balancing values[21] or a kind of meta-RTA judgment to determine the judgment of which group should be taken into account in technology policy – otherwise an optimalization judgment is not effective and persuasive. We may also decide to have just one group of experts for each particular decision to be made in technology policy. The main issue is then how to choose experts. J. Kaźmierczak suggests that people involved in technology assessment should be ethical in order to rely on their expertise[22]. This however brings the issue of moral expertise. Why certain people chosen by those responsible for technology policy should determine what is right and wrong in a given situation? There is an answer to the latter problem: participation of stakeholders in backcasting and therefore also in passing an optimalization judgment on a given technology policy[23]. Thus, the optimalization judgment would be a result of negotiation and persuasion. Here we have to assume that all values are negotiable, including moral values, what is a controversial assumption. Of course, for RTA both procedures for compromizing values which result in a judgment or negotiating a judgment between groups of experts and stakeholders must comply with the normative structure of society as well as the criteria of rationality which follow from it are taken into account. Yet, there is a deeper problem. Judgments arrived at certainly have normative power. They respect

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[20] The idea of ethical judgements as optimalization judgements is developed within a system-theoretical approach. See: Agazzi E.: Right, wrong and science. The Ethical Dimensions of the Techno-Scientific Enterprise. Rodopi, Amsterdam-New York 2004.

[21] J. Echeveriia suggests a kind of axiometrics. See: Echeveriia J.: op.cit. In this case we might not need any RTA.

[22] See: Kaźmierczak J.: op.cit.

[23] For such a proposal see: Quista J., Vergragt Ph.: Past and future of backcasting: The shift to stakeholder participation and a proposal for a methodological framework. "Futures", Vol. 38, 2006, p. 1027-1045.

evaluative rationality concerning the goals which a given policy serves, as well as practical rationality as the action suggested through that judgment should promote those goals. They do not however respect cognitive rationality with respect to the realm of values and goals. The question of truth and falsity of claims constituting the normative structure of society does not even arise after that normative structure is inquired into; it is simply taken for granted. It might however be a case that a certain claim of a normative structure of a given society is false – it states as it is not in the realm of values. Such a case does not arise only if we accept that a current structure of a given society is true by convention. This is however a philosophical issue: is the acceptance of values sufficient to establish their validity? There are good reasons to think that it is not – after all we had such social practices as slavery with its values and we are not claiming that it was correct at a certain point of history; rather we claim that it was erroneously accepted. I will not develop this point further as I bring it only to show that understanding an RTA-judgment as an optimalization judgment works only if we assume that values are conventional, and agree that all types of values can be compromized in the process of balancing goals against negative consequences of technological development.

We may also interpret the RTA-judgement as an if-then judgment and on two levels: if the normative structure of a given society is such and such then it follows that X is good and should be done; and: if goals are such and such then X is good and should be done. This is very much in the spirit of value-free science as proposed by Max Weber. In one version it would be a sort of deductive reasoning, where both the normative structure of a given society and the goals are accepted as "given". For the "given" goals within a normative structure alternative policies can be elaborated. We face here a problem that different societies may have different normative structures, and therefore recommended policies might be different. Thus, RTA might have only a local character. However, the development and use of technology has a global impact, so policies in one society in fact influence the state of societies with different policies. RTA of a more powerful society governs other societies.

In a more sophisticated version RTA would be a rational debate on value-judgements. Weber shows very precisely what would result from such a debate[24]. The point of discussion of practical value-judgements can only be: (1) to work out the ultimately "coherent" value-axioms. It is especially important if there are opposing opinions as to what a proper policy should be. Such a procedure starts with an analysis of particular value-judgements in terms of meaning, and then ascends to more and more fundamental evaluative attitudes. It does not use the methods of any empirical discipline and does not increase our knowledge of facts. It is "valid' in the same sense as logic; (2) to deduce "consequences" from particular value-positions in terms of evaluative attitudes, which would follow from particular value-axioms if they and they alone were made the basis of the practical evaluations of states of affairs. The argumentation is

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[24] For this issue see: Weber M.: The Meaning of 'Ethical Neutrality' in Sociology and Economics, [in:] Shils E., Finch A. (eds.): The Methodology of the Social Sciences. Free Press, New York 1949, p. 1-47.

entirely on the level of meanings, but the procedure depends on empirical inquiry of facts to be evaluated; (3) to ascertain consequences that would necessarily follow from practical realization of a particular evaluative attitude to a problem (technology in our case) because of certain unavoidable means must be used, and that certain inevitable, but not intended, side-effects must be expected. This is purely empirical inquiry, but it indirectly influenced the value-position, because it might show that (a) the intended goal (value-postulate) is not realizable, because there are no means to achieve it; (b) that the realization would be more or less illusory, for there would occur unintended side-effects that would frustrated the plan; (c) that certain means and side-effects should be considered, that were not taken into account in initial plan. The latter could create a new evaluative problem for advocates of a given value-postulate. It might also happen that new value-axioms, and value-postulates derived from them might be discovered with which a value-postulate under discussion conflicts in principle at the level of meaning or at the level of consequences. This interpretation of RTA judgements takes into account reality [a normative structure of a society], so it complies with cognitive rationality, as well as with practical rationality, for it establishes means-end relationship. Yet, it does not respect evaluative rationality, for it does not establish which of normative structures *should* be accepted and how to solve value-conflicts – RTA judgments are only conditional.

What remains is giving a foundation for a TA debate in a philosophical framework, where the issue of values and their status is not reduced to a normative framework accepted by a given society and where judgments about values are seen as true/false. In this point of analysis cognitive rationality and evaluative rationality merge, as both the sphere of facts and that of values are subject of cognition and knowledge. And then practical rationality (the choice of means) becomes more nuanced – the choice of means is separately evaluated as well as circumstance and consequences of the choice; moreover, this approach opens up the possibility of objective criticism of decisions – for example a decision of policy-makers – not from a point of view of a normative structure of a given society but from an objective structure of values, of the status of human beings, relationships between individual and society. The suggested framework does not guarantee that we are not mistaken in our cognition of facts and values, choice of means etc. We have to assume a reformulation of that framework. Yet, only in such a framework we are able to respect the rationality of those for whom TA prepares its recommendations, for there is a rational answer to the question of why that decision, and not others is right as well as to respect all three facets of rationality. There remains a question of which philosophy is able to serve as a framework for RTA. I will not develop an answer to this question but only specify some conditions. First, it has to be realistic, i.e. it should accept a cognitive access to reality; secondly it has to admit a logico-methodological rigour to allow people for arguing, not just persuading; thirdly, it has to be empirical to allow us to start afresh debates when new data occur. I state as a hypothesis that a classical philosophy as it is understood in the Lublin school of philosophy is suitable to become a framework for RTA but

to justify that hypothesis would need research that goes beyond the scope of my paper[25].

Let us sum up the considerations. J. Kaźmierczak is right that if any form of TA is to be effective we need a better methodology of providing evaluative judgements and recommendations for decision-makers. A. Grunwald is right that TA judgments in a particular case should take into account both normative structures and fact-structures and this is the reason why he develops the program of rational technology assessment. Yet there is a problem of the status of TA judgments. If we interpret a TA judgment as an optimalization judgment, its justification in fact boils down to a kind of persuasion – we negotiate a judgment with relevant parties. Yet, this procedure does not guarantee that this is a *right* judgment, even if it is accepted by the parties. It also takes into account the interests of parties involved but there is no procedure to secure that all parties affected by the decision are invited to negotiations. If in turn we interpret a TA judgment as an "if-then" judgment, TA is able to provide alternative scenarios but not real recommendations. In the first case a TA judgment respects – to use Rescher's terms – practical and evaluative rationalities, but not cognitive, as the sphere of values is excluded from considerations. In the second case practical and cognitive rationalities are respected but not evaluative. Yet, in order for the RTA to work all three kinds of rationalities must be respected. In order to fulfill this condition RTA must be founded in a normative structure. Here I agree with Grunwald, but I disagree with him that it should a normative structure of society. He himself notices that an acceptance of a judgment does not make that judgment right. So I suggest that RTA must be founded in the normative structure of reality but this requires to place RTA in a framework of philosophy which would not only inquire into the normative structure of reality (people think differently on that topic what sociological research can show) but also justify its claim by appeal to the metaphysical structure of reality. I suggested the classical philosophy as a suitable framework for such RTA. Further research should show whether my hypothesis is correct.

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[25] For details of that paradigm of developing philosophy see: Krąpiec M.A., Maryniarczyk A.: The Lublin Philosophical School. Polskie Towarzystwo Tomasza z Akwinu, Lublin 2010; Kamiński S.: Method in Classical Philosophy, [in:] Borkowski L., Stępień A.B. (eds.): Studies in Logic and Theory of Knowledge, Vol. 2. TNKUL, Lublin 1991, p. 105-118.

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