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Maksymilian Smolnik
Pontifical University of John Paul II in Krakow
Kraków, Poland
e-mail: smolnik@agh.edu.pl
ORCID: 0000-0003-0753-5190

PHILOSOPHY IN ENGINEERING SYSTEMS OF ACTION: ANALYSIS AND INTERPRETATION OF THE SELECTED ONTOLOGICAL ASPECTS OF JÓZEF KONIECZNY'S THEORY OF ACTION

Abstract. Designing and examining systems of action plays an important role in modern engineering. Such a general approach to actions is also supportive to the discussions on the development of artificial intelligence agents. As a philosophically remarkable and practically useful approach to actions the theory of action proposed by the Polish philosopher, scientist and military specialist Józef Konieczny undergoes here further considerations.

The Konieczny's concepts have not been intensively thoroughly researched and further developed, and a deep philosophical analysis is the condition for their efficient application when solving real-life problems.

This paper presents own interpretations of Konieczny's views on action, including own clarifications or additions to the original solutions. The main aim is to identify the essential elements of the theory of action and analyse it in the ontological context. The selected structures of action were characterised, the analysis of the fundamental concepts was conducted, the ontological characterization of the types of actions and the objects involved in action was developed, and the certain issues of realism and functionalism identified were discussed. The results obtained constitute an important testimony to the practice of philosophy in technology and are useful when aiming at further development of the approach analysed.

Keywords: Praxiology, Theory of action, Józef Konieczny, Systems of Action Engineering, Philosophy in technology, philosophy of technology.

1. Introduction

Designing, examining and modernising the systems of action plays an important role in various fields of modern engineering. Such a general approach to actions is also supportive to the discussions on the essence of an acting subject or a subject solving certain problems (Brożek & Ol-

szewski, 2013, 121–129; Brożek & Olszewski, 2014), agency and the development of artificial intelligence agents, especially these considered as ethical agents involved in social relations (Polak & Krzanowski, 2020).

As a philosophically remarkable and practically useful approach to actions the theory of action proposed by the Polish philosopher, scientist and military specialist Józef Konieczny (1936–1984) undergoes here further considerations. Konieczny is known for developing several new theories in the field of technological and military sciences (cf. Kaczyński, Miszalski & Sienkiewicz, 1985): the attempt of formalisation of praxiology (Konieczny, 1968; Konieczny & Stonert, 1971), the theory of maintenance of technical objects (Konieczny, 1975a; Konieczny & Olearczuk, 1965), the cybernetics of conflict (Konieczny, 1970a), the theory of supporting (Konieczny, 1980), and the Systems of Action Engineering[1] approach (Konieczny, 1983a). Each of them requires certain approach to the analysis and/or synthesis of actions, therefore the development of the own theory of action was essential for the other fields of his scientific and philosophical interests.

Despite such outstanding achievements, the works of Konieczny have not been intensively thoroughly researched and further developed. Therefore, it is important and justified to analyse and attempt to improve these solutions. In this case, deep philosophical analysis is the condition for the efficient application of the considered concepts when solving real-life problems. Although prepared applying the general and philosophical concepts as well as the elements of formal logic and set theory, the early (e.g. 1965–1970) works analysed consider the ontological aspects of action to the limited extent compared to the monograph *Systems of action engineering* (Konieczny, 1983a). The latter work presents significantly developed philosophical approach to actions in terms of their existence, identification and description. The analysis of the recalled writing is sometimes complicated because of the structure of the original texts and gradual development of the concepts in question over the years. These are other reasons justifying the attempts at original, creative interpretations of the works of Konieczny.

The paper covers the elements of such an attempt,[2] and presents own interpretations of Konieczny's views on action, including own clarifications or additions to the original solutions. The main aim of the work is to identify the essential elements of Konieczny's theory of action and analyse it in the context of the ontology of action. The methods adopted include the analysis of the original writings, interpreting and conceptual works based on thought experiments. The results obtained constitute an important testimony to the practice of philosophy in technology and are useful when aiming at

further development of the approach analysed (e.g. developing an ontology of action or discussing the issue of the roles of the objects during action or the philosophical characteristics of the subject, agent or aim of action.)

2. Recognising action in the writings of Konieczny

Konieczny refers to action[3] through the objects he defined (Konieczny, 1968; Konieczny, 1970b; Konieczny, 1971a; Konieczny, 1983a; Konieczny & Olearczuk, 1965; Konieczny, Olearczuk & Żelazowski, 1969):

- the chain of action
- the subsystem of action
- the system of action
- the executor of action
- the process of action.

The five objects mentioned above appear in the works from 1968–1969, and in SAE only the first three are defined and used.[4] Regardless of this issue, the consideration of any of the mentioned objects practically corresponds to the consideration of a certain action (to which the considered object refers[5] – this is analysed in more detail in sections 3.3 and 4.1). The following paragraphs provide definitions of the individual objects introduced by Konieczny.

2.1. Chain of action

The chain of action is defined as an ordered triple of objects, also called *the links of the chain of action*, which are (Konieczny, 1968, 14–15; Konieczny, 1983a, 63; Konieczny, 1983c, 181–182; Konieczny et al., 1969, 19; cf. Konieczny, 1971a, 93–94; Konieczny et al., 1965, 9–10):

- the subject of action (the agent, represented by x)
- the intermediary of action (the instrument, represented by y)
- the object of action (the material, represented by z).

The above is given by the formula (Konieczny, 1968, 14–15; Konieczny, 1983a, 63; Konieczny, 1983c, 182; Konieczny et al., 1969, 19):

$$L = \langle x, y, z \rangle,$$

where L stands for the chain of action[6]. Moreover, the chain of action can be presented in drawing notation (Konieczny, 1968, 14; Konieczny, 1983a, 63; Konieczny et al., 1965, 10; Konieczny et al., 1969, 20–21).

It is important that the chain of action exists in relation to a certain aim of action: "Such an ordered triple of objects associated into a single whole by means of certain ties resulting from the fact that all these objects par-

ticipate in the action undertaken for the attainment of a *certain aim* will be called *a chain of action*." (Konieczny et al., 1969, 19); "These elements [the subject, the intermediary and the object of action] are united into a single whole by the realisation of a common aim of action, thus constituting the links of a peculiar chain of action [...]." (Konieczny, 1971a, 93). In this context, Konieczny's remark relating to action modelling is also important: "According to this conception, an analysis of a given acting whole is carried out by the one who asks, in the view of the given aim of action, who is the subject, what is the intermediary and what is the object of the action in this whole. An analysis of this type is necessary both when the whole in question is already acting and when the whole is only being composed or designed" (Konieczny, 1971a, 94).

A more extensive characteristics of the chain of action[7] is available in (Konieczny, 1968; Konieczny, 1971a; Konieczny, 1983a; Konieczny et al., 1965; Konieczny et al., 1969).

2.2. Subsystem of action

The subsystem of action is defined differently in the works from 1968 and 1969 than in the works from 1982 and 1983. However, in both cases the definitions are based on the concept of the chain of action.

According to the content of the studies (Konieczny, 1968, 103–104; Konieczny et al., 1969, 51) the subsystem of action is an ordered pair of objects, constituted by: the chain of action and its environment, which is represented by the formula:

$$U = \langle L, O \rangle,$$

where: U – the subsystem of action, L – the considered chain of action, O – the environment of the L chain of action. Moreover, it is stated that there exists a set of subsystems of action, marked with the symbol $\boldsymbol{U}$.

In the cybernetic context, the subsystem of action is a relatively isolated system[8] (Konieczny, 1968, 104; Konieczny et al., 1969, 51).

Considering the presented definition of the subsystem of action, it is important to note that the environment of the chain of action (occurring in the given subsystem of action) is not strictly defined in the cited works. However, considerations are made regarding this object: "So far, when dealing with chains of action, we have only analysed those objects which constituted its links. Therefore, all those objects that do not belong to the chain and form its environment remained outside our considerations. For no chain acts in an absolute vacuum." (Konieczny, 1968, 98; Konieczny et al., 1969, 48).[9] At the same time, taking into account (or not) the objects in the specific en-

vironment of the chain of action is determined by the point of view adopted in the research[10] (Konieczny, 1968, 99; Konieczny et al., 1969, 49).

A more extensive description of the environment of the chain of action appears in the later work on the theory of using and servicing of technical objects: "The environment of the chain of action – the set of objects associated with the chain of action through the action, and due to the given aim of the action, not belonging to this chain; the chain of action is associated with its environment by information and energetic links; due to the degree of the influence on the properties of the chain, the micro-environment and macro-environment of the chain of action are distinguished; the environment of the chain is characterised by the parameters of the socio-psychological environment and the physicochemical environment." (Konieczny, 1975a, 285–286).

Characterization of the subsystem(s) of action can also be performed, among others, due to the distinguished object k present in it (them) (Konieczny, 1968, 109–110; Konieczny et al., 1969, 53–54). Such an approach will also appear within the characteristics of some systems of action.

In the later academic coursebooks (Konieczny, 1980; Konieczny, 1982a) and monograph (Konieczny, 1983a) the subsystem of action is defined as the aggregate[11] consisting of the site of action and the object of action (Konieczny, 1980, 14–15; Konieczny, 1982a, 35; Konieczny, 1983a, 75).[12] It is presented as an ordered pair of the mentioned objects (Konieczny, 1980, 14; Konieczny, 1982a, 35; Konieczny, 1983a, 75; Konieczny, 1983c, 182):

$$U = \langle a, b \rangle,$$

where: U – the subsystem of action, a – the site of action, b – the object of action.

The objects present in the subsystem of action: the site of action and the object of action are defined using the concept of the chain of action and its definition. This is done by individually defining the three types of subsystems of action (occurring in practice) – since there are distinguished (Konieczny, 1980, 15; Konieczny, 1982a, 35–36; Konieczny, 1983a, 75–76; Konieczny, 1983c, 182–183):

- the subsystem of service (in other words: the subsystem of servicing), presented:

$$UO = \langle \langle x, y \rangle, z \rangle$$

and/or

$$UO = \langle SO, OO \rangle,$$

where: UO – the subsystem of service, $\langle x, y \rangle$ – the site of service (SO), z – the object of service (OO);

- the subsystem of use[13] (in other words: the subsystem of using), presented:

$$UU = \langle\langle x, z\rangle, y\rangle$$

and/or

$$UU = \langle SU, OU\rangle,$$

where: UU – the subsystem of use, $\langle x, z\rangle$ – the site of use (SU), y – the object of use (OU);

- the subsystem of control, presented:

$$UK = \langle x, \langle y, z\rangle\rangle$$

and/or

$$UK = \langle SK, OK\rangle,$$

where: UK – the subsystem of control, x – the site of control (SK), $\langle y, z\rangle$ – the object of control (OK). The symbols x, y and z in each of the three cases of the subsystems of action shown represent the appropriate links of the chain of action (according to the convention presented in section 2.1).

2.3. System of action

In (Konieczny, 1968, 111; Konieczny et al., 1969, 58) the system of action (of an object k) is an ordered pair of the set of all subsystems of action in which the considered object k occurs, and the relation defined on this set of subsystems of action:

$$S(k) = \langle \boldsymbol{U}(k), F\rangle,$$

where: $S(k)$ – the system of action of the object k, $\boldsymbol{U}(k)$ – the set of the subsystems of action in which the object k occurs, F – the relation defined on the set $\boldsymbol{U}(k)$.

Shortly after presenting the above definition of the system of action, it is added that the object k "acts in a specific role" (Konieczny, 1968, 112; Konieczny et al., 1969, 59). In cases where the object k is a human, he may act as[14] (Konieczny, 1968, 112; Konieczny et al., 1969, 59–60):

- the subject – whenever he makes decisions and initiates action (he belongs then to the $S_x(k)$ system of operating)
- the intermediary – whenever he follows the order of his superior (he belongs then to the $S_y(k)$ system of use)
- the object – whenever he is ill, hungry or tired (he belongs then to the system $S_z(k)$ of service).[15]

Moreover, the same human may simultaneously fulfil the roles of any two or all three links of the chain of action (Konieczny, 1968, 113; Konieczny et al., 1969, 59–60).

In the academic coursebook (Konieczny, 1982a, 54) and the monograph (Konieczny, 1983a, 87) the system of action is presented as "the ordered set of distinguished subsystems of action" and defined as an ordered pair consisting of the set of distinguished subsystems of action and the order relation over this set, i.e. the structure of the system (Konieczny, 1982a, 54; Konieczny, 1983a, 87; Konieczny, 1983c, 183):[16]

$$S = \langle \boldsymbol{U}, F \rangle,$$

where: S – the system of action, $\boldsymbol{U}$ – the set of distinguished subsystems of action (the subsystem base of the system), F – the order relation (the structure of the system).

The objects occurring in the systems of action are the subsystems of action. This relationship justifies the thesis that "the systems behave purposefully because the subjects participating in the sites of action of the subsystems of these systems behave purposefully" (Konieczny, 1983a, 88). In (Konieczny, 1983c, 183) further theses related to the presented quotation were written:

- the aim at which the system of action is directed is the essential property of this system
- in a system of action, at least one of its subjects is the carrier of the aim of action.

It should also be remembered that (as noted in section 2.2) in both cases of the definition of the system of action, the definitions of the subsystem of action differ from each other (the subsystem of action is defined differently in the works from the years 1968, 1969 than in the ones from the years 1982, 1983).

2.4. Executor of action

The executor[17] of action is the object defined in (Konieczny, 1968; Konieczny et al., 1969). It is built using the previously defined subsystem of action (and therefore the chain of action too).

The executor of action is the ordered pair of objects which are: the aim of action and the subsystem of action that implements this aim. This definition is noted using the following formula (Konieczny, 1968, 122; Konieczny et al., 1969, 66):

$$R = \langle \alpha, U \rangle,$$

where: R – the executor of action, α – the aim of action, U – the subsystem of action implementing the aim α.

The aim of action is understood here[18] as the object (the object of action) whose specific state is desired by someone (by the subject of action) (Konieczny, 1968, 120; Konieczny et al., 1969, 65).

Combining the definitions presented so far in sections 2.1–2.4, it can be noted that the complete formulation of the executor of action (e.g. as part of the description of a certain action) involves denominating the number of the objects which extensively characterise the action: the subject of action, the intermediary of action, the object of action, the aim of action and the environment of the chain of action. This has an important practical significance for considering the process of action.

2.5. Process of action

The process of action is defined with the use of, among others, the concept of the executor of action, and it refers to the occurrence (and the changes) during action of the specific states of the object (the entity) playing the role of the object of action. These states are treated as events – this is clearly indicated in the analysed works, in which the introduction of the concept of the process of action is preceded by the remark: "We will now analyse action as a certain 'stream' of events." (Konieczny, 1968, 138; Konieczny et al., 1969, 73).

More precisely, the process of action (of the executor of action) is defined as an ordered pair of the set of events and the relation of action of the certain executor of action, which orders the set of events[19] (Konieczny et al., 1969, 74):

$$P(R) = \langle \boldsymbol{I}, D_R \rangle,$$

where: $P(R)$ – the process of action of the executor of action R, $\boldsymbol{I}$ – the set of events (the set of the distinguished states of the object playing the role of the object of action), D_R – the relation of action of the executor of action R ordering the set $\boldsymbol{I}$.

The relation $D_R \subset \boldsymbol{I} \times \boldsymbol{I}$ is characterised as follows. The D_R relation of action[20] occurs between the events i and j from the set of events $\boldsymbol{I}$, if and only if there exists an executor of action R such that the event i belongs to its input repertoire and the event j belongs to its output repertoire (Konieczny, 1968, 138; Konieczny et al., 1969, 73):

$$(iD_Rj) \equiv \exists R(i \in \{WeR\}) \wedge (j \in \{WyR\}),$$

where: $\exists R$ – the symbol denoting the existential quantifier, i, j – the events (the distinguished states of the object playing the role of the object of action), (iD_Rj) – the D_R relation of action of the R executor of action between the events i and j, R – the executor of action, $\{WeR\}$ – input repertoire[21] of the R executor of action, $\{WyR\}$ – output repertoire of the R executor of action.

In the presented equivalence, the executor of action R is considered as a cybernetic system with an input and an output. It transforms in-

put (earlier) events into output (later) events, i.e. results (and some of them correspond to the aim of action of the executor), therefore it can be called a "purposeful event converter" (Konieczny, 1968, 138; Konieczny et al., 1969, 73). The input repertoire of the executor of action $\{WeR\}$ is the set of stimuli of the cybernetic system, and the output repertoire of the executor of action $\{WyR\}$ is the set of its reactions (Konieczny, 1968, 138; Konieczny et al., 1969, 73).

The properties of the D_R relation of action are: connexity, asymmetry and transitivity in the set I (although it is allowed that in some cases this relation is not connected). Generally, the set of events I is a finite set. However, it can also be considered as an infinite set. The analysed works (Konieczny, 1968, 139; Konieczny et al., 1969, 74) indicate that the set of events I is the set of at least two elements (see Smolnik, 2020) – for in this set the first element (i.e. the initial event) and the last element (i.e. the final event) are distinguished.

In SAE, the process of action is not defined as shown above. However, SAE considers changes in the state (of the distinguished type) of the objects (the entities)[22] present in an action, which is the condition for describing and assessing the reliability of action (see Konieczny, 1983a, 198–208; Konieczny, 1983b, 82–105; cf. Smolnik, 2022).

3. Analysis of the fundamental concepts and terms of SAE

The analysis and interpretation of the selected ontological aspects of the theory of action under consideration requires consideration of the fundamental concepts and terms relating to action used by Konieczny.

3.1. Action

The first of the key terms is *action*, referring to the main subject of interest in the monograph (Konieczny, 1983a). This fact is indicated by **thesis 17**, which connects action with the systems of action (mentioned in the title) in which it is performed (Konieczny, 1983a, 17). Action was defined within **thesis 16**: "Action is the manifestation of the purposeful behaviour of human beings"[23] (Konieczny, 1983a, p. 17). The above-mentioned definition links the concept of action with the concept of behaviour through the term "manifestation"; however, both the term "behaviour" and the term "manifest itself" seem to remain without a definition in the work in question. This approach is similar to the definition of action included in the encyclopaedia (Pszczołowski, 1978, 56–59), in which, how-

ever, action is defined strictly as the human behaviour that meets certain requirements: "Action [...] purposeful, conscious and voluntary human behaviour."[24] The above-mentioned definitional approach to action included in the encyclopaedia does not seem to be in contradiction with the approach of Konieczny.

It is worth noting that both definitions of action indicated in the previous paragraph limit the possibility of performing it only to people (which is typical of Konieczny's views and is reflected in his other works – e.g. Konieczny et al., 1969, 20–21; see also Konieczny, 1983a, 63: "We assume that every purposeful action is carried out in a chain of action, and only people and human teams[25] can be the subjects in the chains." or Konieczny, 1983a, 64: "[...] the actions in chains cannot be completely instrumentalised[26]. The human will always remain the subject of his own actions."). Moreover, the existence of an action remains closely related to the existence of its aim.

3.2. System

Taking into account the considerations conducted by Konieczny in the fields of methodology and science-of-science (Konieczny, 1983a, 26–37, 48–55) and the comments written in the biographical paper concerning primarily his scientific and philosophical activity (Kaczyński et al., 1985), it is clear that the term *system* was adopted by him from the general systems theory, cybernetics, or systems engineering.[27] However, in the analysed monograph (Konieczny, 1983a), the author of this paper did not find a separate definition[28] of a system. Therefore, the interpreter is left to independently attempt such a definition based on the characterizations of the system (systems) stated by Konieczny and other sources.

In the characterization of the world of systems and system thinking, Konieczny includes **thesis 48**, the beginning of which gives an insight into the important features of a system: "If any organised whole is treated as a system, we can distinguish systems of action (the systems acting purposefully) and systems that are not the systems of action, sometimes called the general systems." (Konieczny, 1983a, 19). Similarly, the "whole" is mentioned in the description of the systems theory, more precisely in the content of **thesis 171**: "The subject of research in the systems theory are the complex wholes called systems." (Konieczny, 1983a, 31). Currently, considering only the above theses, it can be assumed that the system is a complex, organised whole. However, this definition can be developed, taking into account the fact that Konieczny uses (more general) concepts of the set theory in reference to the systems.[29] When analysing the definitions of the systems

of action presented in his various works, it can be noticed that the systems are always defined as ordered pairs (as presented in section 2 of this paper).

Considering the above-mentioned definitions of the systems of action and the previous theses regarding some features of systems, as well as the comments included in the cited works of other authors (Bojarski, 1984; Mazur, 1976), it seems justified to conclude that in SAE a system is the ordered pair, in which the first place is occupied by the set of the system elements, and the second place is occupied by the set of order relations defined on the set of elements.

3.3. Model

A survey of the theses regarding systems of action leads to the term *model*. As in the case of the *system*, no clear definition of a model was found in the monograph (Konieczny, 1983a). However, the models of the various types (Konieczny, 1983a, 59, 349) and the model system (Konieczny, 1983a, 17–18) are considered.

Konieczny distinguishes the following models of a system: identification, evaluation and optimisation. They are described as the methodological tools with various purposes. The identification model is "the methodological tool for viewing a real or designed system of action [...]; used to learn about the system according to the distinguished model features". The evaluation model of a system is the methodological tool used to evaluate a real or designed system of action, which is done applying the evaluation indicators and criteria. The optimisation model of a system is the methodological tool for optimising the system of action in relation to the certain decision variable, optimisation criterion and constraints of the system (Konieczny, 1983a, 349).

Moreover, it is indicated that there are three basic types of the system identification models: praxiological, cybernetic and mathematical (economic) (Konieczny, 1983a, 59, 349).[30] It is worth quoting[31] their characteristics here: "The praxiological approach in the identification analysis of systems is based on the use of the praxiological models in which the systems reality is perceived from the point of view of the aims of action."; "The cybernetic approach in the identification analysis of systems is based on the use of the cybernetic models. The essence of these models is the information and decision-making aspect of the modelled systems."; "The mathematical (economic) approach in the identification analysis of systems is based on the use of the economic-mathematical models. These models take into account the quantitative aspect of the processes conducted in the systems of action." (Konieczny, 1983a, 59; cf. Konieczny, 1983a, 49–51).

By analysing the modelling issues concisely presented in the three paragraphs above, an attempt can be made to more precisely characterise the concept of the model used in SAE. In particular, attention should be paid to perceiving models as the methodological tools used by the researchers and/or designers of the systems of action (cf. Konieczny, 1983a, 349). They therefore act as the means enabling human epistemic access to the system. The access is based on a specific representation of the modelled object (real or designed) through its selected features. This is especially noticeable when considering and/or applying identification models, in case of which the type of the approach (and therefore the type of the model) determines the considered features of the system.[32] Recognising parts of the reality by considering their selected features is known in the methodology of science and is associated with the concept of modelling (see Grobler, 2006, 175–176[33]). Therefore, it is proposed to define a model for the needs of SAE as the description of a part of reality (existing or postulated) that considers this part aspect-wise – that is, taking into account only some of its features, chosen by the creator[34] of this description.

The adoption of the definition of the model presented in the previous paragraph can be additionally justified by referring to the subsequent theses formulated by Konieczny (1983a).

- **Theses 26–28** refer to the genesis and use of the models of systems (which corresponds to the indications of the formulated definition): "The system researcher mentally creates the models of the existing and/or designed systems of action", "The models of the existing systems are created when these systems are identified and/or evaluated", "The models of the non-existent systems are created when the systems are designed and/or improved" (Konieczny, 1983a, 17–18)
- **thesis 45** describes the relations between the model of a system and the real system: "For the model of a system is the abstraction of the reality surrounding us" (Konieczny, 1983a, 19)
- **thesis 51** indicates the existence of the systems of the two types: the real systems and the model (thought) systems – the classification criterion in this case is the reality of the system (Konieczny, 1983a, 19)
- **thesis 60** refers to the relations between the human and the model system: the human can act in the world of systems as the teacher (carrier) of the model system (Konieczny, 1983a, 19–20)
- **thesis 123** links thinking with modelling (which, similarly to the theses 45 and 60, corresponds to the genesis of the model included in the definition formulated, cf. thesis 26): "The result of systems thinking is the model of the system" (Konieczny, 1983a, 22)

• **theses 337–341** clearly indicate the aspectual character of the description obtained during modelling (related to the issue of choosing the represented features included in the definition): "The cybernetic models are used to identify the information and decision-making situations in complex systems of action", "When creating the cybernetic models, one distinguishes in the system of action the realisation system and the control system; each of these systems (subsystems) fulfils a designated role in the system as a whole", "The mathematical models are used to identify the economic situation of a given system in its systemic interval[35]", "The basis of these models are the two equations describing any system of action: the system potential equation and the system utility equation", "A great difficulty in the practical realisation of the mathematical modelling is generated by the problem of measurability of the system of action and its behaviour" (Konieczny, 1983a, 50).

3.4. Summary

To summarise the considerations presented in sections 3.1–3.3, the following definitions can be put together:

- an action is goal-oriented, conscious and arbitrary human behaviour
- a system is the ordered pair consisting of the set of the elements of the system and the set of the order relations defined on the set of the elements
- a system of action is the set of the chains or subsystems of action ordered by the binary relation of direct supporting[36]
- a model (e.g. a model of a system of action) is the description of a part of reality (existing or postulated) that considers this part aspect-wise (i.e. taking into account only its chosen features).

The above decision is helpful in further research on and interpretation of the theses of SAE.

4. Ontological characteristics of the types of actions and objects occurring in action in SAE

The analysis of the chosen concepts and terms of SAE presented in the previous section has indicated that various types of actions (systems of action) are considered. In addition to the typification of actions, a typification of the objects occurring in action can also be developed. Such an order seems necessary in the identification, analysis and interpretation of Konieczny's views.

4.1. Types of actions

As presented in section 3.3, due to the reality of the system, the real systems of action and the model (thought) systems of action are distinguished (thesis 51). It should be remembered that action is carried out in the systems of action (thesis 17). Considering the above-mentioned theses (17 and 51) together provides the basis for the conclusion that actions may also be real or model. By adding the definition of the model (section 3.4) as another premise to the reasoning performed, it can be assumed that both the actions and the systems of action may be of the real and/or descriptive existence. The last statement (i.e. the descriptive existence of actions) seems justified not only due to the adopted definition of the model, but also the indispensable use of a certain language (and therefore also the description of the action) in thinking about the action.

Actions which exist descriptively (model, thought) may have different origins. The description of an action may be created as the result of:

– abstraction based on (the observation of) a real action (thesis 45) – which is of the research, empirical character
– designing (planning) an action – which is of the creative, postulative character (thesis 28).

Attention should be paid to the fact that, apart from the genesis of the description of the action, the type of the description itself is important (especially in the context of preparation and realisation of actions) due to its subject scope.[37]

As part of this study (cf. Smolnik, 2024), it is proposed to distinguish three types of the characterizations of action in relation to the chain of action (section 2.1). It should be emphasised that the complete characterizations of an action represented as the chain of action includes: the description of the object playing the role of the subject of the action, the description of the object playing the role of the intermediary of the action, the description of the object playing the role of the object of the action and the description of the aim of the action (i.e. when the indicated four elements have been characterised in the way that it is possible to identify them in the reality, the action carried out in the considered chain is completely described). The announced three types of the characterizations of action are as follows (and are distinguished depending on the types of descriptions[38] used in them):

– individual characterization – the characteristics in which objects acting as the subject, intermediary and object of action are described using definite descriptions

- mixed characterization – the characteristics in which at least one of the objects acting as the subject, intermediary or object of action is described using a definite description and at least one of the objects acting as the subject, intermediary or object of action is described using an indefinite description
- generic characterization – the characteristics in which all objects acting as the subject, intermediary and object of action are described using indefinite descriptions.

Due to the features of the descriptions used, the characterizations of actions of the three types presented refer to the different sets of objects in the world that play the appropriate roles in the actions. Individual characterizations refer to the actions in which the specific roles can only be played by the precisely defined, unique objects in the world ("no one else can do it with anything else"). The situation is opposite in the case of the generic characterizations, referring to the actions in which the particular roles can be performed by many objects in the world – in this case it is not the "key" who does something and with what, but what is to be done (and it can be done by different people, with different tools, etc.). A mixed characterization is an intermediate case between the individual characterization and the generic characterization – then the "unrestricted choice" of the objects that can participate in the action applies only to the certain roles to be fulfilled, while the remaining roles require the involvement of the strictly defined objects in the world. Such descriptions of action can be encountered – for example – when one is talking about: a concert by a famous virtuoso (the person acting as the subject of the action is important here, but not the instrument and the composition of the audience), a ride in a historic car (the vehicle playing the role of the intermediary of action is significant in this case, but not its driver and passengers) or conservation of a specific work of art or a building (what is important is the artefact acting as the object of the action, but not the people conducting the maintenance works and the tools used by them).

The issue of taking on the specific roles in action by the objects in the world will be discussed further in section 4.3.

To summarise, the types of actions distinguished according to the criteria presented above are listed in the Table 1 (cf. Smolnik, 2024).

Taking into account different works of Konieczny, one can undoubtedly state that there are possibilities of building more extensive typifications of actions – however, this paper was limited only to the above-mentioned criteria, which were considered basic and more important in the context of the conducted ontological characterization.

Table 1

The types of actions according to the reality of their existence and the genesis and type of their characterization (cf. Smolnik, 2024)

Types of actions according to the reality of their existence					
Real	Descriptive				
	Types of descriptive actions according to their genesis		**Types of descriptive actions according to the type of their characterization**		
	Abstracted	Designed	Individual	Mixed	Generic

4.2. Types of objects occurring in action

This chapter presents a characterization of the types of the basic objects that occur in (any) action, primarily in relation to the approach presented in SAE.

Based on the survey and analysis of the approaches to action presented in section 2, it can be concluded that during action reveal themselves at least:

- objects existing in the world
- events (the states of the objects in the world)
- roles played by the objects in the world
- structures of action.

The issue of the objects in the world was discussed extensively in the works of Konieczny. In (Konieczny, 1968; Konieczny et al., 1969) it is captured through the description of the sets of objects in the world and the axioms of existence of the objects. In the monograph (Konieczny, 1983a), the objects in the world are treated as the matter of the systems of action and subjected to the extensive characterization in terms of their selected features – see (Konieczny, 1983a, 39–46). The objects in the world are, for example: people or devices (technical objects) (Konieczny, 1983a, 43), see **thesis 219**: Biological matter ("especially people and human teams") and technical matter ("especially devices and aggregates of technical devices") constitute the basic carrier of the matter of systems of other types (Konieczny, 1983a, 39).

The **objects in the world** are of the real existence in the case of the realised actions (the real actions) – see **thesis 40**: "The world around us consists of many systems of action, and each of the systems realises a different aim of action" (Konieczny, 1983a, 18); **thesis 99**: A system of action is a creation of reality (Konieczny, 1983a, 22); **thesis 217**: The condition for the existence of a given system of action is that there is the

material matter which is the realisation of this system. "We say *that the system of action exists if and only if there is the material matter that is the realisation of this system*"; **thesis 218**: Such a system (see thesis 217) is called the *real system* or *material system* (Konieczny, 1983a, 39).

It seems reasonable to adopt the solution that in the case of the descriptive (model, thought) actions, objects from the world exist at least descriptively (postulatively); they may also be of the real existence. The following examples can be considered to support this thesis.

When one is planning the actions for the upcoming vacation, these actions exist only descriptively, but in reality there already exists the person who will become the subject or object of these actions in the future (similarly, the other objects that will play the other roles in the actions may already exist, e.g. a railway carriage in which the one will go on a trip).

When one is considering the actions of his grandchildren who have not been conceived yet, these actions exist only descriptively. Similarly, i.e. only descriptively, there exist the people who will play the roles of subjects of these actions. The issue of the existence of the other objects which appear in the actions of the dreamt grandchildren may look similar (e.g. the postulated existence of their house, which will have been built).

The **events** are perceived as the distinguished states of the objects in the world participating in the action. As shown in section 2.5, the most important (in the context of the aim of the action) are the states of the object playing the role of the object of action. However, it is possible and reasonable to consider the states of all objects in the world which occur in the action, because the course and efficacy of the action depend on each of them in some way (cf. Konieczny, 1983a, 198–200).

The state (of a specific type) of an object is determined by the set of selected features of this object, which characterise it at the different stages of the action (in particular: at the beginning and at the end of the action).[39] Examples of such features are: being dirty and being clean (when talking about the action of washing a window) or having a diameter of 50 mm and having a diameter of 40 mm (when talking about the action of turning a shaft). Finally, it can be assumed that the events are considered with respect to the occurrence of the specific features of the objects.

The **roles** played by the objects in the world participating in an action are: the subject of the action, the intermediary of the action and the object of the action[40] (cf. Konieczny, 1983a, 41; Konieczny et al., 1969, 19–21, 58–60). They are conceptualised functionalistically, i.e. the identity of the object itself is secondary in this case to the function that this object performs[41] in the action. In many cases, it is possible that the same function (role)

in the given action can be performed by many different objects in the world. This issue is discussed in section 4.3.

The approach postulated in this paper is that the role of an object in an action is the function defined on the set of features of the objects in the world, which makes it possible to at least decide which features are required and which are not allowed in the case of the action considered.

In relation to the roles of the subject, intermediary and object of any action, Konieczny provided their characterizations in (Konieczny, 1968, 15; Konieczny et al., 1969, 19–20):

- the role of the subject of action consists in initiating this action
- the role of the intermediary of action consists in transferring the action from the subject to the object of action
- the role of the object of action consists in enabling the location of the aim of action on it.

This characterization should therefore include the most important features of objects, necessary to perform individual roles in action (in general). Considering specific actions and the roles of objects occurring in them will then lead to the formulation of additional requirements in relation to the features that the individual objects should possess (e.g. performing the role of the subject in action generally requires the ability to initiate an action, but performing the role of the subject in the action "transporting goods with a lorry" (i.e. the role of a lorry driver) requires possessing additional features).

As shown in section 2, the **structures of action** (the chain of action, the subsystem of action and the system of action, as well as the executor of action and the process of action) are perceived by Konieczny as the objects of the set theory (n-tuples). In SAE (Konieczny, 1983a, 18–19) the real and the descriptive (model) existence of the systems of action is indicated (thesis 51). This means that the analysed approach to action allows for the real and descriptive (model) existence of the set theory objects (according to the appropriate existence of the actions, section 4.1). It is worth recalling here (section 2.3) that the system of action is built on the basis of the subsystems of action, and they are based on the chains of action. It seems reasonable that the type of the existence of the (system of) action is inherited by its fundamental "lower-level" objects (the subsystems, the chains of action), and that a similar transition takes place in the case of presenting (on the basis of the system of action) the executor of action and the process of action.

In addition to the four types of objects occurring in action mentioned above, the **aim of action** also deserves special attention. Analysis of its defi-

nition presented in section 2.4 leads to the conclusion that the aim of action is an object which does not directly correspond to any of the mentioned types of objects. Although being an entity connects it with the entities in the world, it is the object considered in the context of the specific state (which belongs to the set of events), and this state is determined by the object playing the role of the subject of action. Therefore, the aim of action exists as long as there exist the person who determines it and the entity the desired state of which is concerned.

This paper proposes the modification of the above-mentioned definition of the aim of action by "shifting the weight" from the entity (object) in the world to the state of this object. The changed definition is as follows: the aim of action – the state of the object playing the role of the object of action desired by the person playing the role of the subject of action.

The aim is also perceived as an event (conditioned by the certain features of the object) in the encyclopaedia (Pszczołowski, 1978, 32–33). Such an approach corresponds very well with the identified functionalism (see chapter 4.3), because it refers primarily to the specific (desired) feature of the object, and not directly to the object itself and its identity. This seems to facilitate the assessments of the result of action, although it inherits the disadvantages of the functionalism discussed in the next section.

4.3. Realism and functionalism in the approach to action

As noted, two approaches to the objects existing in the world are used in SAE.

When considering realised actions, the real existence of the objects in the world occurring within these actions is unquestionable. In the case of the actions existing descriptively, the matter remains more complex and has been discussed in section 4.2. There is therefore no doubt that Konieczny is a realist and recognises the real existence of the entities in the world (cf. the cited theses 40, 45, 51, 99, 217 and 219).

A characteristic feature of SAE, however, is considering at a certain level of analyses the objects in the world solely in terms of the roles they perform. Of course, such an approach does not exclude the real existence of the mentioned objects. Moreover, the performance of the roles is conditioned by the features of these objects, and in the case of the real actions, by their real existence. The identified functionalist approach is therefore based on the realism presented in the previous paragraph.

Functionalism in SAE has a noteworthy practical significance. It is based on departing from the individual features of the entities in the world,

including omitting the issue of their identity (clearly visible in the case of the generic and mixed characterizations of actions). Looking at the objects solely through the roles they are to perform in actions facilitates the analysis of the structures of the actions and the relations between the actions. Such an approach enables effective research and design of actions (and methods) in terms of their structure and the requirements placed on the entities in the world occurring in these actions. It is also often applied in practice, e.g. when searching for an employee for a specific position – in such a situation, the characteristics that a person must possess to perform specific tasks (i.e. as an employee who is to act as the subject of certain actions) are precisely indicated; other features of this person are then of at least secondary importance.

The example presented in the previous paragraph shows that functionalism in the approach to action provides many benefits of a practical nature, but it encourages the omission of numerous features of the real objects in the world and their aspectual consideration. This can lead to complications of a technical or organizational nature, as well as to dehumanization (when it comes to an exclusively functionalist perception of a person, i.e. reducing the person to several features) with its various consequences.[42] In SAE, despite the use of the functionalist approach at some stages of considerations, the realistic approach to the entities in the world is clearly visible, taking into account many of their features that are important for the realisation of an action.[43]

5. Final summary

The analyses carried out have shown that the ontological characterization of action in the approach postulated by Konieczny is complex. The structure of the objects considered in SAE is also complicated. Since the approach considered refers not only to the research on but also to the design of actions, it requires an extensive typification of the objects related to action.

The presented theory of action, although based on the elements of praxiology, cybernetics, systems engineering, formal logic and set theory, is the original achievement of Konieczny. It seems to be based on the seemingly trivial discovery of the chain of action, which, however, allowed the formulation of the more complex structures of action and their characterization, among others, for the needs of organising and improving activities in practice.

Due to the extensive work on his own theory of action conducted by Konieczny over many years and the changes in some philosophical positions and theses (definitions) or the addition of the new theses to the system, the research, analysis and interpretation of the original source works are necessary and justified when striving to identify and improve the mentioned theory. The complexity of the original solutions, the multitude of concepts formulated by Konieczny and the historical evidence of their usefulness for the applied sciences additionally encourage further research into his theory of action.

The possible development of the Konieczny's original concepts may be carried out in many directions and undoubtedly in both theoretical and application areas. The theory of action proposed by Konieczny still requires identification and interpretation; the particular concepts should be listed and described as well as the axioms identified, and some definitions developed (work in this area is already underway and this paper constitutes an example of that). Further philosophical and methodological reflection on the original concepts is possible; on the one hand, they allow one to learn about certain basics of (the processes of) action, and on the other, they could be discussed and modified when considered together with other approaches to action. Exemplary issues to be addressed here are the problem of characterising the passage of time in the (process of) action or the problem of reliability of action. Finally, a methodological reflection on the ways of application of the theoretical concepts in practice (e.g. in the military, industry, education) together with the formulation of the model actions of particular types are another research problems still worth attention.

NOTES

[1] For the purposes of this paper, the term *Systems of Action Engineering* (*SAE*) will be used as the proper name for the Konieczny's approach to action, and especially in reference to the theses presented in his last monograph (1983a). During the research, the initial chapters of the monograph have been deeply analysed, and the theses regarding action noted and numbered. In the paper the numbering of theses was adopted without providing their complete list (however, the selected theses used directly are included to ensure the clarity of the text).

[2] The results presented in this paper were obtained as the parts of the development of author's doctoral dissertation on the identification and attempt to develop Konieczny's system of formal praxiology, prepared under the supervision of rev. dr. hab. Adam Olszewski, prof. UPJPII. They were also discussed to a significant extent during seminars at the Faculty of Philosophy at The Pontifical University of John Paul II in Krakow and presented at the "Philosophy in Technology" scientific conferences.

[3] The definition of action presented in SAE is analysed in section 3.1.

[4] It is also important that the definitions of the subsystem and the system of action presented especially in the years 1982–1983 are different from the definitions formulated in the older works indicated. This is analysed in more detail in the following subsections.

[5] Anticipating the further sections and interpretations of the original works, it should be noted that this object is not (only) a description of an action, but a certain structure of it, which in some cases may really exist. This conclusion is indicated in particular by some paragraphs of the monograph (Konieczny, 1983a). At the same time, some parts of the earlier work (Konieczny et al., 1969, 16) question such a conclusion, while others (Konieczny et al., 1969, 19) support it (or at least do not contradict it).

[6] What the subject, intermediary and object of action are is a separate issue. At the beginning of the work (Konieczny, 1968) a strict solution was given in this respect (these are the objects in the world, e.g. people or devices). The study (Konieczny et al., 1969) includes at least two solutions of this problem (these are the objects in the world or the sets of objects distinguished due to their roles or the roles of the objects – however, in the latter case the original text is not precise). The monograph (Konieczny, 1983a) seems to provide the strongest foundations for considering the subject, intermediary and object of action as the roles (functions) of the objects in the world. This matter is discussed further in sections 2.3 and 4.3.

[7] However, what is also worth emphasising here is the explanation of the genesis of the chain of action in the methodological context. Konieczny considers the above-mentioned approach to action in his theory strictly through the definition presented in this section. However, he introduces and justifies it by listing the examples of selected actions and then making a generalisation, which is the noticed structure of the (every) action. This is clearly visible in (Konieczny, 1968; Konieczny, 1983a; Konieczny et al., 1969). Therefore, it can be stated (despite the lack of such a comment by Konieczny himself) that the chain of action is the result of a scientific discovery derived from the analysis of the selected actions, and as the structure of action (or the expression of a certain law governing action in general) it is empirically justified by inductive reasoning.

[8] The definition of such a system may be found, for example, in the dictionary (Kempisty, 1973).

[9] See also the further characteristics related to the environment in the subsystem of action (Konieczny, 1968, 98–104; Konieczny et al., 1969, 48–51).

[10] This thesis refers to treating the chain and the subsystem of action as the models of action (see Konieczny, 1971a; 1983c) rather than real entities existing when the action is carried out (see Konieczny, 1983a).

[11] The terms *a group* or *an assembly* could probably be used here too to translate Polish term *zespół*. It is important that the Polish term *zbiór* (meaning *a set* in the set theory context) is not applied here. This issue is further discussed in the footnote 25.

[12] Such a definition and further classification of subsystems of action already appear in (Konieczny, 1975b, 18–19), which, however, lacks a more detailed description of the subsystem with the use of formulas.

[13] Or *the subsystem of utilisation* as suggested in (Konieczny, 1983c).

[14] Or *play the role of*. It turns out that the subject, the intermediary and the object of action are the roles of the object in the world. This solution has serious practical advantages and seems justified (section 4.3), but it is surprising when one remembers the theses from the initial chapters of the cited works (especially Konieczny, 1968 – see footnote 6). Analysing the later work (Konieczny, 1983a), it can be assumed that (at least at that time) its author used the expressions *to be the subject / intermediary / object of action* and *to play the role of the subject / intermediary / object of action* interchangeably (with the same meaning intended). Since, as already noted, the monograph (Konieczny, 1983a)

provides the strongest grounds for treating the subject, intermediary and object of action as roles of the objects in the world, when reading it, the statements including the structure *to be the subject / intermediary / object* should most likely be treated as the "shortcuts" from the complete formulation including the structure *to play the role of the subject / intermediary / object*. However, it is difficult to insist on such a decision in the case of the work (Konieczny, 1968).

[15] The symbols: $S_x(k)$, $S_y(k)$ and $S_z(k)$ used according to the notes in Konieczny's original works refer to the description of the systems of action when considering the distribution of the object k in the chains of these systems (see, among others, Konieczny, 1968, 111).

[16] One of the original symbols has been modified within this paper.

[17] Probably the terms *realiser* or *implementer* could also be used in this context to reflect the original meaning.

[18] In his works from 1968 and 1969, Konieczny considers at least two different definitions of the aim of action.

[19] It is also noted that "the process P is the set of events $\boldsymbol{I}$ ordered by the action of the executor R" (Konieczny, 1968, 139).

[20] The chapter of the thesis (Konieczny, 1968) covering the analysed relation was titled *Action as a relation*, which opens a new interpretative context of action.

[21] In the thesis (Smolnik, 2020) it was indicated that the concept of the repertoire was characterised as a part of the discussion on the exploitation repertoire of a device: "The exploitation repertoire of the device – the set of operational states of the device; the use repertoire of the device and the service repertoire of the device; the set of device uses and the set of device services; e.g. for a car, the set of operational states, the elements of which are: types of use of the car, current technical maintenance, storage, medium overhauls and major overhauls." (Konieczny, 1975a, 292). The definition of the repertoire of a general kind may be found in (Kempisty, 1973, 377), where it is stated that the repertoire is: "the set of the distinguished states which the input or the output of the system may take. This applies to both the external inputs and outputs, and the internal inputs (outputs), as well as the input vector or the output vector. The input vector repertoire is the set of stimuli that the given system can receive; for a typewriter, e.g., it is the set of strokes on the keys with fonts, manipulations of levers to move the roller, reverse the carriage, etc. The output vector repertoire is the set of reactions that the given system can transmit; the door, for example, can be: open, semi-closed, closed and blocked by the handle mechanism, locked with a key. The repertoire may be continuous or discrete. When dealing with a specific input or output of a given system, its repertoire can be treated in a quite arbitrary way (from the point of view of the measurand or degree of accuracy), as long as it is appropriate to solve the given problem."

[22] I.e. the objects (the entities) fulfilling the roles of the subject, intermediary and object of action.

[23] Probably the Polish term *celowy* (Eng. *purposeful*) could be also translated here as *goal-oriented*.

[24] Here it again may be questionable, whether the term *purposeful* or *goal-oriented* better reflects the original content. The term *voluntary* is used meaning *free* or *arbitrary*.

[25] Pol. *zespoły*. The Polish term *zespół* (Eng. *an aggregate*, *an assembly*, *a group* or *a team*) was used in the field of the action theory by Konieczny to describe at least two objects (entities) present in an action and playing (together) a specific role in this action (see, e.g., Konieczny, 1983a, 63–64; the presented definition is proposed by the author of this paper). From the methodological perspective it is important that:

1) although Konieczny, when presenting teams, uses the symbols typical to represent sets in the sense of the set theory

2) he does not name these objects (entities) applying the term *set*.
Such an approach suggests that a *team* is not a *set* (in the sense of the set theory). Finally, it leads to the ontological conclusion: the objects (the entities) in the world (and not sets) play the roles in actions. This conclusion seems fully justified in the case of SAE. However, it is not obvious when considering Konieczny's earlier works (e.g. Konieczny et al., 1969, 19–21; see also the footnote 11).

[26] See (Kotarbiński, 1965, 125–132). Cf. Polish term *instrumentalizacja* (Kotarbiński, 1958, 195–208).

[27] In this respect, it is worth recalling some of the considerations carried out within the above-mentioned disciplines at the time of the development of SAE (e.g. Bojarski, 1984; Mazur, 1976; Sadowski, 1978) relating to, among others, the definition of a system.

[28] The definition related to this term is also missing in the *System hand-dictionary* included in the monograph (Konieczny, 1983a) and (in a slightly different version) in the academic coursebook (Konieczny, 1982b).

[29] Similar approaches are presented by, among others, some of the previously mentioned authors: "All this created the need to use the general concept of something that is known to consist of some elements and that these elements are related to each other by some relations. This concept was named according to the following terminological convention: a system is the set of elements and the relations between them." (Mazur, 1976, 45); the issue was also extensively discussed by Bojarski (1984, 43–47).

[30] This issue was also included as **theses 54 and 55**, linking the typification of the models with the area of research by Konieczny: "The systems of action are the subject of research in the theory of the systems of action. This theory provides researchers and organisers with the effective identification, evaluation and optimisation models of the systems of various properties" (Konieczny, 1983a, 19) and as part of the thesis 332 (cf. Konieczny, 1983a, 49).

[31] Such a presentation of the original text allows, among other things, the faithful presentation of the distinction between the concepts of the approach and the model, used here by Konieczny. The term *approach* most likely refers here to the research method of the given systemic science (praxiology, cybernetics, economics – cf. Konieczny, 1983a, 27–33, 59), and the term *model* refers only to the methodological tool.

[32] Moreover, the identification models of the particular types are the carriers of the appropriate system laws (see Konieczny, 1983a, 59).

[33] In relation to the systems theory, see also Szymański (1991, 67, 73).

[34] This was clearly stated in (Szymański, 1991, 67): "When we talk about identification, we mean an epistemic decision at a specific level of abstraction, which extracts from the observable features of an object those that are important to us (in the given place and time)."

[35] Cf. Konieczny (1983c, 189–190).

[36] Due to the limitation of the volume of this paper, a separate description of supporting of actions was omitted. This issue was presented, for example, in (Konieczny, 1970a; Konieczny, 1972; Konieczny, 1975a; Konieczny, 1980; Konieczny, 1982a; Konieczny, 1983a), and (in a slightly different approach) in (Konieczny, 1975b). To put it briefly and informally, it can be said that supporting (Pol. *zabezpieczanie*) the action no. 2 by the action no. 1 is creating (ensuring) the conditions for the realisation of the action no. 2 as the result of the action no. 1. More precisely (as proposed by the author of this paper), when the direct supporting relation occurs between the two actions (as before, no. 1 and no. 2), the object that plays the role of the object of action in the supporting action (no. 1) is, as the result of (at least) this action, in the state in which it can play the appropriate role in the action no. 2. The concept of supporting enables the identification of the

praxiological networks (Konieczny, 1982a, 23–29, 42–48, 61–65; Konieczny, 1983a, 69–71, 80–83, 91–93), which are of the great practical importance for the analysis and synthesis of actions, especially included in larger projects.

[37] This issue was most likely not systematically discussed in Konieczny's original works, although they contain the examples useful to illustrate the problem.

[38] Here the term *description* is used in the technical meaning of the philosophy of language (see Rostworowski, 2016, 4–8). In the case of any characterization of the action represented as the chain of action, it seems reasonable that this characterization is always made with respect to the objects in the world that play the specific roles in the action under consideration (and refers directly to these objects). At the same time, for the construction of the characterization itself, it is probably not important whether it refers to an action from the past, present or future and whether it is possible or impossible to perform. Moreover, the author of this study did not find any contraindications in SAE regarding the construction of the characterization of postulated (future) actions which would be performed by (currently) non-existent objects in the world. Therefore, within this theory, one can consider the actions involving, for example, people who have not been born yet or technical means which have not been invented yet.

[39] Cf. the other works (Kotarbiński, 1958, 26; Kotarbiński, 1965, 15; Smolnik, 2020, 80–84).

[40] See **thesis 252**: The basic functions of a human in the system of action (i.e. the functions that he performs as part of his role in the system) are the functions of: the subject, intermediary and object of action (Konieczny, 1983a, 41).

[41] Cf. the term *office* and the related concept in (Duži, & Čihalová, 2024; Materna, 1998).

[42] The circumstances that are particularly conducive to dehumanization may be deciding on the suitability of a human for a given action or on the replaceability of a human (with another human or object of another type) within certain actions. The practice of organising actions provides such problems to be solved, but it is important to go beyond the aforementioned functionalism and the image of a human available only from the perspective of his considered role. This is also related to the question of the possibility of replacing a human with a technical object as part of the implementation of specific projects.

[43] See (Konieczny, 1983a, 40–42).

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