Chapter 6 System and Environment Design

ABSTRACT

The knowledge about the conditions necessary for existence, which conforms to the environment and changes of technical potentials, is hastily formed. If it is to be regarded in science, system, or environment design, as a discipline of knowledge (boundary zone (SG)), must not only be characterized by certain features that are common to all scientific subjects, it also has to be clearly distinguishable from them. The former decide whether it may be generally referred to as science, the latter decide whether it has the right to independent existence. Design of technological and power machinery and equipment (technical system (ST)) and environment (O) belongs to those few areas of technical sciences today, which methodological features have not been fully defined. Thus, it is still the subject of various disputes and controversies. At times, these disagreements go so far that its scientific character, and thus its place in the family of sciences, is called into question. With certain types of interpretations the knowledge of technical system and environment design is nothing but a set of directives for the use of practitioners, derived from other fields of technical/biological science. In this case, of course, it could not be a subject of science, as it would not have its own research issues and its own methodology of solving them.

6.1. DESIGN BASICS

Between the environment and technology, understood as a set of machines, tools and constructions, there is on the one hand the boundary zone (SG) and on the other – the gap referred to by some thinkers as "dehumanization of technical progress" (*Flizikowski*, 1998; *Flizikowski*, 2002; *Flizikowski*, & Co-authors, 2005; *Flizikowski*, 2008; *Flizikowski*, 2011; *Powierża*, 1997; *Ministry*

DOI: 10.4018/978-1-4666-2664-5.ch006

of Economy, 2009; Świątkowski, & Flizikowski, 2010; Ziemba, & Co-authors, 1980).

According to yet another concept, the knowledge of technical system and environment design would be the work of theoretical investigations of a range of disciplines, such as: ecology, environmental protection, system theory, design and machinery construction basics. It is then debatable whether some interconnected elements of these sciences constitute a separate discipline, or whether it is possible to distinguish a different body of knowledge which came within the scope of these disciplines and which deserves the name of system and environment design (Goldberg, 2003; Ostwald, 2005; Pahl, 1994; Tarnowski, 2010; Zawada, & Co-authors, 2005).

The purpose of these reflections is to consider these and other concerns regarding the environmental, i.e. ecologically compatible nature of technical systems design.

In the light of the underlying assumptions of methodology, which we take as the theoretical basis of these considerations, each science is a set of sentences describing reality. It is self-evident that these sentences require a certain systematization and that they must be determined on the basis of objective criteria and specific, verifiable premises. It is not clear, however, in the case of energy environment technical systems of machines and equipment, what kind of claim systematization is applicable in this case, nor what is the way these claims are determined.

Consequently, the initial methodological characteristics of this science requires answering the following questions (*Flizikowski, 1998*):

- What kind of research is at the basis of scientific technical knowledge. What data material is this science built on. It is therefore a question of premises, and thus, the type of cognitive operations on which the technical system and energy environment design is to be built on.
- What kind of research problems would be solved by the technical system and energy environment design, in other words – which part of reality would it deal with. It is therefore a matter of detailed, factual analysis and description of the claims being constituent parts thereof.
- For a complete methodological characterization it is necessary to determine how and according to what principles the systematization of technical system and energy environment design research results is to take place, and thus what should the structure of this science be.

6.2. CHARACTERISTICS

When identifying the methodological characteristics of technical system and energy environment design it is necessary to recognize two kinds of approach to the subject matter. The first approach focuses on the objective aspect, whereas the second deals with program aspect. The first approach is concerned with what design is, as a science, the second aims at answering the question what it should be.

The analysis presented herein will generally make use of the program aspect. This trend results from the current situation in technical sciences. Modern technology is distinguished by a significant number of orientations and directions coming from entirely distinct methodological concepts. Consequently, anyone who wishes to pursue this discipline in a deliberate, consistent and comprehensive manner, faces the necessity of choice. It is therefore entirely reasonable that any choice made at that point would entail taking a program angle, at least with reference to the individual researcher's workshop.

It is doubtful, however, whether a science that is not intended to achieve a certain methodological integration of its research procedures can be successfully developed. Only then can one expect internally cohesive knowledge that will persistently and reliably explain reality. Only then can one expect that the accumulated knowledge of one field of phenomena will justify knowledge of other fields, being, in turn, justified by other elements of the same uniformly constructed and expressed knowledge.

These considerations weigh strongly in favour of adopting the only possible, program point of view. It is necessary to choose a specific concept of practicing and developing technology in melioration of environment. It is therefore a matter of answering the question what, in terms of methodology, should ecotechnology be like and how it should be built. Should the investigations on this subject reveal a strong foothold, it will 31 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

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