

can reformulate the goal of the creation of IR systems, specifically documentary systems. Thus, *documentary IR systems are created with the goal of automatic information retrieval for the satisfaction of a POIN*.

Now we can proceed with the formulation of the function of the system, in particular of a documentary IR system.

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Function of a Documentary IR System

To determine the function of a documentary IR system, we are interested in the function of the entire system as a whole—not the functions of its separate parts. We recall that this function is usually called the *whole* or *external* function of the system (Ackoff & Emery, 1992). It is convenient to consider the whole function as a description of requirements to the system's output directed toward satisfaction of the goal according to which motion is carried out in the system as well as by how elements of the system interact.

Generally speaking, formulation of the function is necessary during the creation of any new system. In those cases when we are creating another copy of a known system and we are satisfied with the function of this system, a new function need not be determined. For example, if we want to create a new model of automobile, we do not need to redefine the function of an automobile. In this case we will propose only a new solution, which will allow us to better fulfill a known function. Sometimes the known function of a system may not satisfy the developers because it does not fully satisfy the goal of the system. In other words, even if the function of the system is fully realized, the quality of achievement, determined by how completely the function fulfills its goal, may not satisfy the developers. For this reason, it is possible to formulate another function leading to a better satisfaction of the goal.

We will consider some requirements for the formulation of the function. Because the function is formulated starting from the purpose of the system's creation, and it is assumed that the system realizing this function enables the achievement of the mentioned goal, then in this way, directly or indirectly, the function must include some conditions providing for achievement of the goal. It would seem that the simplest solution is to begin with the requirement of ideal achievement of the goal, as this would satisfy all those who need this system. However, the function of a system is not simply the formulation for the accompanying documentation. The process of creating a system following the function definition is the process of realizing the function. Starting from this, first note that it is often impossible to formulate the "ideal" with respect to the achievement of a specific goal satisfying a given need. For example, even in the satisfaction of our own need for food (about which it seems we should know all, completing this process daily, and more than once), we cannot with absolute

certainly say what quantity, what products, in what combination, and at what interval we will need food at each concrete moment for the maximal positive effect with respect to our personal health and, consequently, for maximal lengthening of life (survival). Second, there are often no necessary resources (products) for an ideal satisfaction of a need. For example, if for the satisfaction of an IN using a collection of documents in an existing IR system, the required document is not present or the necessary information has not yet been extracted from nature with the help of science, then the necessary resource is unavailable and the IN cannot be ideally satisfied. Finally, we are often not in a position (i.e., the level of knowledge, ability, technology, etc., is insufficient) to create a system that will ideally achieve the goal. All these points are important, because it is meaningless to formulate the function of a system that will be impossible to create. For this reason, during the creation of a system, the function appears in the role of a technical specification with an indication of a specific quality, achievement of which is required for fulfillment of the function. Moreover, the system that is assumed successful is only that system which fulfills the formulated function (saying that it "successfully functions"), where the stability of fulfillment of the function becomes one of the main indicators of the quality of the system's operation.

The quality of achievement of the goal determined by the function must be acceptable to the system's user. But what does the acceptable quality of satisfaction of a POIN mean from the point of view of the carrier of POIN (the user)? In fact, exactly this quality (at minimum) must be included into the goal function of the documentary IR system. It is extremely difficult (if at all possible) to give a complete set of parameters and their exact values indicating "acceptable quality." So, how do we define "acceptable quality"? As an answer to this question, the following approach, for example, can be used.

It is clear that any user during his or her life has constantly satisfied a POIN and is familiar with different methods and ways to satisfy POIN. The IR system that will be used to replace other methods must be somewhat better than the alternative methods available to the user. Of course, the creators of a system understand those difficulties and the quality with which the user is dealing, if only because they themselves are users. In fact, for this reason, during the formulation of a function, we take into account some parameters of goal achievement (parameters that we think are essential for the user), and we assume it at least exceeds those indicators of these parameters that are inherent to alternative (accessible to the user) methods.

The preceding approach describes the minimally acceptable level for developing an IR system. This approach is especially expedient for creation of a principally new system, because formulation of a function "at minimum" often facilitates (simplifies) realization of the system. However, this is only one possible approach. It is also possible to develop an IR system starting from the ideal (maximal) by relaxing the requirements and "removing oneself" from the ideal