

2. Let us assume that a search in a collection containing 10,020 documents, 20 of which are pertinent, resulted in outputs consisting of
  - 18 pertinent documents and no nonpertinent documents;
  - 20 pertinent and 1000 nonpertinent documents.

It is clear that quality of these two outputs is practically incomparable: the quality of the first is very high, whereas the second output most likely should be regarded as unacceptable (see Section 10.3, "Problems of Evaluating the Functional Effectiveness of a Document Search"). As to the correctness of the identification of the search collection in these cases, additional considerations are needed concerning concept-based views to determine the position from which identification correctness is evaluated. We have not found discussion of these points of view in literature. Nevertheless, our analysis of publications (see, for example, Popov, 1981; and Salton, 1975) leads us to conclude that some researchers believe (this belief is usually implicit) that a share of found pertinent documents, that is, recall ( $R$ ), and a share of nonpertinent documents not found during the search, that is, specificity ( $S$ ), are equally important (they mutually compensate each other) in evaluating the correctness of identification. (Note that in this context search recall and search specificity can be considered as coefficients of identification of pertinent and nonpertinent documents, respectively.) If one adopts this point of view (as it was stated, there are no other points of view!), then one can conclude that the correctness of document identification in a search collection (resulting in outputs discussed in the given example) is the same in both cases. Indeed,  $R^1 = 0.9$ ,  $S^1 = 1$ ,  $R^2 = 1$ , and  $S^2 = 0.9$ .

3. Let us assume that a search in a collection also containing 10,000 documents, 20 of which are pertinent, resulted in outputs, consisting of
  - 14 pertinent documents and no nonpertinent documents;
  - 20 pertinent and 9 nonpertinent documents.

The quality of these outputs are close, but the identification correctness of the search collection cannot be considered as close in these cases, keeping the previous example in mind.

Thus, the above examples confirm that, indeed, the new formulation of the goal of document search and the former formulation do have essential differences. This is confirmed both in the case of the intuitive evaluation of identification correctness and in the case of evaluation based on a certain point of view. Note in this connection that when a search is made in the same document collection, the high quality of the output implies a corresponding level of identification correctness of the search collection documents. The opposite implication is not true, which follows, in particular, from the second example.

Naturally, if we assume that the goal of document search is to ensure correct the identification of documents in a search collection, then we can say that there are also two methods of evaluating the functional efficiency of a search:

the by-content method and the formal method. (See Section 10.3 "Problems of Evaluating the Functional Effectiveness of a Document Search.") In that section we mentioned that if the functional efficiency of a document search is evaluated by a human (the by-content method) he or she uses appropriate concept-based views (determining a position from functional efficiency is evaluated). Here, once again, it should be pointed out that we have not seen any discussion of the concept-based views in a situation for which the correctness of the identification of the documents in a search collection must be evaluated. Recall that the concept-based views in question are formed taking into account the task for which the document search is carried out. However, we are also unaware of any tasks that would lead to a search whose goal is to correctly identify documents in a search collection. Tasks of this type are unlikely to be of practical interest, because, generally speaking, they assume that the user does not care about the precision of the search. Nevertheless, such tasks and, hence, formulation of the goal of the document search in this section are worth considering, even though at present we cannot expect successful realization of the by-content method for evaluating the functional efficiency of a document search (in the discussed case) because of the lack of both a theoretical and a practical basis.

The situation with the formal method of functional efficiency evaluation in the discussed case is even more complex. First, in this case there is no clear idea of what must be the basis for formal rules to be used in the evaluation method. Second, even if we assume that these rules are based on complex search characteristics, we do not know what kind of CSCs they can be. We should note here that in some publications (e.g., see Popov, 1981; and Salton, 1975) the search characteristic  $R + S - 1$  is discussed, which, generally speaking, potentially could be used in formal rules. This assumption is based on the fact that the concept-based view cited earlier (namely, that in evaluating the correctness of the identification of the documents in a search collection, search recall and search specificity are equally important) does not exclude the possibility of using this characteristic as a basis for a pragmatically justified evaluation of functional efficiency in the discussed case. At the same time, we cannot give a strong argument for the expediency of using this characteristic in evaluating functional efficiency. The main reason is that at present there are no ideas about the position from which functional efficiency is evaluated (we are not even aware of tasks leading to a search whose goal is to identify, as correctly as possible, the documents in a search collection). Hence, before proposing required complex search characteristics or formal models for their construction, one must at least eliminate this reason. However, this is impossible at present. The preceding considerations cause the additional difficulties in realizing the formal method of evaluating functional efficiency in the discussed case.

The previous discussion, in our opinion, gives a clear idea of the role of formulation of the goal of a documentary search in the context of evaluating functional efficiency.