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Operations research and ethics: Responsibility, sharing and cooperation ☆

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Abstract

After a discussion on the relevance of ethics in operations research, two approaches to the ethical discourse, one based on rules and the other based on principles and values, are analyzed. Then, two ethical principles, which can help OR researchers and practitioners in their activity are discussed in some detail. The first is the "responsibility principle", proposed in a more general context by the philosopher Jonas, which in our case suggests to take into account in our work not only the point of view of the "client", but also the point of view of all the "stakeholders", i.e. the ones who can directly or indirectly be affected by the results of our activity. The second, which can be called the "sharing and cooperation principle", calls for a more open distribution of the results of our research activity, whether they are ideas, algorithms or software.

Keywords: Societal problem analysis; Ethics; Social implications of operations research practice

1. Introduction

Science and technology are more and more intertwined: the latter motivates the former and, at the same time, new methodological developments make new applications possible and hence lead to new technological advancements.

Technology has a pervasive and every day stronger impact on society and on human life. That has led to a growing awareness that science cannot be considered above or beyond the realm of value judgments and hence of ethics. As Robert Oppenheimer put it after Hiroshima: "scientists have now experienced sin".

These considerations apply in a special way to operations research which, has as its objects methodologies and techniques for providing support in decision making processes. Hardly any area in OR can be considered far enough from the real world to escape from ethical considerations.

The awareness of the relevance of ethics in operations research has been growing in the last years. The rôle of operations research in addressing social issues has been advocated among others by Rosenhead [15,16] and, more recently, by Koch [11]. Schneeweiss [18] analyzes the relations

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between ethics and decision processes and therefore operations research: "via the analyst or consultant, OR, as an applied science, is part of the decision process and thus is, at least partially, responsible for keeping moral norms". A more systematic analysis of the relations between ethics and operations research has been performed by Brans [1,2], who outlines what can be considered the first ethical code for operations research. Note that scientific associations in fields which are contiguous to or overlap with the OR area, such as ACM and IEEE, already have their ethical codes [14,7].

In this paper two ethical principle are discussed, which can help OR researchers and practitioners in their activities.

The first is the *responsibility* principle, along the lines developed in a more general context by the philosopher Jonas [9,10]. Applied to our field this principle suggests, for example, taking into account in our work not only the point of view of the "client", i.e. the person who pays for our research or for our professional advice, but also the point of view of all the "stakeholders", i.e. the ones who can directly or indirectly be affected by the results of our activity.

The second principle, which can be called the *sharing and cooperation* principle, calls for a more open distribution of the results of our research activity, whether they are ideas, algorithms or software. The rationale behind this principle is twofold. First, our results are not only 'ours'; in fact, they are only the tip of an iceberg consisting of a pre-existing large body of knowledge. We will have used in our work the results of the work of the scientific and professional community, and it is our duty to enable the whole community to benefit from our work. Second, we should contrast the trend to an ever increasing privatization of ideas, which is something relatively new in science, and which rather often turns public investments into private gains.

2. Values, science and technology

The claim that science and technology are value-neutral, which was quite common among researchers not long time ago, is now challenged more and more. It is still slow in dying and, most often, the practical behavior of people working in scientific or technological areas appears to conform to it. "Guns don't kill, people do", the motto of those who oppose firearms control bills in the United States, is only one of the most typical expressions of the belief that problems only derive from people's behavior not from technologies, although it is not difficult to unmask the corporate interests which are behind it.

The idea of the value-neutrality of science derives from two different assumptions. The first is *methodological*: scientists must be objective, neutral observers of the subject of their study. The second is *ontological*: the object of scientific analysis must be seen as it is, or, put in a different way, the *natural laws* simply *are*; no value or purpose can be attached to them. From the above assumptions it follows that science is nature laden, i.e. the development of the scientific knowledge is a kind of natural process dictated by nature itself not by society. Jonas, in [10], argues against the second assumption, and hence implicitly against the first one, and shows the paradox it generates: a purposeless and disinterested nature has given birth to the subjectivity of human life, whose main characteristic is to put endless questions about its purpose and its nature, that is to 'be interested'. In other words, subjectivity cannot be explained while remaining within such a concept of nature; it is a paradox with a Gödelian flavor. However, a philosophical discussion on this matter is beyond the scope of this paper; here I will use a different argument against the neutrality of science.

Science and technology are strictly intertwined, to such an extent that it is often hard to make a distinction between the two. There is a kind of reinforcing loop in which scientific results foster the development of new technologies, and, at the same time, new technologies push forward the frontiers of scientific knowledge. On the one hand, technologies are a driving force of economic development and are within the realm of economics and of corporate interests no less than within the scientific realm. On the other hand, they have a deep influence on society and on its dynamics and are at the same time influenced by social forces. As the development of new technologies or the