

# Can Instruments Replace Humans also as Liable Entities?

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This issue of the Magazine deals with instruments that replace humans: this is not surprising, from a purely technical perspective, since we know that nowadays instruments have become more and more autonomous and do not need humans to operate them. They have also become more and more pervasive in our lives. Today we do not only use instruments to diagnose illnesses and treat them, but we also rely on them when we organize our days according to weather forecasts, check the speed of our cars, pay for the fuel, etc.

However, there is still a field in which instruments, in general, cannot replace humans: they cannot be considered liable for harm or damage they may cause, and a liable individual has to be always identified.

From the legal point of view, it is always necessary to identify someone who is in charge of controlling the instruments (and, more in general, any machine) and, consequently, who can be considered liable for any harm or damage that may occur in case of failure.

Autonomous devices pose a new problem, from this legal perspective. Indeed, up to now, in the Instrumentation and Measurement field, technical experts were needed not only to operate the instruments, but also, or even mainly to interpret the results provided by the instruments themselves. Instruments were not capable of providing all of the information needed about the measurand. Think, for instance, to DNA profiling in forensic sciences: the instrument provides electrophoresis peaks in correspondence to each considered allele, but only the experience and competence of the operator can validate the peaks and assess whether they belong to a known sequence or not. It is therefore clear that the operator holds full responsibility for the obtained results and this may imply potential professional liability issues, that may also include negligence.

The new problem is that all instruments are becoming more and more autonomous and they may even suggest possible interpretations to the operator. This is surely the case of medical imaging, where CAT, MRI, PET and similar scan machines

suggest a possible diagnosis to the doctors, and will probably be the case with DNA profiling in the future. How can we consider a machine liable for a wrong diagnosis or a wrong identification?

As I wrote above, laws and regulations in practically all law systems do always require a person to be responsible for the machine's activity, which could, for example, cause harm to somebody to whom a compensation should be granted.

This is common practice in legal matters. To grant compensation to people involved in an accident not only that occurred because of an instrument misoperation, but it is also used to make the inventor aware of the potential consequences related to a machine that is not compliant with the official Standards and regulations. (As well as those who place the machine on the market or put it into use).

Although this has been common practice recently, this has not always been the case, especially in the early days of the industrial revolution, when machines caused several cases of death and injured several people, mainly due to the ignorance of the potential harmful effects of the new machines. This might appear surprising, but, at that time, inventors were not considered liable for the damages caused by their inventions, so as not to discourage new inventions that could favor progress and welfare.

After the first pioneering period, rich with new inventions, the new machines started to be manufactured by industries and have slowly become the outcome of mass production, widely available so that as many people as possible could have access to progress. In this new scenario, the potential harmful effects originated by the more and more autonomous operations of machines, often replacing humans, could not be neglected any longer. However, it is still difficult to predict whether new technologies may have undesired and potentially harmful effects, since they generally manifest themselves only after a period of time, and this period of time can be quite long.

Therefore, placing new machines and instruments on the market requires a sort of risk management analysis that, unfortunately, cannot be complete because not all risks associated with the investigated matter are known. This lack of knowledge raises doubts about the safety and the reliability of a product that could seriously damage people. Hence, in conformity with

this approach, regulations have been issued that set limits in order to assure that these kinds of products (machines) are not distributed or, if distributed, risk is minimized.

This approach refers to the *precautionary principle* that was first introduced during the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, in June 1992. It was then encompassed in the EU Treaty (art. 191) as a basis for the national legislation of the Member States. The official website of the EU describes this principle as a mean that:

*enables rapid response in the face of a possible danger to human, animal or plant health, or to protect the environment. In particular, where scientific data do not permit a complete evaluation of the risk, recourse to this principle may, for example, be used to stop distribution or order withdrawal from the market of products likely to be hazardous.*

Even though this approach finds its roots in environmental issues, legislators have applied it whenever a new technology-related problem had to be dealt with in other areas also, including the economic ones, and the information about the associated risks were considered insufficient, or unsolved doubts were still present.

The most significant example of the precautionary principle application is that related to protection from the exposure to the electromagnetic field (EMF) generated by machines (such as printers, PCs and similar devices of everyday use). The EU regulation imposes a severe limit to the emissions for that family of products, with the aim of preventing diseases even if no clear scientific evidence is available about any indisputable relationship between diseases and the exposure to the EMF.

To come back to this issue's topic, how can the aforementioned law principles impact on autonomous instruments and those who play a role in their design, production and placement on the market?

Since, especially at the beginning, the possible harmful consequences of totally autonomous instruments cannot be fully predicted, the precautionary principle may impose more severe limitations in their use than those envisaged by the scientific and technical community. Thus, probably discouraging the development of new technologies and related applications, or simply delaying their diffusion and the benefit they may have on our everyday life.

Consequences that are more important may arise from the legal need to identify a liable person. As I wrote above, it is

clear that the person liable for an incorrect use of a traditional instrument or the incorrect interpretation of the obtained results is the person in charge of that specific measurement activity. In this case, nobody will consider the manufacturer liable for the potential damages or harm caused by an incorrect use of the instrument, unless they can be clearly attributed to a fabrication flaw. However, what if the employed instrument is fully autonomous, does not require an operator, and may even provide an interpretation of the measurement result?

In this case, the liability for the problems caused by incorrect results can be assigned to the manufacturer, or the company that placed it on the market, or the reseller that sold it, depending on the regulations of the country in which the problem occurred.

As you see, new technologies and new scientific achievements do not pose only technical problems, but also legal ones that, if not considered at the right moment, may create unexpected problems to the individuals involved in the whole process, including those that were never considered liable in the past. And legal issues do generally require more time than technical ones to be solved. So, do not disregard them!