On the other hand, practical application is only one of the relevant dimensions in knowledge organization. It is also possible to conceive a KOS without immediately applying it. Actually, science often work in this way: phenomena are investigated only in order to improve our knowledge of them, irrespective of any conceivable application; it is only after a theory is developed and acquired in the scientific community, that some technological application, often unexpected, is derived from it.

This suggests that knowledge can also be organized *for the sake of it*, looking for general structures able to account for relationships between concepts in any context. This approach can be described as *ontological*, that is, attempting at mapping the relationships that actually exist between things, thus taking knowledge organization more as a natural science than just as a practical technique. Obviously such mapping is limited by the current capabilities of human means. However, it is believed that as more accurately is reality reflected in a KOS, as more effective will it be even for practical applications. "Is the classification that is soundest as a basis of generalizations also most convenient for information retrieval? This, indeed, seems to have been true in most cases I have encountered" [Mayr 1981].

The ontological approach has had a variable popularity in the history of knowledge organization. While some founders, like Melvil Dewey or S.R. Ranganathan, were mainly concerned with finding pragmatic solutions, others, like E.C. Richardson or H.E. Bliss, looked for a naturalistic order of knowledge [Dousa 2009]. Those who try to reflect reality in their schemes as directly as possible need first to identify some natural principles, according to which phenomena (or disciplines studying them) can be arranged. As these principles should hold throughout all the fields of knowledge, they have to be very general. Two theories have been especially considered in this respect by knowledge organizers: those of general systems and of integrative levels. As they seem to be compatible between each other, they can be used both for the same KOS.

General systems theory, developed by Ludwig von Bertalanffy, allows to describe any class of objects as a system, composed of parts variously interacting. Systems can thus be treated mathematically by a set of general laws, independently from the kind of objects they represent (an atom, or an ecosystem, or a car) [Foskett DJ 1980].

Differences between kinds of objects, on the other hand, can be accounted for by the *integrative levels* theory, developed by James K. Feibleman, Nicolai Hartmann and others. According to it, existing phenomena can be grouped in a series of levels of increasing organization, each based on the previous ones but also showing new emergent properties (organisms are made of atoms, but also have additional properties, like the function of an organ, which make no sense if applied to atoms). This suggests that the main classes of a KOS can correspond to the series of levels. Such idea was especially explored during the 1960s by the Classification Research Group in London [Foskett DJ 1978], and is currently being implemented in the Integrative Level Classification research project <http://www.iskoi.org/ilc/>.

Another general feature of KOSs, which is more familiar to applied ontologists, are the *categories* into which concepts can be organized, like those of entities, attributes, processes, etc. These are clearly of philosophical origin, and also correspond to the categories of facet analysis in the tradition of bibliographic knowledge organization. Categories and integrative levels can be crossed to form a grid acting as a useful general guide for a KOS [Gnoli 2008].

While it is possible (and frequently done indeed) to develop a special KOS using ad-hoc idiosyncratic classes and categories, only reflecting the particular perspective of a single application, this is not enough anymore when several systems have to be connected for shared use. As we know, this situation is increasingly relevant in the view of the Semantic Web. The only way