# Jerzy Skolimowski and Bunge-Wand-Webber Ontology- BWW Technology and Science Definition

Jerzy Skolimowski is a Polish film director, screenwriter, dramatist, actor and painter. Beginning as a screenwriter for Andrzej Wajda’s Innocent Sorcerers, Skolimowski has made more than twenty films since his directorial debut The Menacing Eye. The Bunge-Wand-Weber is a TLO with low ontological commitment. It is intended to support all applications of information systems.Bunge-Wand-Webber Ontology – BWW

Inspired by Bunge, applied to information systems. There is an element of ontologically inspired formalization of information systems. There is also a major element of adopting an ontological approach to the representation of domains of reality that are modelled in information systems.

When you think of the word technology, what comes to mind? It might sound like something from a sci-fi show or something that has to run on electricity. Technology makes us think of the very complex. But energy doesn’t have to be complex.

Technology is the use of scientific knowledge for practical purposes or applications, whether in industry or in our everyday lives. So, basically, whenever we use our scientific knowledge to achieve some specific purpose we are using technology. Well, there is slightly more to it than that. Technology usually involves a specific piece of equipment. But that equipment can be incredibly simple or dazzlingly complex. It can be anything from the discovery of the wheel, all the way up to computers and MP3 players.

According to Skolimowski, “*Science concerns itself with what is, whereas technology concerns itself with what is to be” – Jerzy Skolimowski, 1966*

It may be clear by this point that technology is deeply entangled in human will and judgment. Technology is certainly not value-neutral, although it is often portrayed as such. Part of the reason is our messy collective handling of the relationship between technology and science. Science and technology are frequently mentioned in one breath; while they are related, we must decouple the two to fully understand what technology is, apart from science.

A scientist Is a spectator whose goal, at least in theory, is to detach their identity from the scientific process. The person’s will is constrained to looking for truths that are universal, certain and timeless. The scientific method is constructed to rid its output of human context and distortion, so that in theory, anyone should be able to replicate a set of results. The scientist’s identity should be rendered irrelevant.

In a sense, science aims to be a minimally instrumental pursuit, as it only aims at the truth. In contrast, technology is highly instrumental; it’s all about pursuing various goals using tools.

Consequently, in its idealized form the scientific method limits freedom of the will, while technology amplifies freedom of the will. Technology is by no means derived with certainty. It is the extremely particular result of someone’s will, based on rationalizing through the concrete and contingent circumstances of the world.

We are not pursuing “truth”; we are exploiting “truth”.

(The caveat is that science, of course, involves significant free will and judgment in practise too. Scientists have to make decisions about what constitutes a worthy investigation, outlining and framing the task at hand. Science has also been commissioned for entirely instrumental ends. I have noted that objectivity and non-instrumentality are ideals that the scientific process aims for, which does not reflect practise. Still, the difference in ideals for science and technology has major implications for the way people conceive of and execute the work.)

Even though technology often exploits scientific truths, technology does not require rigorous science. For millennia, humans built tools and found new and more efficient ways to do things with trial and error, without needing a methodical pursuit of truth. Cheesemaking is an ancient biotechnology whose genesis never relied on a theory of bacteria. Nowadays, science and technology have a closer relationship, but even so, technology is not determined by science.

Anyone trying to apply science via technology must reason through contingencies, constraints, and behavior in specific circumstances. Questions like What is most appropriate and desired in this context? Arise. Science focuses on necessity and universality; technology focuses on contingencies and specificities. Thus, technology does not just follow from science as some kind of 1:1 relationship. There is a critical juncture between science and technology, between present and future. Here the technologist stands, choosing what kind of future, out of the infinite possibilities, that will actually materialize based on our scientific understanding of the present world.

A piece of technology prioritizes some low-resistance path to achieve an end, and its essential nature involves instrumentality and free will. It must inherently be purposive.

Correspondingly, neither the work of technology nor a technological artifact can be either neutral or deterministic. Viewing a technology as a purely neutral object is ignoring the human intention designed into it, the meaning that humans give to the technology we interact with, and the incredible agency involved in a technologist’s work.

Skolimowski asserted that our technological pursuits consist in providing means for constructing objects according to our desires and dreams.3 After we internalize the scope of our agency, the critical question for technologists will become: what are the desires and dreams worth specifying, and the paths we should create, and endorse, to get there?

Wand and Weber have developed a series of models based on the ontological theory of Mario Bunge—the Bunge–Wand–Weber (BWW) models.

The Bunge–Wand–Weber framework defines a representation model based on an ontology defined by Bunge in 1977 (Wand and Weber 1993; Recker et al. 2006). Two main evaluation criteria are Ontological Completeness and Ontological Clarity.

Ontological Completeness is decided by the degree of construct deficit, indicating to what level the modeling language maps to the constructs of the BWW representation model.

Ontological Clarity is decided by construct overload, where the modeling language constructs represent several BWW constructs, construct redundancy, where one BWW construct can be expressed by several language constructs and construct excess, having language constructs not represented in the BWW model.

Rosemann et al. (2006) and their findings include:Representation of state. The BPMN specification provides a relatively high degree of ontological completeness (Rosemann et al. 2006), with some limitations. For example, states assumed by things cannot be modeled with the BPMN notation. This situation can result in a lack of focus in terms of state and transformation laws not being able to capture all relevant business rules.

System structure. Systems structured around things are under-represented, and as a result of this problems will arise when information needs to be obtained about the dependencies within a modeled system.

Representational capabilities compared with other approaches. A representational analysis was done in Rosemann et al. (2006) on different approaches that show that BPMN appears to be quite mature in terms of representation capabilities.

This can perhaps be partly explained by the fact that the previous approaches like EPC and Petri nets influenced the development of BPMN. It is interesting that only BPMN of the process modeling notations is able to cover all aspects of things, including properties and types of things. From this it is possible to conclude that BPMN appears to denote a considerable improvement compared with other techniques. The combination of ebXML and BPMN would provide maximum ontological completeness (MOC) with minimum ontological overlap (MOO) (Recker et al. 2005).

Whereas the BWW-ontology look at individual concepts The Workflow Patterns Framework[1] (van der Aalst et al. 2003; Russell et al. 2006) provides a taxonomy of generic, recurring concepts, and constructs relevant in the context of process-aware information systems (Wohed et al. 2005) (see also Ouyang et al. 2014). The patterns have been used to examine the capabilities of business process modeling languages such as BPMN, UML Activity Diagrams, and EPCs; web service composition languages such as WCSI; and business process execution languages such as BPML, XPDL, and BPEL (Russell et al. 2006).

The available patterns are divided into the control-flow perspective, the data perspective, and the resource perspective. Workflow pattern-based evaluations are presented in Recker et al. (2007) and Wohed et al. (2005, 2006). The outcomes of the evaluations include:

Representation of state. Due to the lack of representation of state in BPMN there are difficulties in representing certain control-flow patterns (Wohed et al. 2006). There are further inherent difficulties in applying the Workflow Patterns Framework for assessing a language that does not have a commonly agreed-upon formal semantic or an execution environment. There are several ambiguities that can be found in the BPMN specification due to the lack of formalization (Wohed et al. 2006). This has been improved in BPMN 2.0.Multiple representations of the same pattern. The simple workflow patterns have multiple BPMN representations while capturing the most advanced patterns required deep knowledge of the attributes associated to BPMN’s modeling constructs that do not have a graphical representation.

Support for instances. Workflow and environment data patterns are not supported due to the lack of support for instance-specific data for a task or subprocess with a “multiple instance” marker.Resource modeling. Support for the resource perspective in BPMN is minimal, but the modeling of organizational structures and resources is regarded to be outside the scope of BPMN. The authors state that the lane and pool constructs are in contradiction to this.