

Standardization

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There are moments when you curse every engineer in the world. You are travelling around, want to charge your phone only to find out that you have brought the wrong cable. Could that bunch of mentally challenged morons not for once have put the customers interests first and have given every phone the same connector? If it is possible to standardize something complicated like the communication protocol, it should be possible to do the same thing for something simple like the connection of 2 power supply wires? It did work for normal 230 V plugs, didn't it? Until you enter Belgium, Switzerland, Great Brittan or the USA. Then you realize the world is not as standardized as we sometimes think. Or are we wrong in our thinking?



Perhaps we first should step back to the principles of standardization. In fact there are multiple forms. An important distinction is that between formal standardization, which is top down, and de facto standardization, which is bottom up. It is formal standardization if a group of smart people comes together to write down how things should be done. This is often about communication protocols. Think about TCP/IP, GSM, but also the coding of information on CDs (the red book) and DVDs, and even something basic as the ASCII character set, or (even older) the Morse code. Standards on management systems (ISO9001, PAS55) also fall within the category of formal standardization. If all manufacturers of appliances keep to the standard, products become interchangeable. This way, a CD produced by Sony can be played in a CD player of Philips. It may sound attractive to create interchangeability only for the own range of products (like Apple does), but history has proven that consumers prefer choice above anything else¹, and being tied to one supplier does not help that. In general, innovation will happen at a higher speed with open standards, simply because more people can be involved in developing new stuff. In some cases, multiple standards can be defined in parallel. This was the case with VCR's in the 80s of the previous century. Multiple systems were available, but as for one system more film titles² were available in renting, most consumers opted for that system and

¹ This is one of the conclusions from the book "What technology wants" of Kevin Kelly

² Guess three times what kind of titles....

in the end only that system survived. Consumers do not want to choose between standards, they want to have freedom of choice within one standard.

The other form is de facto standardization. This happens when one party starts something new, other parties want to join and then copy the form. Electricity plugs are a fine example. Electricity has started all over the world as small local grids, which were extended piece by piece. To make appliances moveable they got plugs (instead of a fixed connection to the grid) and the suppliers of those appliances had an interest in universal plugs. As in the early 20th century globalization and free trade between countries were unknown concepts, the universality stopped at the border. With the opening up of the borders as it happened in Europe, a new option for harmonization appeared. However, if a standard has many users, it will be almost impossible to change standards. Think about driving on the right or the left side of the road. Sweden changed sides in 1967, but suppose that you would have to commence such an operation in Great Britain today. That we on the continent all drive on the right side has to do with formal standardization, that is the rule that Napoleon introduced in his empire. Another example of de facto standardization is the keyboard on a computer. It may seem that the QWERTY keyboard is the universal standard, but in Belgium and France they prefer the AZERTY keyboard, which can be quite inconvenient for Dutchmen wanting to use a computer at our southern neighbors.

Within standardization, it is possible to distinguish standardization of form and function. Even though electricity plugs have a different shape, the voltage coming from the sockets in the wall are often the same. All over Europe, it is the same 230 Volt at 50 Hertz. As most appliances convert the alternating current of the grid into a direct current before it is actually used, there is a significant tolerance for the precise characteristics of the grid voltage. Therefore it is possible to find one power supply with multiple plugs in one box, so that the device can be used in the USA (110V 60Hz), Continental Europe (230V 50Hz) and the UK (240V 50 Hz). However, this only works for devices that use a separate power supply, appliances that are connected directly (light bulbs, irons, coffee machines) that is in general not the case. A 110V light bulb would burn very brightly and very short if used at 230V. This functional standardization allows, given the right adapter, to connect many devices to all sockets all over the world.

However, if truly different specs would apply (like 1500 Volts of direct current), it would become much more troublesome to make things work (even though the Thalys runs at 1500/3000 volts DC and 25000 Volts AC) and a true conversion is needed. Another energy carrier like natural gas, compressed air or a direct drive could even require multiple conversions. Natural gas is first converted to heat, then to motion, which drives a generator that produces electricity.

A famous example of standardization of function but not of form is that from the Apollo 13 mission, which required a square filter of the command module to be fitted in the round hole for the filter in the Lunar module. In the end they succeeded, even though it required tape and parts of the manual to make an adapter.

This returns me to charging my phone. The charging voltage is highly standardized, as every phone can be charged via the USB port of a computer. If it would be possible to connect the voltage carrying wires of the cable that I had brought to the points of contact in the phone it would be possible to charge the phone. A multi meter, some wire and a soldering device would suffice. But it appears I have forgotten those precisely on the day that I brought the wrong cable.