Defining what a successful SUPER-conductor for a magnet is, isn't easy. It is often underestimated to what extend the type of magnet and its application are strongly determining the conductor requirements. Whether it is a one-off magnet where cost is not an issue, a quasi-commercial small series, or a long-term commercial production of magnets, is crucially influencing the conductor choice. The technical and economic considerations for a single high-end magnet in a satellite or for an insert in a high-field facility are very different from those for a few hundred or thousands of magnets for particle accelerators or ultimately the long-term series production of MRI magnets.

In textbooks, we find long tables with superconducting materials ever discovered, but when it comes to those for practical use in magnets, only a few remain. Yet another hurdle we encounter when attempting to use these NbTi, Nb3Sn, MgB2, BSCCO and ReBCO wires in high-current multi-strand cables and often mechanically reinforced conductors. They have to survive the enormous Lorentz force and thermal-electro-magnetic infestation present in large-scale magnets and guarantee degradation free and reliable operation for some 20 to 30 years.

The requirements for successful SUPER-conductors will be reviewed and a few striking examples, where naive initial designs had to be corrected, will be presented. Long-term research and development to learn, understand and improve not only bare transport properties of conductors but also their thermal-mechanical behavior are required for magnets to be successful.