Design research is increasingly weak in comparison with other fields; without action to increase scientific, theoretical, and methodological rigour there is a real possibility of the field being superseded and becoming obsolete through lack of impact. The aim of this paper is to show how design research could become more rigorous, relevant and have greater impact. I conduct a two-part review that combines systematic and critical components. Part one characterises the major scientific challenges facing design research, and part two examines how such challenges have been addressed in related fields. I identify key learning indicating future directions for theory-driven design research. I conclude by providing some concrete recommendations for the field of design research and individual design researchers.