

# Foreword

In December 2016, the Chinese Academy of Engineering (CAE) launched the Strategy Consulting Project on Global Engineering Focus (hereafter called “the Project”). The Project aims to identify the engineering research and development focus by scrutinizing hotspots in global engineering research and development. Thus, it will play an important role in offering academic guidance and assisting decision making.

As a long-term mission of CAE, the Project will be implemented on a rolling basis in every ensuing year. In collaboration with Clarivate Analytics, CAE draws upon the strengths of its different academic divisions and the “1+9” Journals of CAE (e.g. *Engineering* and nine other specialized journals). By adopting its specialty criteria of every division, every year the Project publicly releases 90 identified engineering research hotspots and 90 engineering development hotspots in both Chinese and English. (Each academic division identifies 10 research hotspots and 10 development hotspots, yet no engineering development hotspots have been issued by the Engineering Management Division this year.) Among them, 27 engineering research focuses and 27 engineering development focuses are selected for detailed elaboration.

Based on rigorous data analysis and informed expert judgment, the Project follows the principles of combining

quantitative with qualitative research, using data mining and expert assessment for mutual validation, and giving equal consideration to engineering research hotspots and engineering development hotspots. As for data analysis, comprehensive use is made of data from both journal and conference papers (indexed in SCI, EI, and ISTP), as well as global patent databases, with full consideration to papers’ citation frequency and life. By doing so, basic information about hotspots in each field is obtained for experts to scrutinize and select focus. Expert judgment and interpretation are emphasized at this second stage, with reference to results from the initial data analysis. Through in-depth interactions between expert opinions and data analysis, engineering research hotspots and engineering development hotspots are selected. Annual engineering research focus and engineering development focus are eventually determined through expert assessment and judgement.

In this report, “hotspots” are defined as the most active cluster of papers or patents and represent the fastest knowledge accumulation among academic papers or patents. In terms of methodology, all candidate hotspots are obtained through data mining and analysis. Experts are then invited to select hotspots. Finally, focus is obtained and deciphered through expert assessment and judgment.