Appendix 2

In this appendix, we present the results of a network analysis that exceeded the range of the article but still provides some interesting insights. To assess relevant developments over time, the network analysis is based on article keywords, citation, and co-citation to indicate important works in our literature set and study co-authorships in terms of collaboration among authors. The analysis was conducted using *VOSviewer* software (van Eck and Waltman 2010), which allows the presentation of citation links, co-authorship, keyword co-occurrence, and more. A *Scopus* database export of all available articles in our literature set was used as input for the analysis, and our sample consisted of 94.8% of the total sample.

In Figure 1, we examined the solution methods in relation to keyword occurrence and co-occurrence in the literature set. The list of keywords provided by the authors are extracted and co-occurrences highlighted. It is apparent that genetic algorithms, mathematical models, heuristic algorithms, and integer programming occurred most frequently. Taking the year of occurrence into account, a trend from genetic algorithms to greedy algorithms, knowledge-based systems, learning algorithms, and variable neighbourhood searches as solution methods for the different multi-factory problems is perceivable.

Next, we demonstrate the outcome of a citation analysis, which is displayed in Figure 2. The most cited papers are highlighted by size, the link between papers is demonstrated by their location in proximity. The most prominent works are De Giovanni and Pezzella (2010) with 153 citations, Moon, Kim, and Hur (2002) with 151 citations, and Chen and Pundoor (2006) with 141 citations. When analysing the publication years it can also be concluded that the earlier works of Moon, Kim, and Hur (2002), Chen and Pundoor (2006), Naso et al. (2007), Jia et al. (2003), Chan, Chung, and Chan (2005), Gnoni et al. (2003), and Chan et al. (2006) to some extent opened up the research stream and are cited often, but remain rather isolated. The contributions in orange or red colour in Figure 2, which were published in recent years, are more evenly distributed and clustered together. This indicates a strong connection with regard to citation and mutual perception.

Co-authorship networks are established through a connection of authors, based on the number of publications they created together. Figure 3 shows the co-authorship network of our literature set. In total, Sai Ho Chung (8 articles), Ling Wang (8 articles), Felix T.S. Chan, Javad Behnamian (7 articles), Bahman Naderi (6 articles), Keyi Xing, Rubén Ruiz, Shih Wei Li, and Kuo Ching Ying (5 articles) published the most articles in our literature set. The strongest link exists between Sai Ho Chung and Felix T.S. Chan, who co-authored 6 articles, and Shih Wei Li with Kuo Ching Ying, who co-authored all their 5 articles. If we look at the citations of the authors mentioned, it is apparent that Rubén Ruiz and Chiung Moon have the most citations per article with 59.4 and 71.5 citations, respectively. Other authors who have published a comparable number of articles, on the other hand, are quoted significantly less frequently. The research stream is quite heterogeneous, and various small clusters have formed. Therefore, we conclude that there is already some cooperation, but it could be intensified in order to achieve even better solution methodologies for scientific and industrial problems through the exchange of knowledge.

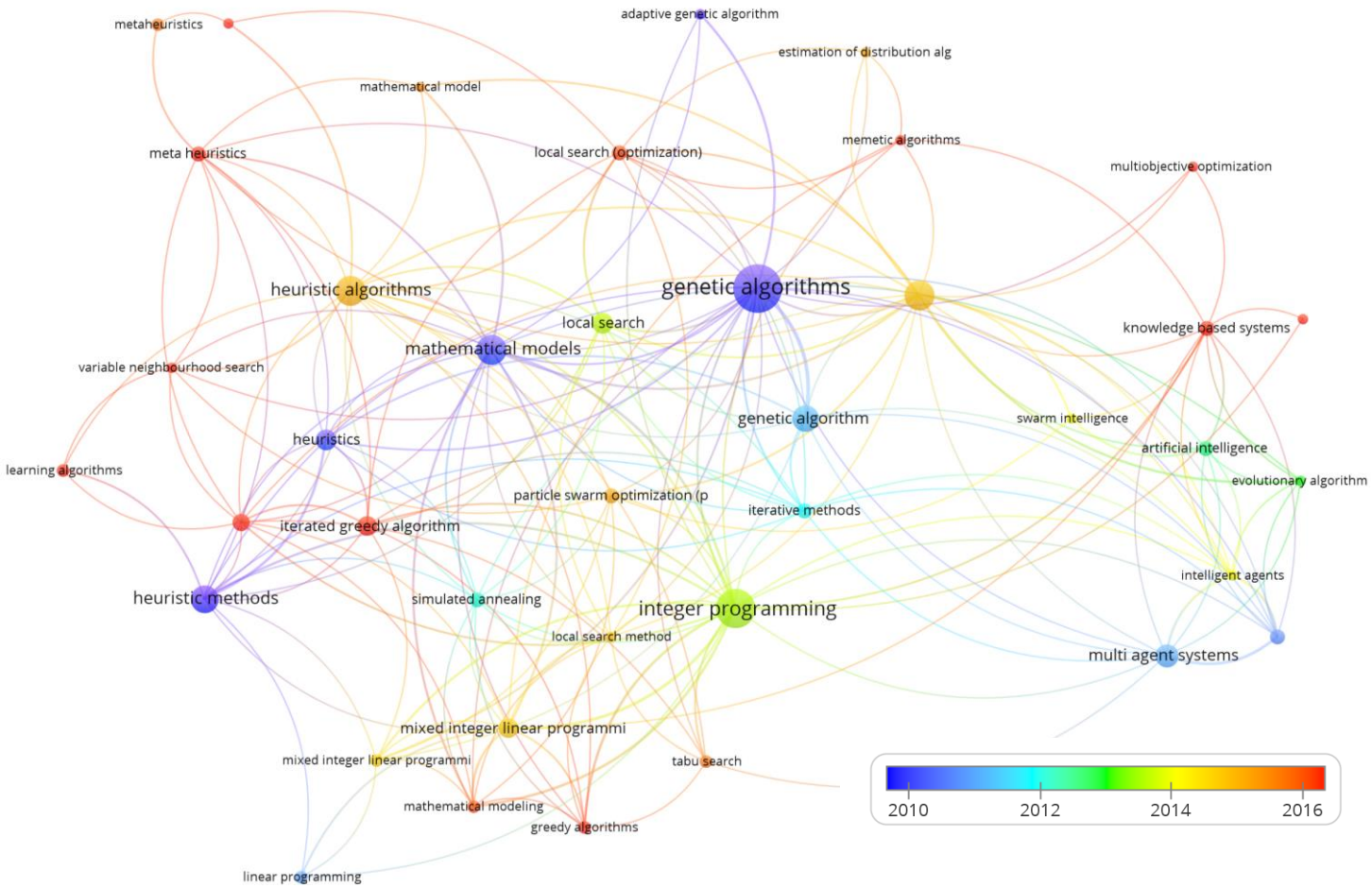

Figure 1. Keyword occurrence and co-occurrence

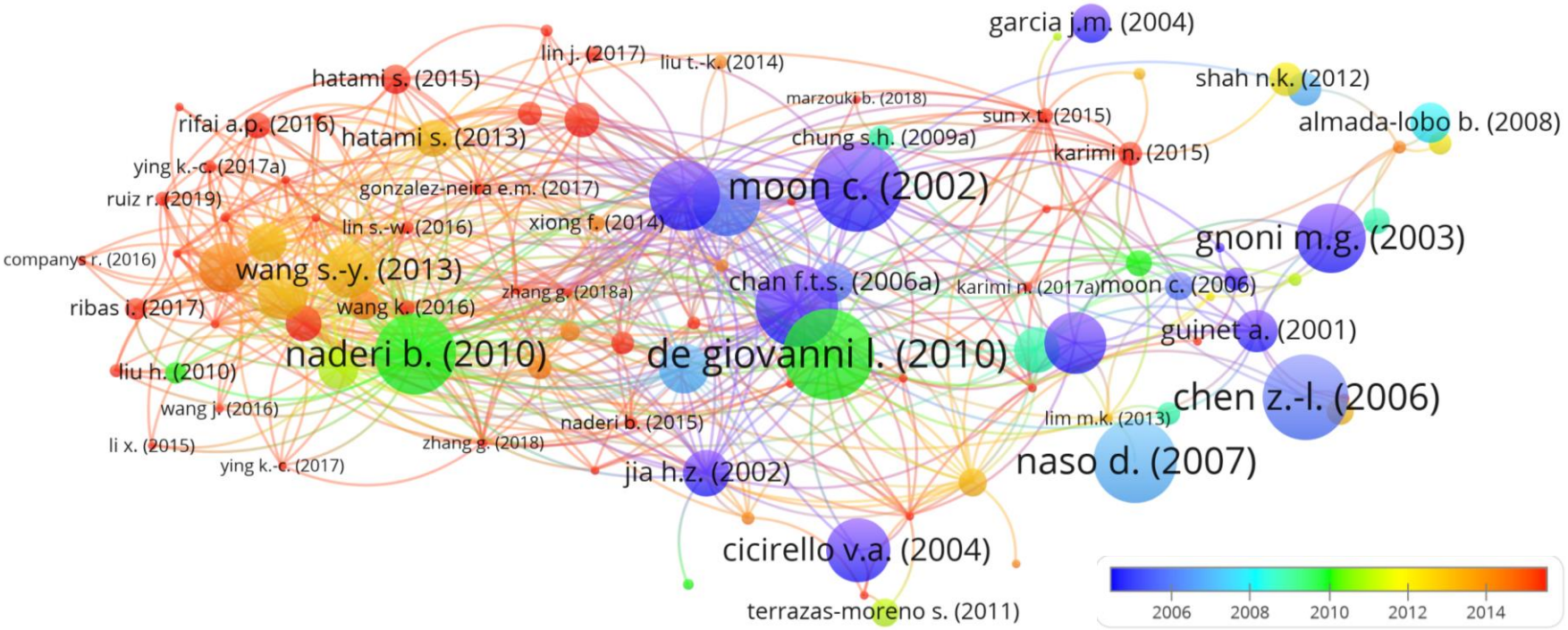

Figure 2. Citation analysis

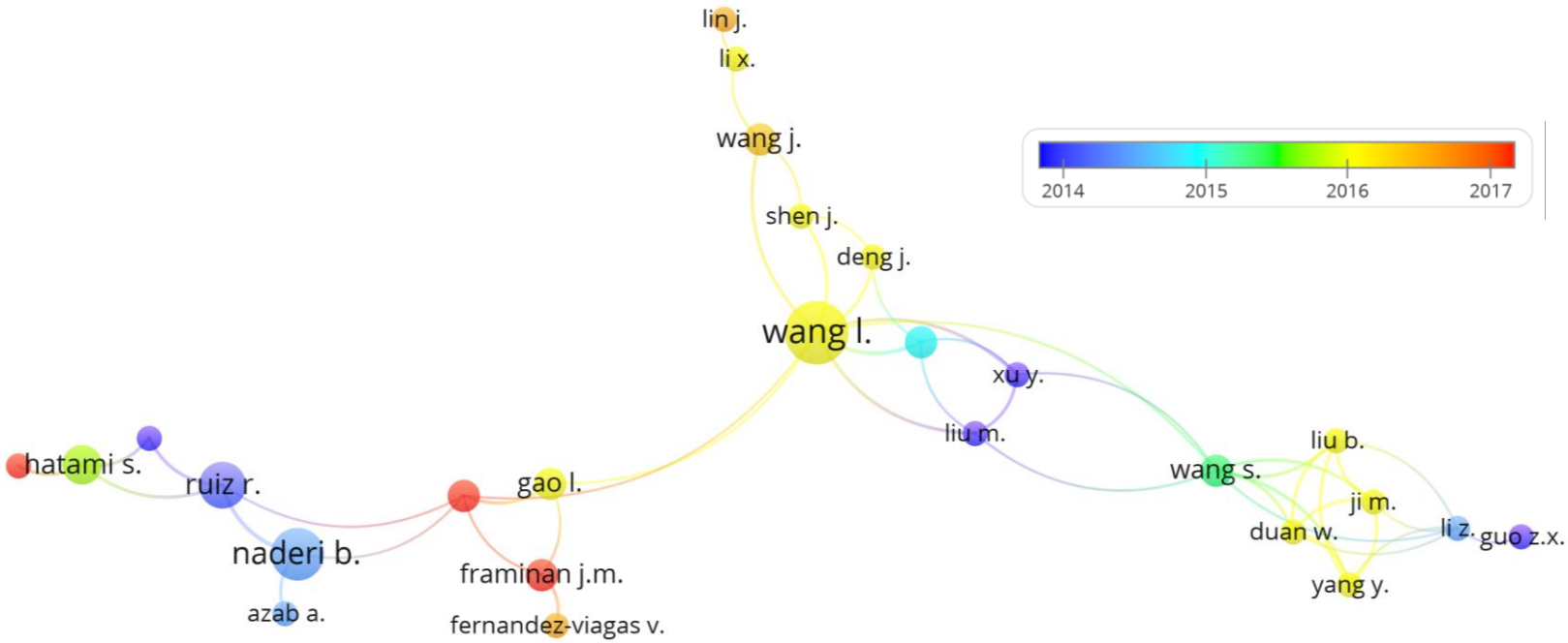

Figure 3. Co-authorship analysis