



## Summary

**Title:** Understanding the Difference Between Participants and Contributors in a Standard-Development Process.  
(CPI Competition Policy International)

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## Abstract

The development of technological standards, such as the fifth generation (“5G”) cellular standard, requires cooperation and coordination among hundreds of companies and thousands of engineers. However, not every participant contributes in the same proportion to the creation of a standard. We examined the 3rd Generation Partnership Project (“3GPP”) — a partnership of seven global standards-development organizations that develops protocols for mobile telecommunications — and found that a small group of companies, which represents 1 percent of 3GPP members, is responsible for over half of the contributions made to the 3GPP in relation to the development of 5G. There is then a large number of 3GPP members that make only minimal contributions, if any at all. Although there is a large heterogeneity among contributions in terms of their inventive content, these data suggest that only a few companies make risky investments in R&D to develop the technologies that are used to build cellular standards. Yet, when successful, those investments benefit not only all 3GPP members but also the industry and society more broadly.

**Keywords:** standardization, cellular standards, 3GPP, contributions

## Summary

The development of technological standards, such as the fifth generation (“5G”) cellular standard, requires cooperation and coordination among hundreds of companies and thousands of engineers. Yet, not all participants contribute to the creation of a technical standard in the same proportion. We examined the public data from the 3rd Generation Partnership Project (“3GPP”) — a partnership of seven global standards-development organizations that develops protocols for mobile telecommunications — and found significant differences among the contributions that various participants made to the creation of the 3GPP technical specifications.

As of October 2023, there have been almost a million written contributions in 3GPP since the beginning of 5G, which reflects the broad scope of work that lies behind the development of telecommunication standards. The 3GPP counts about 550 members, representing different industries and verticals, including mobile network operators and vendors, satellite, semiconductors, automotive, IoT, universities, and representatives from public bodies among others. Although every 3GPP member can influence the development of a standard through direct participation in the process, we found that a small group of companies – six companies to be specific - is responsible for over half of the contributions made to the 3GPP in relation to the development of 5G. There is then a large number of 3GPP members that make only minimal contributions, if any at all. For example,

the combined contributions made by companies from the satellite industry, which is one of the most heavily represented groups in 3GPP, account for 1 percent of contributions. Similarly, members from the automotive and IoT industries combined made less than 1 percent of contributions. There are also over 300 3GPP members that have made no written contributions at all.

Of course, there is a large heterogeneity among contributions in terms of their inventive content. Whereas some contributions are fairly simple, such as a proposed editorial modification to the discussed specification, others are more intricate, rely on innovative technologies, and are supported by numerical analysis and/or simulations requiring months of preparation. Nonetheless, the 3GPP data show that a lion's share of the work at the 3GPP is done by a very small number of companies and there is then a long tail of members that make only minimal contributions, if any at all.

The skewness in contributions, particularly complex contributions that incorporate advanced technological solutions, is not surprising considering that the development of technologies used to build cellular standards requires significant investment in risky R&D. These investments are made without a guarantee that their research will yield commercial results, that the technology will be included in the standard, and, even if implemented, that the standard will be commercially successful. In other words, contributing to the developments of cellular standard is a risky and resource intensive venture that few companies are willing to undertake. Yet, when successful, these investments benefit not only the small number of contributing companies but all 3GPP members and the economy more broadly.