Standardisation on Statistics: ISO Standards and R Tools

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The process of developing and implementing technical standards, or standardisation, is usually unknown, and often even disregarded. Nonetheless, in specific areas of activity, such as Electrical Engineering or Aeronautics, practitioners are more concerned as technical standards are mandatory in many cases. However, in crossing disciplines as Statistics and other science-related topics, we seldom care about standards, even though research projects funding schemes (e.g. FP7 and the approaching Horizon 2020) are more and more requiring the adoption and creation of standards. In this work, we outline the ISO Standards development process and their national implementation. We focus on statistics-related standards, with an outlook to the $R$ domain: capabilities, opportunities and challenges.

The ISO Standards development is carried out by Technical Committees (TC) which deal with specific subjects. The ISO/TC69 (Applications of statistical methods) is in charge of the development of the standards related to our field. It is organised into six subcommittees. The authors are involved with the AENOR Standardisation Technical Committe AEN/CTN66/SC3 ($métodos estadísticos$), whose aim is to update and adopt in Spain International Standards stemmed from ISO/TC69. The ISO/TC69 directly develops some of the standards that are not in charge of the subcommittees, for example ISO 28640 (Random variate generation methods). It defines several methods to generate random variates, which can be compared with $R$ Random Number Generation (RNG) methods and eventually certify that our method fulfills an international standard. Likewise TC69/SC1 (Terminology and symbols) develops ISO 3534 (Vocabulary and symbols), which has 4 parts, and can be used as a reference for reports and research, and to assess base $R$ functionalities. Many $R$ packages contain functions that are related to ISO standards and can be assessed (and eventually certified), for example: ISO 7870 series, Control Charts (qcc, SixSigma, IQCC packages); ISO 22514 series, Statistical methods in process management -- Capability and performance (qualityTools, SixSigma packages); ISO 3951 series, Sampling procedures for inspection by variables (AcceptanceSampling package); ISO 5725 series, Accuracy (trueness and precision) of measurement methods and results (SixSigma package); ISO 13053, Quantitative methods in process improvement -- Six Sigma (SixSigma package).

Undoubtedly, Data Scientists, and practitioners in general, can take advantage of the synergies between the adoption of international standards and the use of $R$. $R$ programs can be easily verified (which is a requirement in many standards, e.g., ISO 9001) as it is Open Source. Thus, any company or organization can go beyond the traditional « Quality Certified » stamp and extend the use of international standards to their processes.

References

