

# Past, Present, and Future: How to Write an Impactful Review

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Review articles play a crucial role in academia, offering a comprehensive synthesis of a particular field. A well-written review possesses the potential to exert a profound influence on the relevant scientific communities, by enabling readers to quickly grasp the development of a specific domain and the state of the art, while identifying potential research directions and challenges.

This editorial presents key principles of an approach to writing impactful review articles, namely the Past, Present, and Future approach (Fig. 1).

**Past:** Scientific advancements follow an upward spiral trajectory.

Initiate the review with a concise overview of the discipline's historical development, emphasizing pivotal events and relationships. Subsequently, classify various developments and refine their contextual backgrounds, leading to the emergence of thriving branches that exist today.

**Present:** Contemporary research reflects the increasingly interdisciplinary nature of subjects, resembling a growing tree with multiple branches that interconnect to form new avenues. Each technology possesses unique characteristics across different dimensions.

Therefore, perform multidimensional comparisons of existing technologies, accentuating their objectives, concepts, results (or effects). These analogies will help readers to swiftly gain a comprehensive understanding of the field.

**Future:** Every technology, from the standpoint of its present applications, harbors inherent limitations. These limitations often stem from specific application requirements.

Highlight constraints precisely and propose potential solutions to address them. As Albert Einstein once quoted, "The formulation of a problem is often more essential than its solution." Identifying existing

issues within a particular domain can serve as an essential wake-up call for researchers in other fields, motivating them to bring disruptive breakthroughs and novel technological innovations.

The Past, Present, and Future approach supports development of form and content so that each reinforces the other. An excellent review not only presents comprehensive content, clear logical flow, and a smooth writing style, but also well-coordinated visual elements. Consider the following display items.

**Figure:** A picture is worth a thousand words. For review figures, prioritize original figures, as they hold more value. Figures can effectively present both results and methods of the synthesis presented. As most figures depicting results are sourced from other research articles, arranging them coherently is crucial. Redrawing figures holds more significance than reusing the original art, as it allows authors to emphasize specific areas, facilitating readers' understanding of methodological differences. Unlike a mixture of graphs taken from other articles, redrawing figures achieves a more impactful effect.

If multiple technologies can be compared across different dimensions, consider expressing them with scatter plots or bar charts. This allows for an intuitive visualization of each method's characteristics and comparative advantages in various dimensions. Mind maps are also beneficial for categorizing different technologies through branching, offering readers a clearer understanding of their development.

**Table:** A table provides a method to compare different approaches across multiple dimensions. Tables excel at presenting various entries and facilitating comparisons across different columns. However, it is essential to ensure that these dimensions are comprehensively listed in technical papers, to avoid potential gaps when readers may search for specific parameters. A caveat: tables may lack the intuitiveness of graphs, requiring readers to visualize the significance of the numbers presented.



**Fig. 1** Past, present, and future of human evolution, highlighting key technologies for each epoch.

**Box:** A text box can serve as a valuable tool for explaining technical terms and providing supplementary background knowledge. It can greatly assist readers from diverse fields in comprehending the subject matter. Remember, the purpose of a review is to reach a broader audience, and judiciously incorporating boxes can enhance the broad acceptance of your work.

A list of a few exemplary review articles can be found in Refs. 1–7. Note that form follows function; not all these elements should be included in one review.

In summary, a high-quality review significantly contributes to the advancement of a field. As the Tang Dynasty poet WANG Zhihuan eloquently stated over a millennium ago, “Ascend another story to have a further sight retrospect and prospect” (欲穷千里目, 更上一层楼). As a reviewer, it is crucial to adopt a higher vantage point with a broad perspective, encompassing insights from the past, present, and future, while consistently prioritizing the reader’s experience. Utilizing various display items such as graphs, tables, and boxes is of paramount importance to guide readers in comprehending field developments and envisioning future directions.

## References

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