Developing products with improved environmental performance is regarded as a crucial component of companies’ commitment towards sustainable development. The potential benefits derived from ecodesign are constantly highlighted in the literature, and go beyond the pure environmental dimension. However, the primary focus has been positioned on evaluating those benefits in terms of product-related environmental performance, which leaves an open potential for capturing performance from a broader managerial perspective. Consequently, the major challenges tackled by this paper relate to the limited focus on process-oriented perspectives that cover all dimensions of the triple bottom line and offer a systematized view on ecodesign performance measurement. Therefore, this paper presents a comprehensive set of process-related key performance indicators for product development, based on a three-step systematic literature review, followed by systematization of indicators and a critical analysis. A total of 787 indicators were identified and classified according to the sustainability dimensions, product development phases and units of measurement. The results point to a relevant asymmetry in the number of indicators proposed for each sustainability dimension, with large dominance of economic indicators. A critical analysis is presented and discussed in terms of the main organizational functions addressed, emphasizing a potential growth trend towards multi-dimensional indicators in recent years. The paper indicates that product development performance is still being mainly discussed in terms of product physical characteristics, along with a broad assortment of topics - from very specific document-related indicators to high-level strategic dimensions - without focusing on environmental aspects, which is mainly due to the intangible and uncertain nature of product development processes.