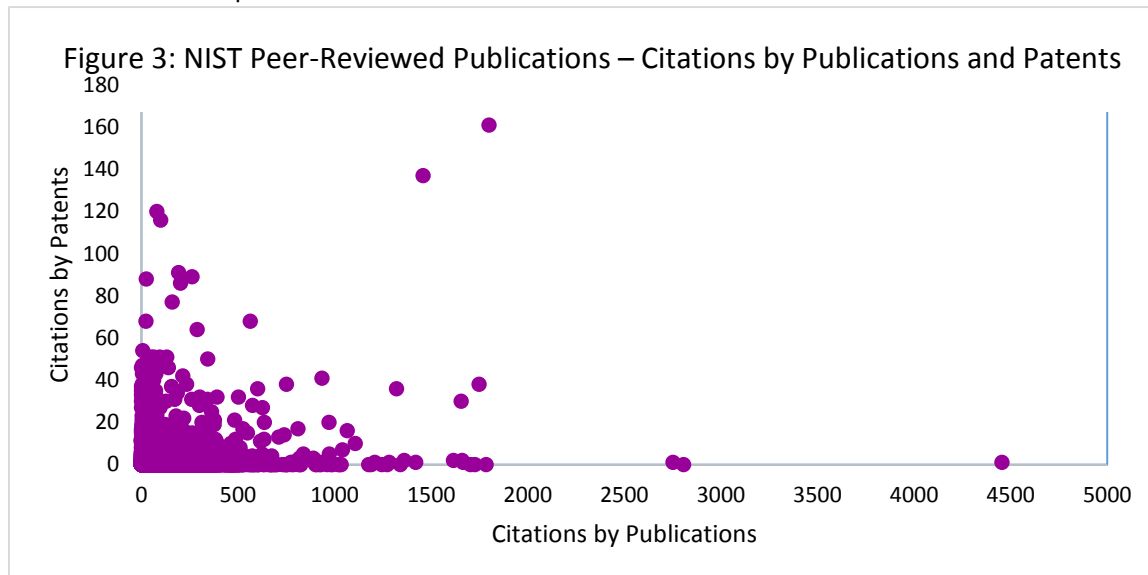


very clear that there are papers that are highly cited by other publications but not cited as prior art in patents. Similarly, there are NIST papers that have a notable number of patent references, but no citations within the peer-reviewed literature.



Findings

Patent citations, or references by inventors to previous NIST laboratory scientific outputs, are an important indicator of knowledge transfer and indicate usage of NIST scientific outputs. Citations demonstrate the breadth of means by which NIST impacts invention and innovation. Significantly, over 90% of NIST’s impact on invention and innovation occurs through NIST peer-reviewed and grey literature publications.

Perhaps more importantly, the results demonstrate that these impacts on invention and innovation do not arise quickly or easily. Practitioners frequently refer to technology transfer as a “contact sport” that requires interaction between developers and users of scientific knowledge.¹⁰ Implementing a broad definition of technology transfer that recognizes the breadth of channels through which NIST knowledge, capabilities and facilities impact stakeholders demands increased participation in and attention to the dissemination and transfer of NIST science. Indeed, the Federal Technology Transfer Act of 1986 declared “Technology transfer, consistent with mission responsibilities, is a responsibility of each laboratory science and engineering professional.” Such efforts may decrease the time until inventors cite NIST science and increase the likelihood and frequency that NIST outputs are cited. Increased focus on the dissemination of peer-reviewed and non-academic publications can increase NIST’s impact on invention and innovation from the scientific and technical outputs that NIST currently produces.

Finally, the results indicate that there are different drivers for scientific and technological impact. Citations within peer-reviewed literature are a common indicator of scientific impact, and patent citations are a commonly used indicator of technological impact. The results above demonstrate that there are NIST publications that are highly cited by either patents or publications but not both. In Figure 3 above, there is a concentration of publications along each axis. Given this distinction between scientific and technological impact, measuring NIST impact exclusively through indicators of scientific impact may not ensure that NIST research has the technological impact needed to meet its mission to promote U.S. innovation and industrial competitiveness.

