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Nanomaterials and Nanotechnology Firms in Europe: A Typology

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Despite the widespread use of nanomaterials and nanotechnologies, little is known about the characteristics of the firms that comprise the industry. For instance, despite many studies opening with forecasts of a rapidly evolving industry with projected revenues of billions of euro, the industry's boundaries are not clearly delineated. By virtue of dealing with materials or technologies on a nanoscale, a wide range of firms, from those that produce nanoscale thin film coatings for semiconductors to those that sequence DNA, are seen, by some academics at least, to be part of the same industry. Furthermore, much of the previous work that has attempted to characterize such firms has depended on small-sample surveys with their associated self-reporting and non-response biases. This is problematic because, in order for regulators to regulate, insurers to underwrite risk, and financiers to provide capital, they must first have a deep knowledge of the industry in which they are involved. To address this shortcoming, this study describes the industry's typology in Europe. Using on-line databases and resources, we identify 517 European firms involved with either nanomaterials or nanotechnologies. Using manual searches of these firms' websites and public disclosures, we characterize each firm into one of six categories: Analysis, Bioanalysis, Drug Delivery, Electronics, Energy, and Materials. However, the operations of seemingly similar firms in each category can vary widely. For instance, while some of the 'Energy' firms manufacture photovoltaic cells, others manufacture ultracapacitors and lithium ion batteries. Moreover, such firms could ostensibly be categorized under the 'Electronics' heading. This has broader implications because it highlights the difficulties that regulators, insurers and capital providers have in evaluating the idiosyncratic risk that each nanomaterials or nanotechnology firm poses. We also find that the majority of these firms are privately owned, venture capital funded, and have less than 50 employees. This too has implications, particularly for regulators, as their actions could potentially have an adverse impact on what is evidently still a nascent, emerging industry.

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