

Tracing the Carbon Nanotube Value Chain: Role of Framing Domains of Nanotechnology in the Media



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LexisNexis®

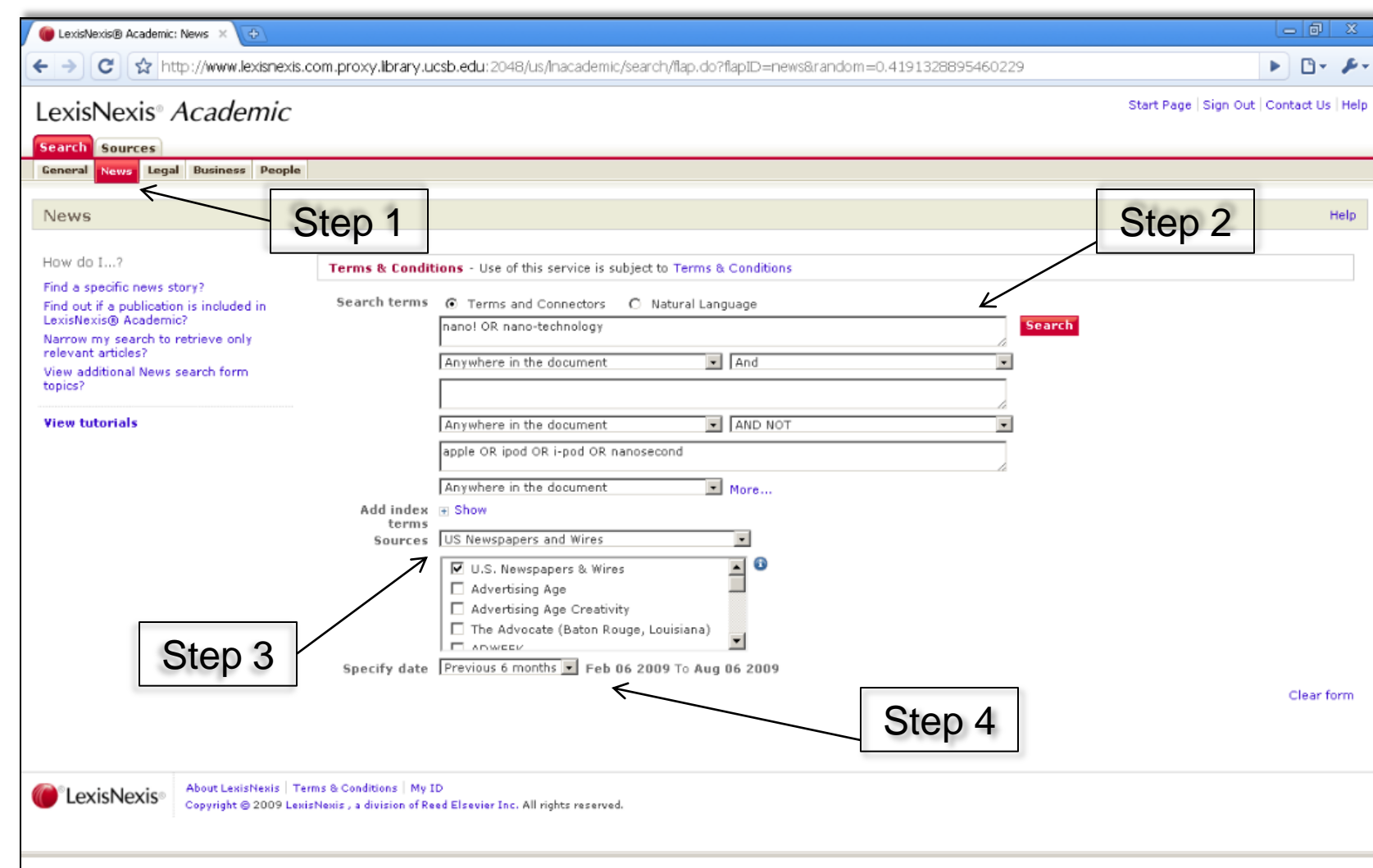


Fig. 1 Our LexisNexis® search Step 1 Narrowing the search results to news only. Step 2 Entering the search terms and excluding words we did not want to find in articles. Step 3 Further isolating our search results to newswires and news articles. Step 4 Focusing our results to articles printed within the last six months.

Abstract

Public opinion has well-documented influence on government policy in the United States. Unfortunately, widespread public fear has often hindered the implementation of policy in important areas such as the health and medical fields. Public neglect has also impeded efforts in areas such as industrial waste reform. It is likely, then, that public opinion has significant effects on public policy concerning nanotechnology, a technology that converges numerous fields such as health, energy, consumer goods, information technology, industry, and the environment. In each field it is likely that support from the public will result in the acceleration of nanotechnology development, and lack of public support will hinder its progress. By compiling a global value chain consisting of twelve of the leading firms associated with carbon nanotube research, development, and production, we will chart the magnitude of the affects of public perception on firm output, revenue, and product development.

In line with current research in communications and political science we recognize the profound influence the media have on public perception. Rooted in previous research at UCSB, we recognize three dominant news media frames: risk, progress, and regulation-- and monitor the ways in which they are framed in news media coverage (Weaver, Lively, Bimber, 2009). To better comprehend public understanding of the emerging field of nanotechnology we work with a random sample of thirty nano-related newspaper articles generated using LexisNexis. We use a content analysis to observe the strength of a correlation between media frames and nanotechnology domains. Utilizing a chi-squared statistic, we expect to see a significant correlation between risk and medicine, and between progress and energy.

Carbon Nanotube Value Chain

A global value chain is a visual tool to observe roles of industries and supporting environments on a product or material in the global marketplace and the added value at each step. Opinion leaders are affective at public appeal even if their information is contrary to the scientific consensus.³ This is just one example why it is important to include these supporting environments in the chain.

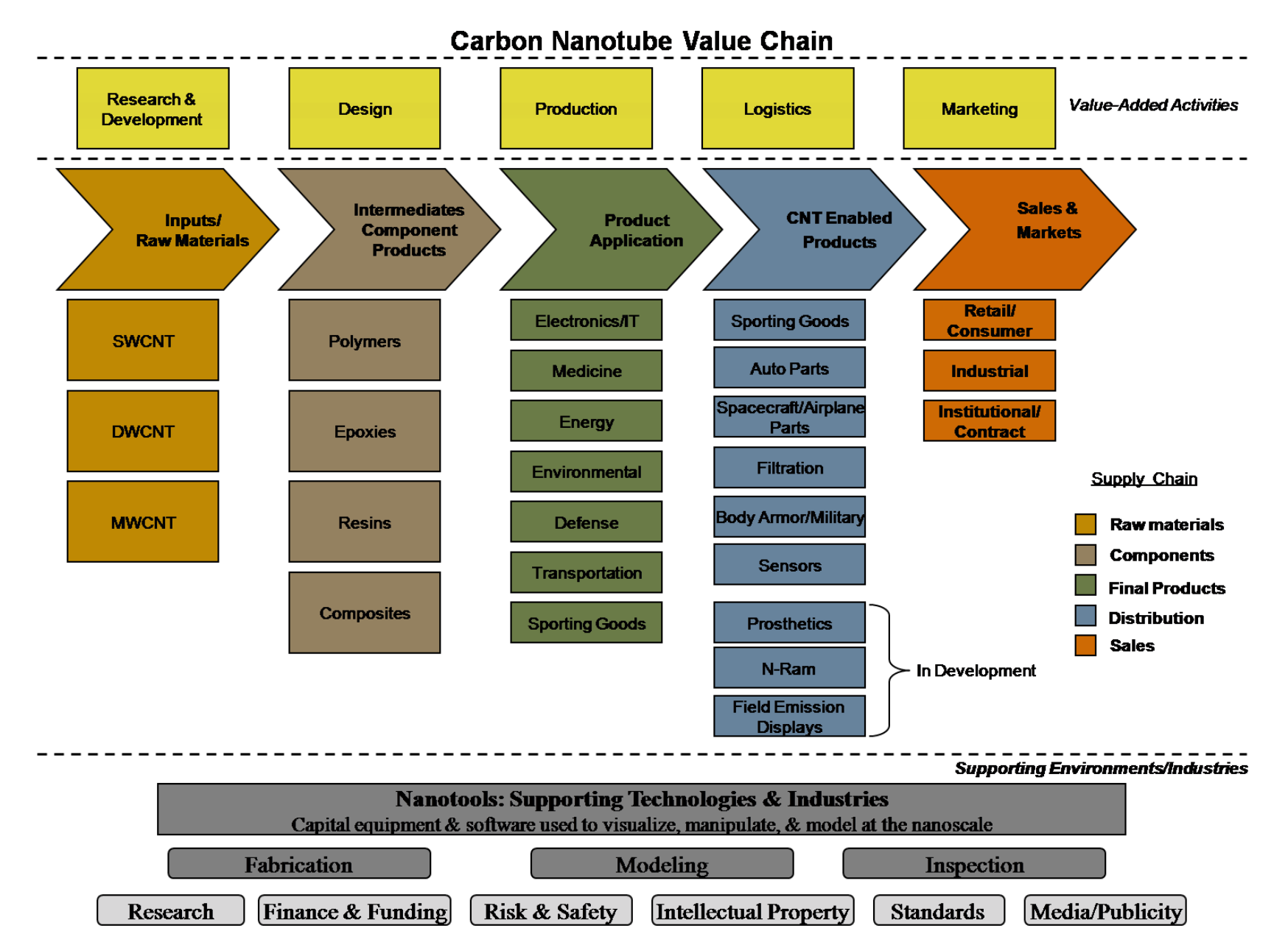


Fig. 2 The supporting environments at the bottom are those which have affects throughout the chain in its entirety.

Methods

Media frames in nanotechnology have been identified from previous research done at CNS. We decided to research the frames expressed in U.S. media, and their relationship to domains, or subcategories of nanotechnology. Using LexisNexis Academic database containing such documents as magazine articles, newswires, business and legal documents, we searched for nano related newswires and articles printed in the past six months (Fig. 1). We excluded key words such as apple and ipod in order to avoid unnecessary results. In this time period, we obtained 135 search results. Thirty of these articles were randomly selected for content analysis using statrek.com to randomly select numbers assigned to our search results.

A content analysis is a methodological approach of validating inferences from text. Different information in the articles was assigned different numbers. Using a codebook to keep consistency in how we assigned information a number, we looked at where the publication came from, what type of publication was it, was nano mentioned in the headline and if so was the tone positive, negative, or neutral, which frame dominated the article, which domain in nanotechnology dominated the article and by what percent. Once we had our data set, we dropped it into SPSS to run statistical analyses.

Results

A frame is the carefully chosen information, or method of giving information to a person or group of people in order to invoke a certain feeling or idea about the subject. When observing these frames in the media we can see from figure 3 that within the general topic of nanotechnology, there is a strong majority of progress frames in the articles. In line with previous work focusing on the risk frame¹, benefit is the main output of information.

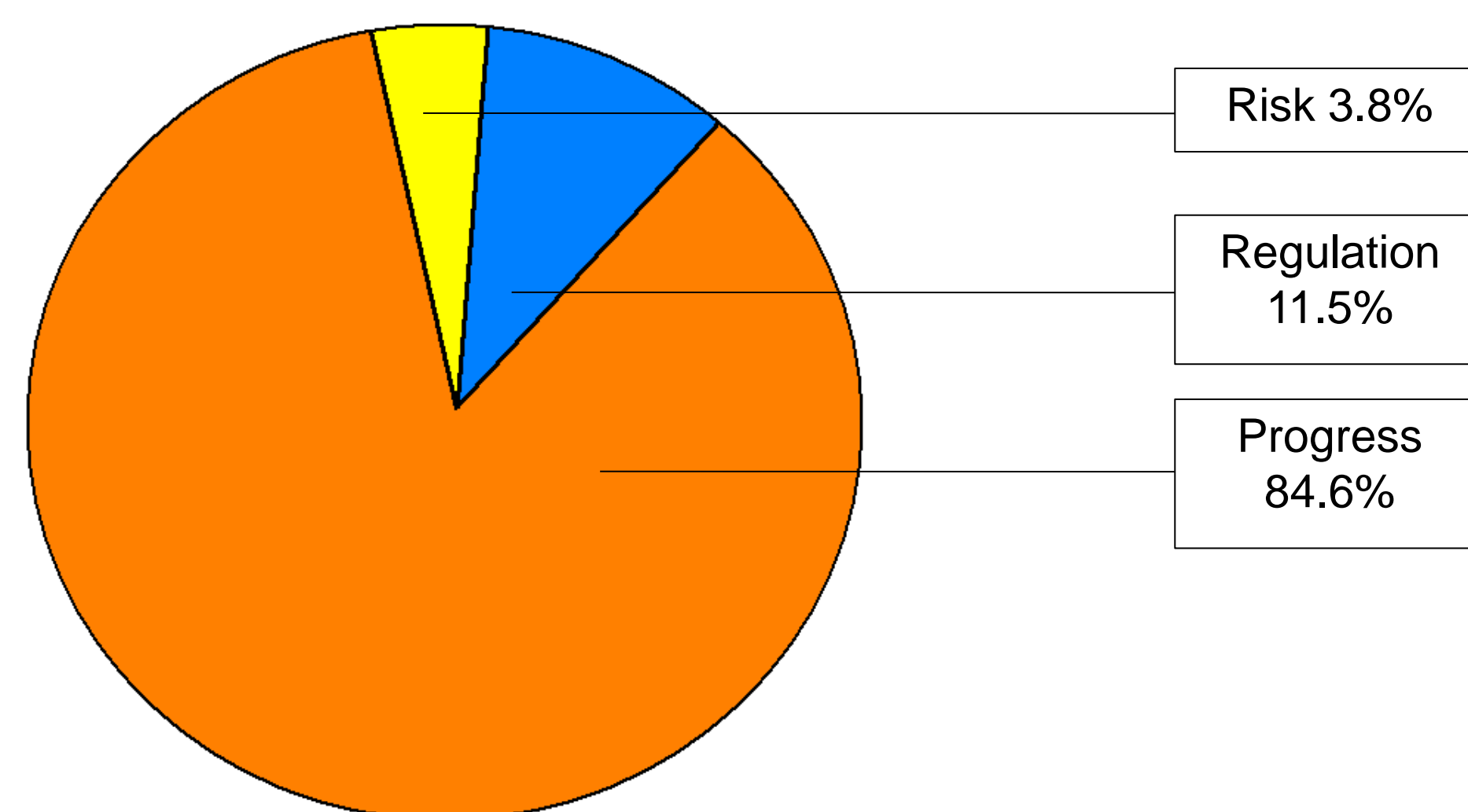


Fig. 3 (left) Progress Frames typically bring to attention the natural process of discovery, application, and benefit for society. Risk Frames usually point out potential danger, and leave the audience without solutions. Regulation Frames express the need for government agencies to place legal restrictions on the relationships between producers, manufacturers, and consumers.²

Figure 4 (below) shows us which domains are receiving the most attention in the past six months. We see from figure 5 that once we analyze nanotechnology in these more specific domains, we start seeing a relationship between frames and domains. Recognizing these trends allows us to further analyze why we see them.

Articles Framed in Each Domain

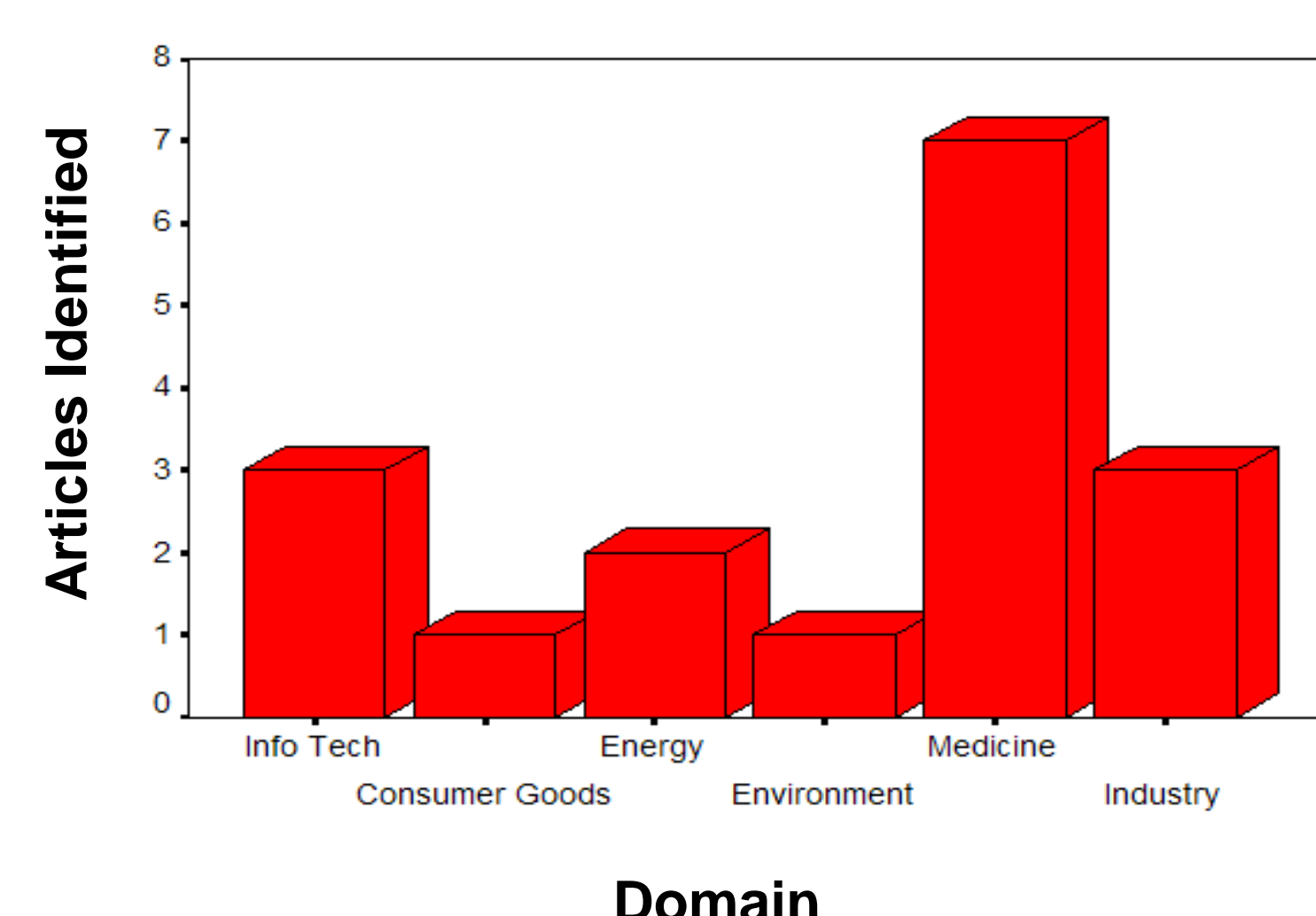


Fig. 4 A graphical representation indicating the attention received by the media on each domain of nanotechnology.

Chi-Square Statistic

Domain \ Frame	Regulation	Risk	Progress
Medicine	10.95**	3.40**	4.34**
Environment	.115	.036	.376
Info Tech	.513	.159	1.678
Consumer Goods	.115	.036	.376
Energy	.238	.074	.779
Industry	.370	.115	2.727**

Fig. 5 Critical Value of $\chi^2 = 2.706$, degrees of freedom = 1, $p < .1** = 90\%$ certainty. Chart represents a significant deviation from the null hypothesis (equal distribution of every type of article) in the yellow frame/domain relationships. This means significant more articles about that relationship.

References

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Conclusion

Our findings indicate that in the past six months, the progress frame has primarily dominated media publication of nanotechnology. We found particular attention on medicine and health in the media. Not only was this domain more frequently publicized than other domains, but the chi-square statistics showed ninety percent certainty in the relationship between the medicine domain and three different frames: risk, progress, and regulation. If these varying emphases persist in the media as nanotechnology continues to emerge, medical applications and industries may be affected positively or negatively by public opinion.

We also saw a significant relationship between industry and progress which one might expect because of industry's impact on research and development. In further research, we may perform these analyses quarterly over the next few years in order to observe changes in the framing on different domains over time. It may also be necessary to survey the public to find how effective these sources are at actually reaching the public. We could also survey to find out if media is in fact the most common way for people to find out about nanotechnology because there is potential for magazines, publications, or television to be more effective. Obtaining this data would help us discover which frames are most reaching the public, because not all types of publications or media exhibit the same frames.

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