

S&T-Function-Application Cross-charting: An approach to visualize the bridges across the gap between R&D and applications

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Introduction

The new “S&T-Function-Application Cross-charting” method offers perspective on how specialized the innovation paths ahead might be. It appears effective at associating novel technology-enabled capabilities to gain functional advantages, and to link those functions to potential applications. Those applications can be associated with target users and most promising markets. This research uses text-mining and NLP techniques and suggests a procedure for transforming the extracted structures into a base source for Cross-charting by combining qualitative approaches.

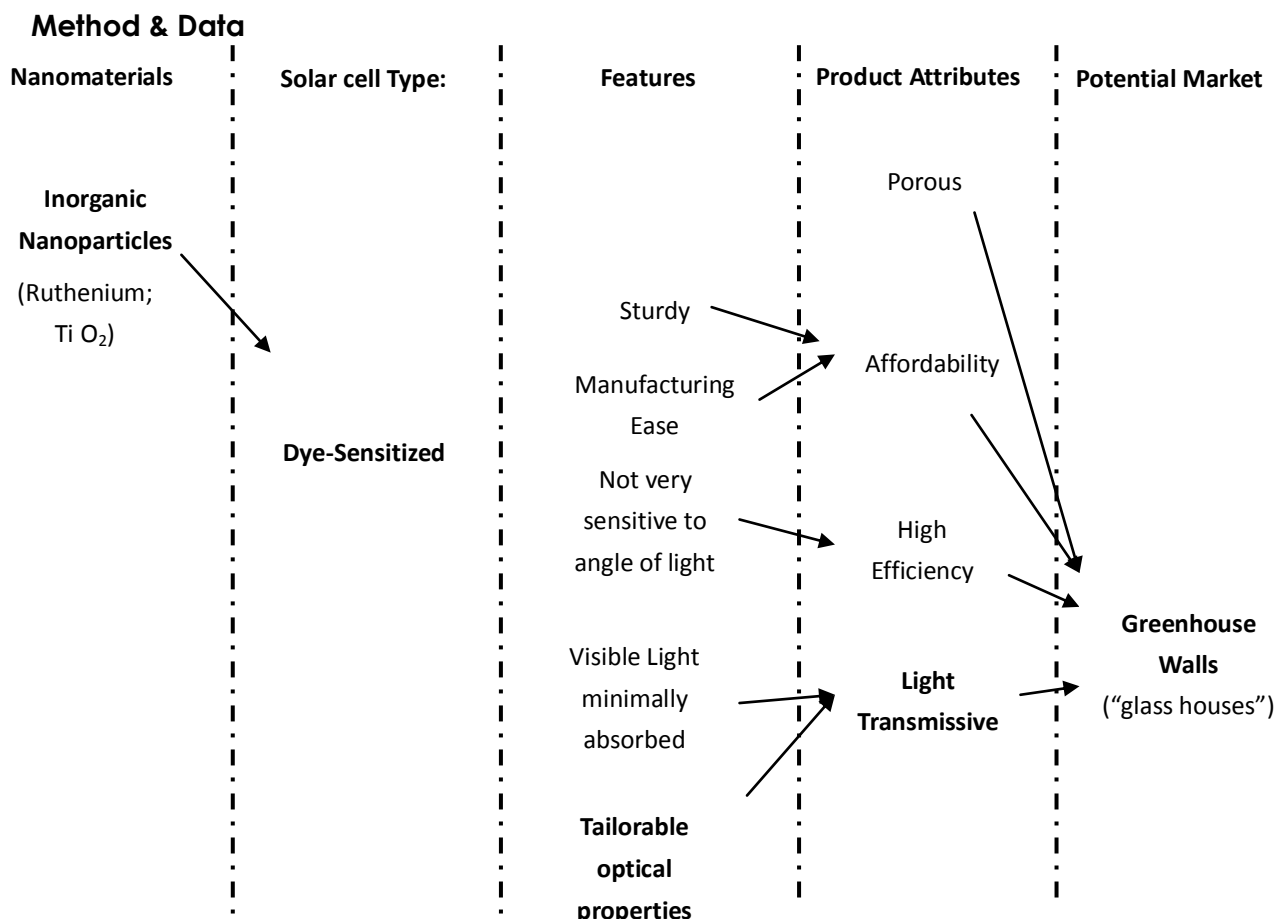


Figure 1: Cross-chart: from nanomaterial to application for DSSCs

In recent years, we are trying to construct a cross-charting for Dye-sensitized solar cells (DSSC) (Guo et. al, 2012). Figure 1 illustrates one of several "cross-charts" we have generated. The basic idea is to take one set of items and relate it to the next, and so forth. One adjusts those sets depending on the study foci and the nature of the technology and market dimensions. We don't show the general one that includes many prominent technical elements, functions, and applications – it shows that developments contribute broadly to functions and applications. Figure 1 illustrates how one can explore a particular application (e.g., glass structures as a special case of BIPVs) to investigate which materials and functions could contribute strongly to that development. Stepping through the five segments of Figure 1:

- 1) Novel research-based contributions [here, focus is placed on nanomaterials]
- 2) Solar cell types [here we only illustrate for DSSCs]
- 3) Features [keying on those most useful for product attributes contributing to glass structures]
- 4) Product Attributes
- 5) Potential Market [here focusing on one specialty area]

To improve the methodology of constructing a Cross-charting, recently, we are pursuing ways to apply "Tech Mining" methods such as specialized thesauri and identification of "triples" (subject-verb-object) to facilitate composing cross-chart linkages by extracting elements and the networks from literature and patent documents.

For the DSSC case, we extract abstract records published from 1991-2010 that indicate some variation of "dye-sensitized" solar cell focus in the topical fields. We also get DSSC abstracts for these years from Compendex, DWPI, and Factiva. Thus, we try to extract subject-verb-object from various datasource by using text-mining & visualization software Vantagepoint and TRIZ software Glodfire.

Conclusion

Starting with one's key asset(s), cross-charting can help identify potentially relevant "upstream" elements to monitor and "downstream" opportunities to pursue. In so doing, it also helps to ascertain key actors (i.e., institutions) to engage. The cross-charting method could inform technology roadmapping endeavors, which is used for communicating the relationships between evolving and developing market, products, and technologies over time.

Reference

Ying Guo, Chen Xu, Lu Huang and Alan Porter. Empirically informing a technology delivery system model for an emerging technology: illustrated for dye-sensitized solar cells. *R&D Management*, 4, 2, 133-149, 2012