



CUBOSOMES

TECHNOLOGY THROUGH PATENT GLASS
RUCHICA KUMAR



WHY USE PATENTS AS TECHNOLOGY INDICATOR

- Patents provide clear idea of number of players in market for a particular technology and key interest areas of all players.
- Patent data provides an accurate understanding of problems a particular invention is aiming to resolve.
- Patent data helps to understand how technology has changed over the years. For example, patent data can provide evidence of what technical domains were being researched into a decade ago as compared to technical domains being researched today.
- Such a comparison helps in mapping out progress of a technology, knowledge externalities and cross industry innovation prospects
- All the above mentioned points barely scratch the surface of ocean that is patent data analysis
- In this report we aim to present few exemplary conclusions that we could draw from a detailed analysis of cubosome technology.

WHAT ARE CUBOSOMES

- Cubosomes are discrete, sub-micron, nanostructured particles of the bicontinuous cubic liquid crystalline phase.
- Cubosomes are liquid crystalline nano-structures formed from the cubic phase of lipids, such as monooleate, or any other amphiphilic macromolecules with the unique property to be dispersed into particles.
- Cubosomes are formed at controlled temperatures into lipid bi-layer twisted into three dimension with minimal surface forming a tightly packed structure with bicontinuous domains of water and lipid. There are three different proposed phases that these cubic structures can be in: the P-surface, G-surface and D-surface for primitive, gyroid and diamond structures respectively.
- Cubosomes consist of honeycombed (cavernous) structures separating two internal aqueous channels and a large interfacial area.

FORMATION OF CUBOSOMES

- Cubosomes can be manufactured by two distinct methods
 1. Top down technique - It is the most widely used in research area, where by bulk cubic phase is first produced and then dispersed by high energy processing in to cubosomes nanoparticles. Bulk cubic phase is resembling a clear rigid gel formed by water swollen crossed linked polymer chains, where as cubic phases are like liquid crystalline structure. The cubic phases exhibits a yield stress that increases with increasing amount of bilayer forming surfactant and oils
 2. Bottom up technique - In this cubosomes are allowed to form or crystallize from precursors. Almgren et., al. discuss the formation of cubosomes by dispersing inverse micellar phase droplets in water at 80°C, and allow them to slowly cool, gradually droplets get crystallizes to cubosomes. This is more robust in large scale production of cubosomes.

LANDSCAPE OF CUBOSOME TECHNOLOGY

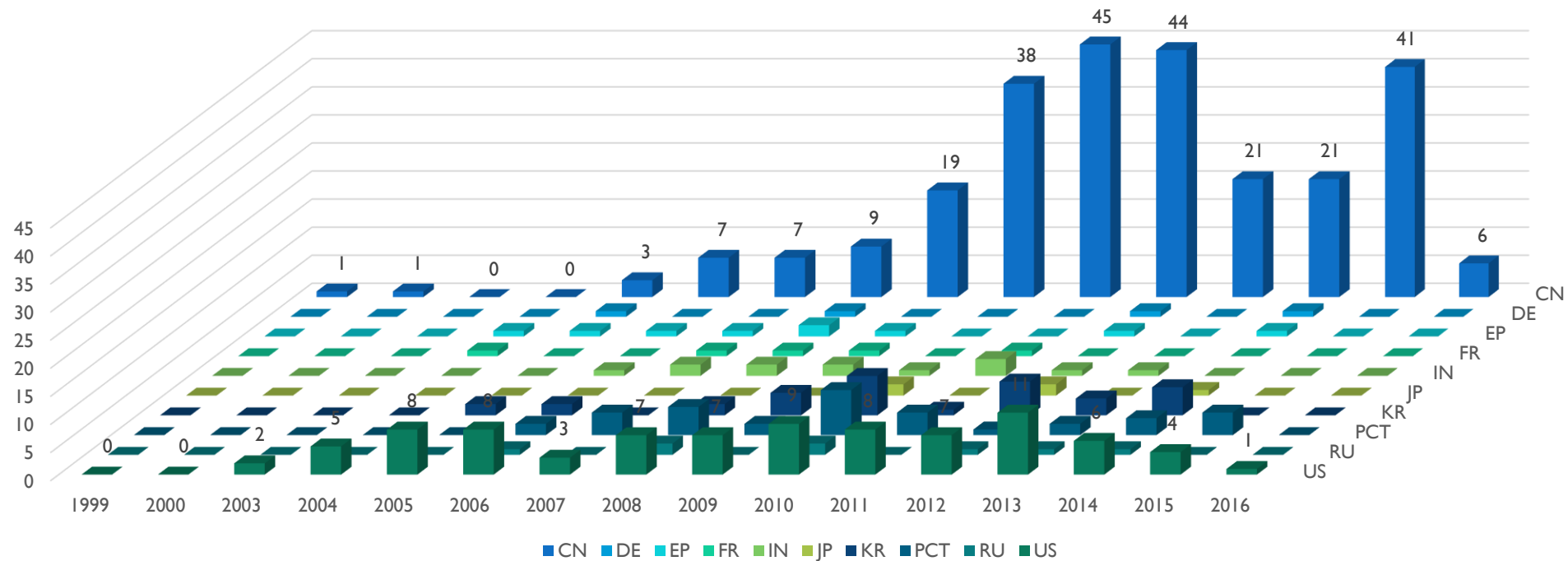
- We have analysed patents related to cubosome technology from year 2006 to 2016.
- This analysis has been undertaken for fulfilling following objectives:
 - To understand evolution of cubosome technology, and to map out its progress in terms of key players, geographical distribution.
 - To identify new research areas and new licensing opportunities in field of cubosome technology
 - To map out applications of cubosome technology, in order to understand new investment or commercialization opportunities
 - To study Technology competitiveness amongst various key players and various jurisdictions in order to determine technology influence and market power of various key players jurisdictions.

AIMS OF THIS PRESENTATION

- This presentations aims to present an overview of this study related to cubosome technology.
- The presentation would include few charts from the original study and basic explanation of each chart.
- Detailed explanation, inferences, conclusions and majority of analysis charts have not been included in this presentation for purpose of retaining simplicity in the presentation.
- Interested candidates may contact the author for complete analysis and report.

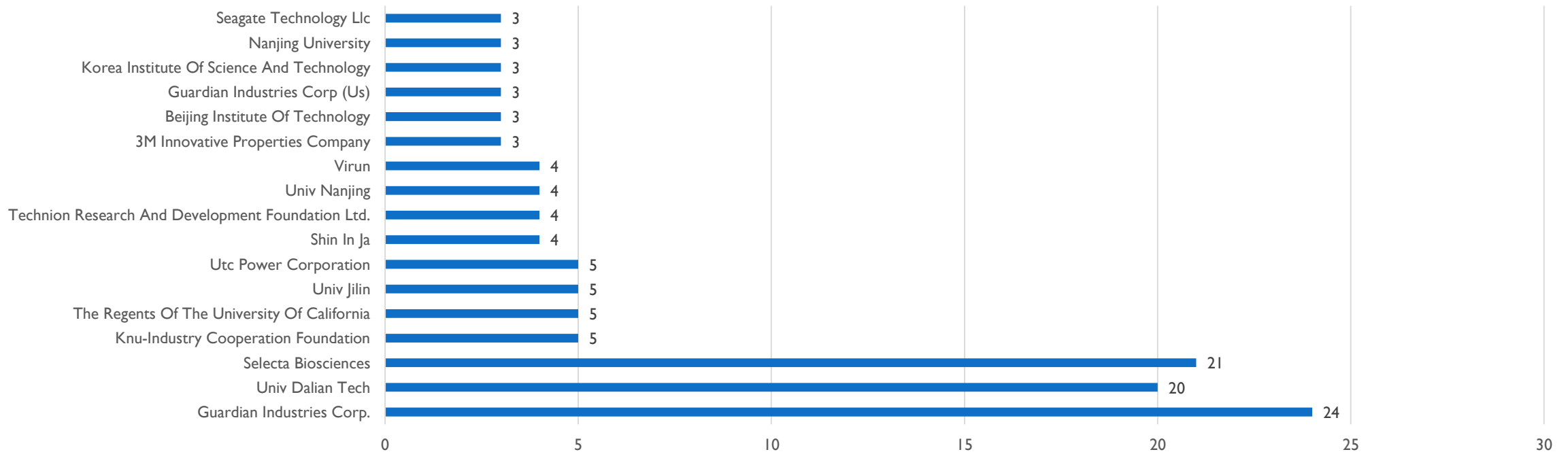
EVOLUTION OF CUBOSOME TECHNOLOGY FROM 2006-2016

Cubosome Technology Progression over the years and across the globe



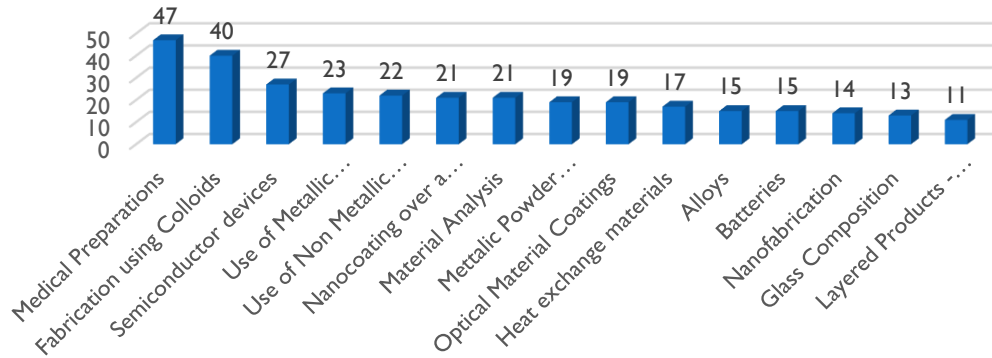
KEY PLAYERS – CUBOSOME TECHNOLOGY

Key Players - Cubosome Technology

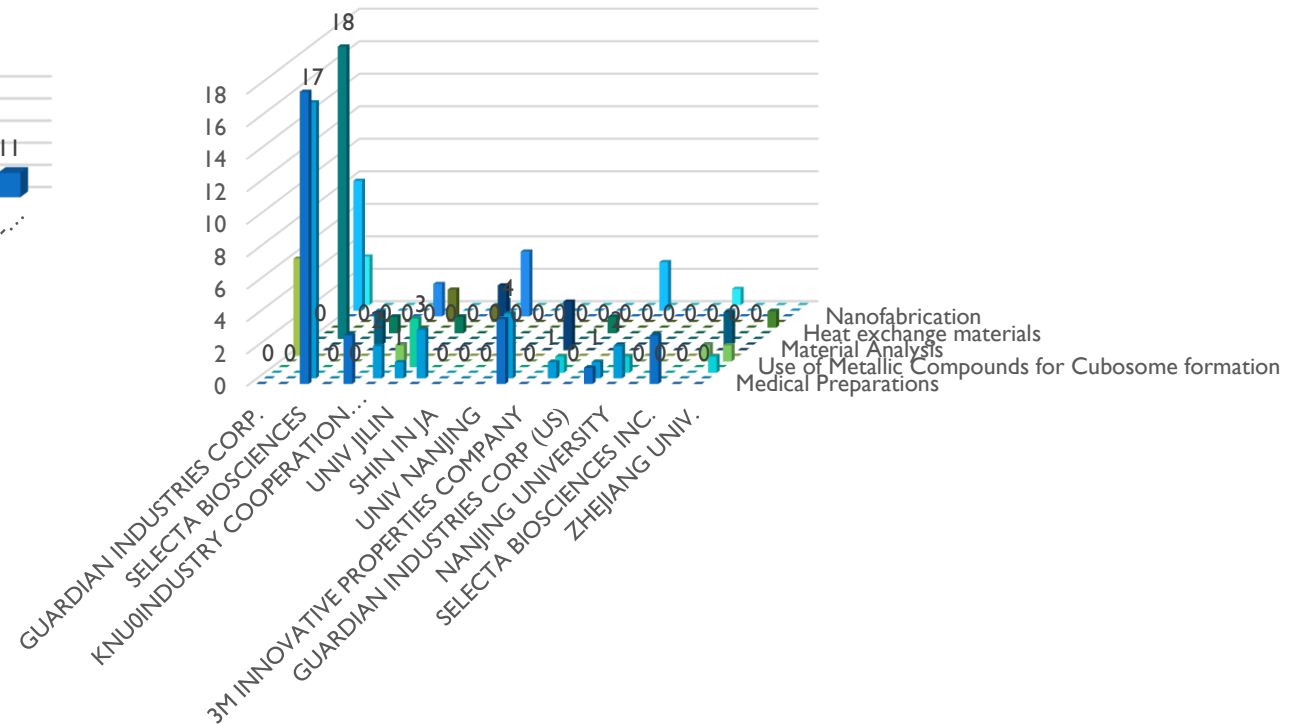


TECHNICAL AREAS UNDER CUBOSOME TECHNOLOGY

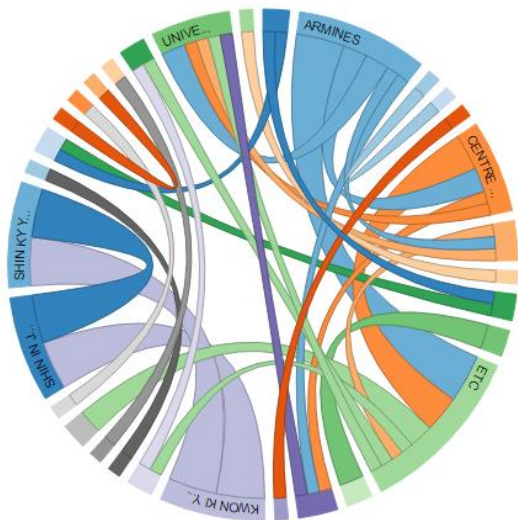
Technical Areas under Cubosome Technology



Technical Area Distribution in terms of Key Players

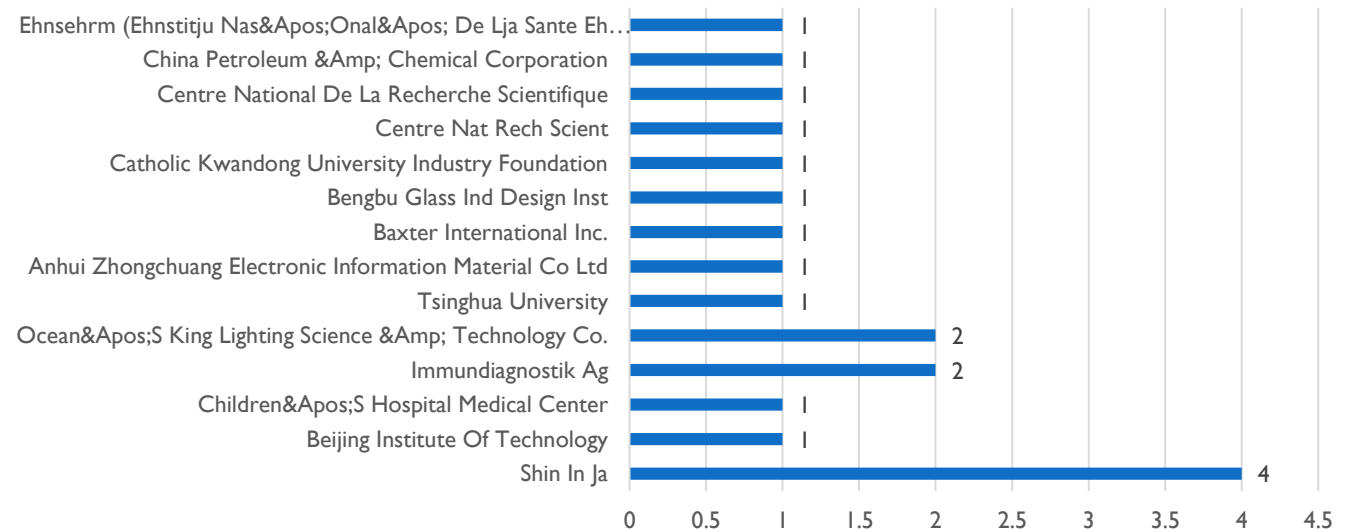


CO-ASSIGNMENT – JOINT VENTURES

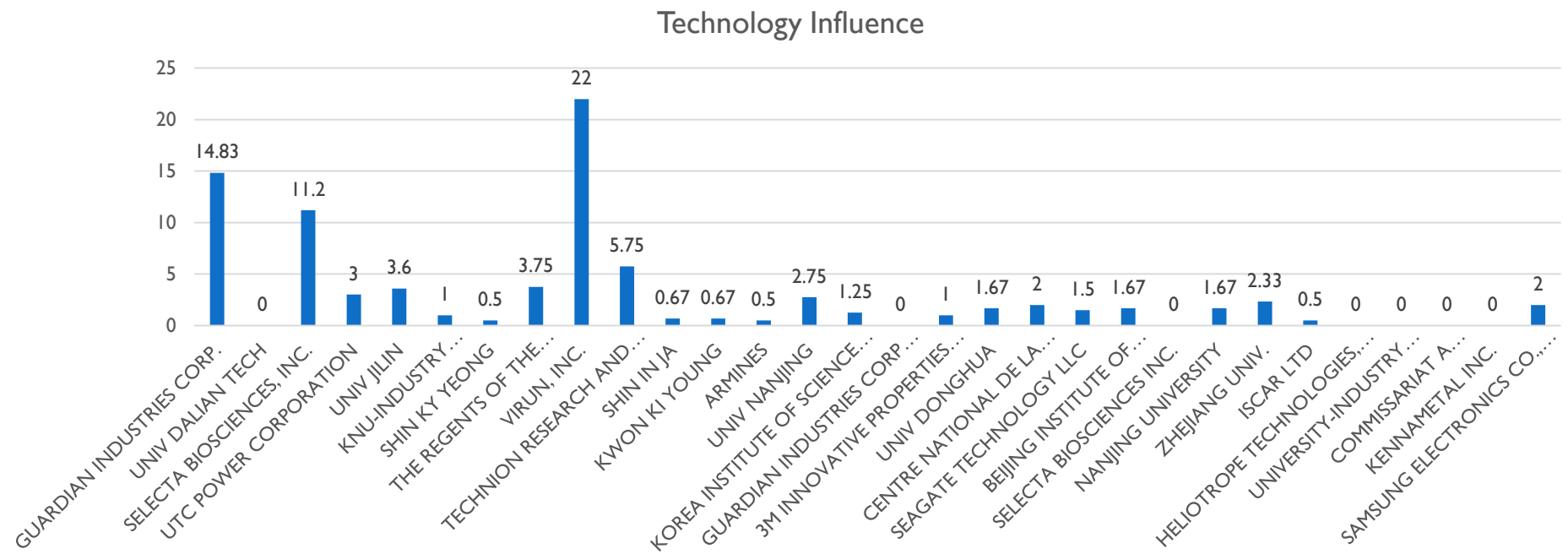


Details available in full report

Number of Applications as a Joint Venture and Players Involved

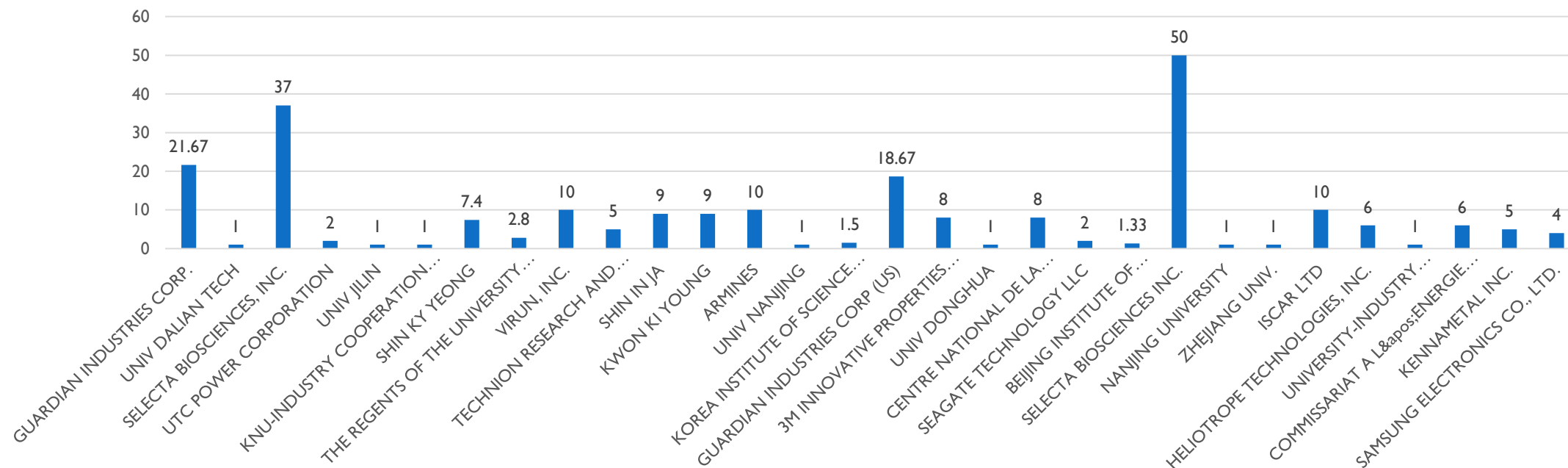


TECHNOLOGY INFLUENCE OF KEY PLAYERS



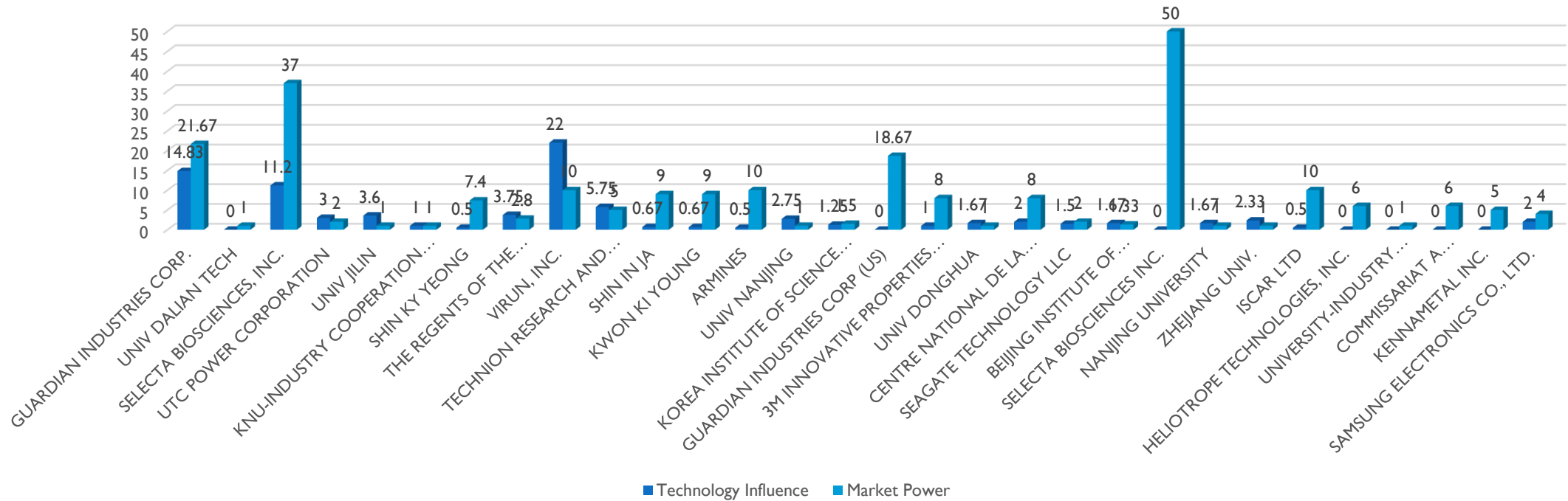
MARKET POWER OF KEY PLAYERS

Market Power of key players – Cubosome Technology



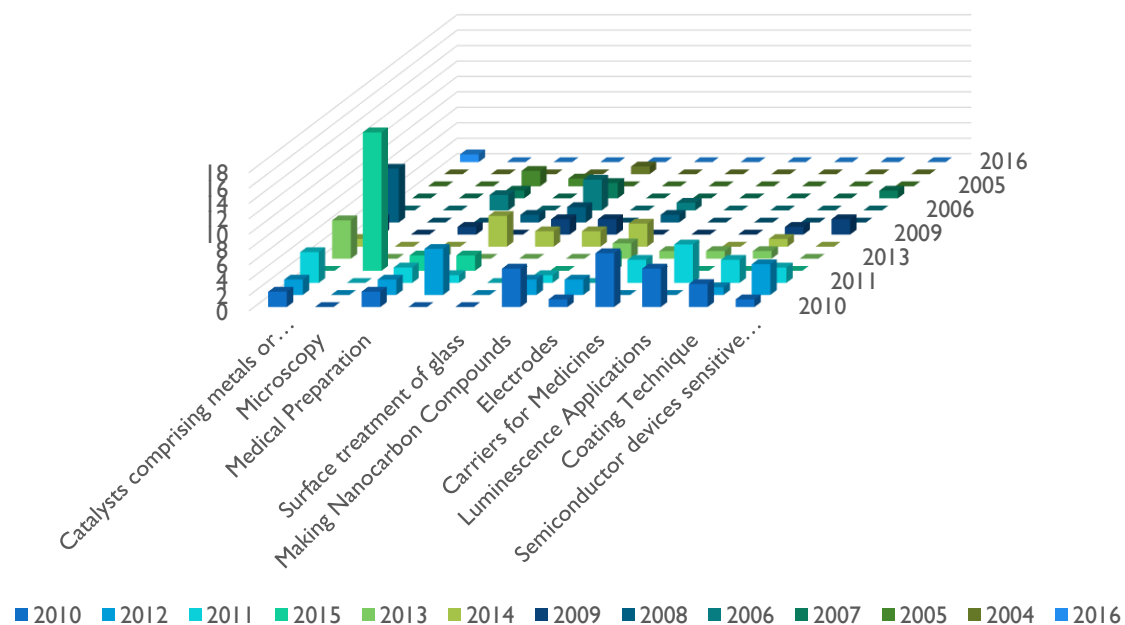
COMPARISON OF TECHNOLOGY INFLUENCE AND MARKET POWER OF KEY PLAYERS

Comparison - Key Players

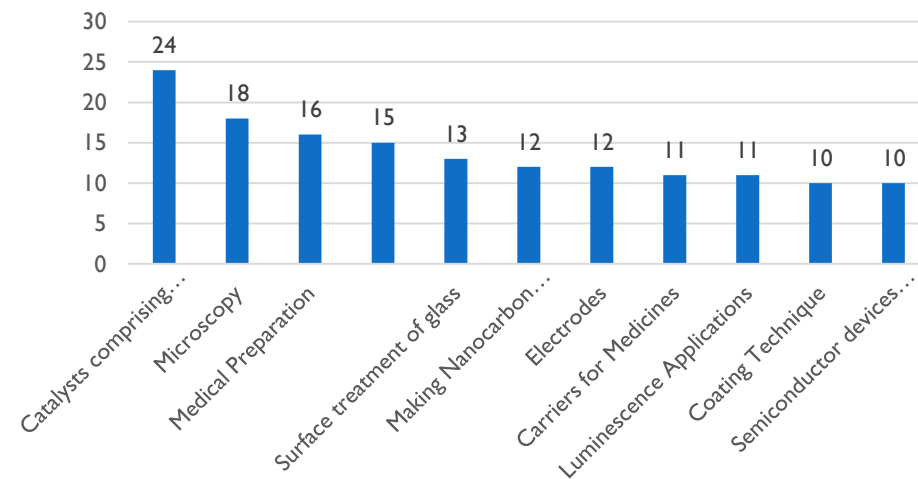


APPLICATIONS OF CUBOSOME TECHNOLOGY

Applications of Cubosome Technology Vs Year of Application of Patent



Applications of Cubosome technology



SUMMARY

- The presentation gives us an overview of cubosome technology along with its key players, and major applications.
- We find upon detailed analysis of Citations, family size, applications of technology, problems solved by technology that cubosome technology has lot more potential that what is being tapped currently.
- There is lot of scope of developing cubosome technology in fields of Medicine, Microscopy amongst others. Details are discussed in complete report available with the author.

ABOUT THE AUTHOR

- **Mrs. Ruchica Kumar** - An Intellectual Property professional and a registered patent agent who has been working in the highly specialized and focused field of Patent Management. As a registered patent agent she has drafted and prosecuted various patent applications. Her work is focused on technical and strategic facets of patent management involving patent analytics, acquisition and management. Her area of specialization is patent informatics wherein, she leverages technical aspects of patent drafting, patent valuation and patent citations to generate comprehensive patent intelligence data. Her sound technical skill set amalgamated with a strong patent knowledge base provides her good understanding of dynamics of cross industry innovation.
- Her competencies include:
 - Innovation Forecasting – Analyzing knowledge spill-overs and externalities for forecasting new innovation areas for an organization using patents as indicators
 - Patent Drafting in fields of Medical surgical devices and implants, cardiac rhythm management devices, urology, gynecology.
 - Patent Invalidation and Patentability assessment
 - Technology infusion and diffusion studies using patents as indicators
 - Licensing and Technology Transfer in fields of general engineering
 - Indian Patent filing and prosecution
 - Technology Mapping
 - Pre-litigation due diligence

CONTACT US

- We welcome any queries regarding any of the topics you found interesting. We would be happy to provide more details on any of the topics you desire. Also, any queries regarding any issues related to intellectual property are most welcome.
- We can be reached at:
 - Phone: +91-971-154-16163
 - Email: rkumar@novocuslegal.com, akumar@novocuslegal.com
 - Web: <http://novocuslegal.com/index.php>

Disclaimer:

This report was not prepared as an account of work sponsored by any agency. Neither the author nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the author or any agency thereof or its contractors or subcontractors. The views and opinions of author expressed herein do not necessarily state or reflect any factual or strategic inference. This report is for reference and illustration purpose only and should not be used for commercial purposes.