

**BAVERSTAM ASSOCIATES, INC.**

Consultants in Advanced Materials

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Selection of Projects focusing on New Business Development

Search for Opportunities in the Consumer Electronics Industry

Our client is interested in entering the consumer electronics industry as a specialty material supplier. We identified several opportunities and rated them in terms of market opportunity, technical and strategic fit with our client's capability and competitive intensity. We also recommended a number of added functionalities for our client to consider providing in order to become a more value-added player and better serve the industry needs. We also provided an assessment of the consumer electronics industry structure and operating dynamics. Finally, we provided key contacts in several CE companies to our client for further discussions, which has already led to a number of meetings to address specific opportunities for our client.

Technology requirements and market for thin film barrier technology

Our client had developed a novel thin film barrier technology that primarily targeted a market that was closely related to an area that the client was currently serving. We were asked to assess the technology fit and market potential for a number of pre-determined end-use markets outside this core market. In the process we also identified one additional area that we assessed. In each case we provided a detailed evaluation of the technology fit and requirements for each end-use market. This included assessing the specific requirements for each segment relative to conventional technology. We also quantified the market potential for the technology in each sub-segment where the technology was applicable.

Specifications and market size for carbon technology in batteries and supercapacitors

Our client is a leading supplier of a type of carbon technology. We assessed its potential application for a range of battery technologies and supercapacitors. We identified the performance specifications and pricing of existing products, and how these products had evolved in price versus performance over recent years. We determined the market size in terms of quantity and unit price of material for these applications. We also assessed a related emerging end-use application where we determined that the technology would have an excellent opportunity.

Market assessment of a new coating technology

Our client had developed a new coating technology serendipitously and wanted to evaluate the market opportunity for the peelable coating as a temporary protective coating. We researched a wide variety of markets including automotive, industrial and others. We provided an overview of the competition and identified a number of potential attractive markets for their technology. We also found a number of companies who had specific interest in the technology and put them in touch with our client.



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Market for coating technology in major global industry

Our client asked us to provide comprehensive market analysis of the market potential for its coating technology in a major global industry. We identified specific segments and applications where our client could potentially develop business. This included identification of well established as well as emerging segments that could use this coating technology. We contrasted technology drivers in Europe, North America and Japan. We emphasized a key technological development in one of these markets as a basis for future growth.

Assessment of niche markets for battery technology in North America

A new European company had been established to manufacture batteries based on a high-performance version of an emerging battery technology. The high volume markets for this type of product are highly competitive and cost driven. We helped the company identify potential high value markets and potential customers for niche applications in the North American market that would serve as early stage entry points. In the process we focused on the particular strengths of the client's technology and developed a short list of end-use segments and specific target companies.

Identification of growth opportunities in new industries

Our client had developed a strong capability in process development and improvement, having developed several innovative solutions for their customers across a wide range of industries. They were interested in understanding the issues related to manufacturing and next-generation technology development in some other industries that they are currently not active in, such as photonics, pharma and others. They asked us to find appropriate personnel in these industries to initiate such discussions, which could lead them to opportunities in problem solving and developing solutions as a new growth opportunity in these industries. We helped identify several areas of interest and introduced our client's capabilities and helped in setting up discussions between key personnel.

Market opportunities for metal oxide powder

Our client, a leading producer of specialty powders had recently expanded into a new product area. They asked us to identify new market opportunities for the product, with a focus on innovative and futuristic applications. We explored a wide range of applications where our client's product could provide value and identified several emerging and other potential applications that could benefit from the functionalities that our client's product provides. They are currently following up on several leads we provided that included requests for prototype samples.

Market opportunities for diecast aluminum

Our client, a leading manufacturer of custom diecast aluminum and plastic parts is concerned with the growing trend to outsource these parts to low cost countries like

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China and South America. They asked us to help identify applications that would have a lower risk of being sourced from abroad, and find new opportunities for them while doing so. We identified some key application segments that utilize a large amount of diecast aluminum and would benefit from our client's high quality, value added offering, making them unlikely candidates for outsourcing. We also found some specific opportunities for our client that we are currently pursuing..

Evaluation of new joining technology for plastic pipes and cables

We assessed the market potential for a new joining technology developed by our client in the plastic pipe and cable market. We provided an overview of the current joining processes used in the piping industry and assessed the opportunities for new joining technology with extensive market size and growth analysis to determine the most attractive market segment within the piping market for introducing the new technology. We found several parties interested in the new technology and we are currently working to set up testing programs for the product.

Market study for new sterilization technology in healthcare sector

A client had identified a promising new technology for sterilization processing in hospitals. We researched the market for sterilization and high-level disinfection technology partly by surveying key decision makers at hospitals across North America. We identified barriers to entry and the dynamics of the market, including strengths and weaknesses of incumbent technologies. The report allowed our client to decide whether or not to enter this market with the new technology, or whether to consider partnering/acquiring other new technologies that we had identified.

Assessment of semiconductor encapsulation market

For a major chemical company, we assessed the semiconductor encapsulation market as a new growth opportunity. We performed competitor analysis and assessed the overall opportunity as well as market barriers to entry for our client. We also provided an overview of electronic packaging and identified different packaging designs that would be best suited for our client's technology.

Market potential of new fiber technology in thermal management

A client had developed a new process technology for mass-producing fibers at low cost. The properties of these fibers made them suitable as a component in various composite materials for thermal management. We identified a wide variety of potential end use applications and analyzed the market potential and probability of market penetration based on cost and technical merits. In each case we forecast near to medium term demand measured in pounds of fiber. We provided specific contacts at each potential customer for our client.

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email: info@baverstam.com**Assessment of the homogeneous catalyst market**

A metals producer had identified the metal-based catalyst market as a new growth opportunity. They commissioned a market research in order to get an in-depth understanding of the competitive landscape and the various drivers and barriers to entry. We also identified different applications in the chemical and pharmaceutical industries, which were beyond those they were familiar with, and provided detailed figures on market size and growth rate estimates. We also assisted in our client's decision on the best way to enter the catalyst market, which led to our client's eventual acquisition of an established player in this market.

Market opportunities for tooling process

For a major US supplier of surface treatment technologies we evaluated and prioritized new market opportunities for a recently acquired new technology. The technology (Spray Form Tooling) had the potential to lower cost and increase quality. Starting with a handful of markets, including automotive, we narrowed down the focus and recommended one primary and large market segment for initial development, where the attributes of the technology would be particularly appreciated.

Markets in Thermal Management for novel type of composite material

A company developed a novel composite materials technology that offers low CTE (coefficient of thermal expansion) and high thermal conductivity. We provided in-depth analysis of potential markets in thermal management. This covered a wide variety of end-use segment in electronics and optoelectronics. We identified specific segments where we described the technological drivers and likelihood of market penetration. We also provided detailed market projections for each segment. We analyzed the underlying technology in detail and the associated merits that our client's technology would offer. We provided specific contacts at packaging firms and chip manufacturers who expressed interest in the technology.

Microelectronics equipment manufacturing

Our client was a design and manufacturing firm focusing on small, consumable machined parts for the microelectronics industry. We identified new business opportunities for our client and helped them grow into a full service provider with design, manufacturing and assembly operations to the microelectronics industry, including OEMs and fabs. This work included semiconductor, optoelectronics and disk drive companies. This work is expected to generate a few million dollars worth of new business opportunities for our client.



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New application search for composite material producer

In a series of two projects we targeted and searched for new market segments and applications suitable for our client's composite materials technology capabilities. Their technological capabilities were focused around mixing fibers, fillers and binders to produce flat sheets. The process used was a water based paper making process, resulting in rather thick paper or sheets. Given the great flexibility this technology exhibited it was desirable to identify new and high value added applications for certain combinations of fibers, fillers and binders. Our work resulted in over 20 new suggested applications, which were described according to their size, value provided and technological fit, among other characteristics.

Researching and targeting new applications for a producer of technical papers

Our client manufactures, among other products, carbon fiber mats. Their products were frequently sold to intermediaries and not to the final end user, resulting in lack of market information. We created a long list of viable and attractive applications for carbon fiber mats. This list was reduced to three applications as more and more information became available and our client was better able to set priorities. We targeted three end-use sectors: laptop computers, fuel cells and automatic transmissions for cars. We ended the project by facilitating setting up a testing program of our client's products with key end user companies.

New application search for an MIT start-up and venture capital funded company

Our client had developed an innovative process for making metal matrix composites, primarily focused in the area of copper based alloys. We assisted in selecting new applications and furthering the understanding of these applications.

Market potential for high-performance heat shield in the automotive industry

A Tier I supplier to the automotive industry had observed the adoption of their high-performance heat shield in an existing sports car as well as a future truck model. A competitor was also supplying a similar type heat shield for a sports utility vehicle. We conducted an analysis of the trends in using this particular heat shield at the Big Three U.S. auto manufacturers, as well as some of the European and German transplants. We scrutinized some assumptions and hypotheses that predicted the adoption of these high-performance heat shields. We mapped out the future trend at each of the Big Three automobile manufactures: each had distinctly different heat management philosophies with regard to this component.

Search for potential applications and markets for low-cost composite

A client was interested in understanding potential markets for a sawdust/thermoset composite that could be manufactured from waste products. We evaluated a patented pressing technology that would have to be purchased for the manufacturing. We



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scrutinized the claims made by the manufacturer. We generated a number of potential applications for the technology and developed a model to evaluate the economic viability in each case. In the process, we provided our client with a global formula for the type of product that should be targeted for this process.

New applications for aluminum and stainless steel

We were asked to identify new applications for aluminum and stainless steel, particularly, as a replacement for low-grade steels. Metal fabrication of stainless steel and aluminum utilized more value added mix of products from our client. The analysis covered a wide range of end use industries and included identification, not only of applications, but also drivers and barriers to the substitution process, size of market segment, vertical distribution chain and possible opportunities for our client to be involved in the substitution process. We came up with several key opportunities for our client to pursue, not only in the substitution to stainless steel and aluminum but also in providing services in existing applications.

Market opportunities for boron nitride

Our client had developed a new technology for processing hexagonal boron, which yielded several advantages including lower cost and complex near net shaping capability. In addition, the new process resulted in a lower dielectric constant and a higher thermal conductivity. We identified new applications for the material and analyzed the value provided by the new technology. Among different applications, we identified microwave devices as the most attractive application for our client. We also obtained information on price levels and the vertical integration chain and assisted our client in deciding on the most suitable entry step in the chain.

Opportunities for low friction carbon/carbon

Our client is a leading manufacturer of carbon materials. They had fortuitously developed a new carbon/carbon material, which exhibited low friction, and good wear properties. We identified potential new applications for the new material focusing on high value, niche applications segments such as high temperature applications. We analyzed the engineering and commercial aspects of the new material and put our client in touch with several potential customers. Our client is now supplying test samples to these customers.

Metal Matrix Composites for thermal management in telecom

Our client asked us to analyze the potential market for MMC heat-spreaders in the telecom sector. We found that the market was limited to a particular company, but delineated alternate application areas that relate to RF transistor packaging in the same industry. We also suggested looking at alternate applications in the semiconductor industry.



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Metal Matrix Composites for semiconductor packaging

We uncovered the range of thermal management applications for MMCs in semiconductor packaging. This covered both logic and power semiconductors. We analyzed the technical requirements for existing and future products in these sectors and put our client in touch with potential customers. We also provided future market estimates for MMCs in the targeted sectors.

Metal Matrix Composite study for semiconductor packaging (II)

One year later, we reviewed the developments in a particular area that suited our client's specific MMC technology and also showed large growth potential. Large chip makers like Intel had adopted the relevant packaging technology but they were not necessarily using MMC heat spreaders. We delivered 4-5 potential customers who had started to use MMCs or had specified it for future products. Our client selected one of these potential customers, based on our recommendation, and started to manufacture prototypes from drawings that we obtained.

Market potential for carbon based heat spreader in mobile electronics

We analyzed the market potential for a client's advanced carbon-based material that has high in-plane thermal conductivity. Our primary focus was on mobile electronics but we also made our client aware of interest in the telecom industry. We analyzed technological developments and future requirements in these industry sectors. We also analyzed cost sensitivity and informed our client about the target price levels it would have to meet in order to enter these markets. We also determined the target specifications that the various potential customers would require.

SiC components for semiconductor fabrication

We analyzed the market potential for a high-purity SiC technology in supplanting quartz in diffusion and LPCVD furnaces in the semiconductor industry. The material is considerably more expensive but potentially offers lower COO (cost of ownership). We searched for and interviewed key personnel at semiconductor fabs across the U.S., as well as furnace OEMs. This work was done to assist in due diligence assessment of a potential acquisition candidate.

Application search for supplier of honeycomb components and systems

Our client had traditionally served the aerospace industry with precision-made honeycomb based components. The honeycomb was made out of hard to weld sheet metals, such as Titanium and stainless steel. The aerospace industry market segment was not doing well and there was an obvious need for new applications, based on their technological know-how. Among several promising applications we highlighted so called collimators used in PVD sputtering applications in cutting edge chip manufacturing.



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After establishing the very promising nature of this market we proceeded to assist our client to commercialize this product within semiconductor fabs. It subsequently developed into our client's largest and most profitable single market segment.

Separator materials for supercapacitors

In this project, we evaluated the current state of supercapacitors used in various applications including power electronics and telecommunications. We studied new developments in supercapacitor technology focusing on the design and use of materials in supercapacitors. In particular, we analyzed the technology and market for separator materials in order to aid our client in evaluating a proposed new business venture. We identified key industry players in both the supercapacitor as well as separator market and provided market size estimates.

Evaluation of chemical processing applications for monolithic catalyst technology

The worldwide leading manufacturer of monolithic catalysts was interested in developing the product for chemical processing applications. We selected a particular reaction that is particularly suited to this type of catalyst. In the first stage we mapped out the large number of processes that use this reaction. We selected four key processes of commercial significance and analyzed the viability of this type of catalysis in these industries.

Materials for supercapacitors

Our client asked us to analyze the viability of their materials technology as an electrode for supercapacitor applications. The electrodes require very large active surface area. Supercapacitors have potential applications in electric vehicles and electronic devices that operate intermittently at high current drain. We mapped out the current practice among supercapacitor manufacturers and developers to determine if there was any interest in our client's material. We analyzed the cost versus performance tradeoff that the industry was looking for.