

Chapter 1 : Aerospace Systems Technical Research Operation Services (ASTROS) Industry Day (Briefing

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Cost reduction pressure on Original Equipment Manufacturers OEMs , rising level of technical complexity across applications requiring high-level competency, increasing tie-ups between OEMs and ESO providers, and shorter product life cycles have been driving ESO business growth. Previously, services outsourced were limited to a lower degree of complexity, such as CAD drawings and designing; however, growing client confidence in ESO vendors over time has led to the increasing complexity of outsourced activities, including the delivery of end-to-end solutions for a product or technology. Vendors present in emerging countries have gained client confidence by taking up tasks requiring core competency and providing specialized assistance for specific end-use segments. Companies find it cost-effective to outsource designing, architecture, development, deployment, automation, and other services to third-party vendors who possess the technological and labor expertise to undertake such tasks efficiently. This can chiefly be attributed to global telecom players expanding their presence in emerging countries such as China and India. Operators and telecom manufacturers demand a wide variety of assistance ranging from designing, implementing, and supporting to testing solutions. The automotive engineering outsourcing market size is projected to grow at a robust rate which may be attributed to the software platform developers making technological advancements in the automobile sector. Automobile companies need to develop predefined strategies for outsourcing vendors in order to meet such core competencies. Automotive manufacturers are facing increasing demand for capacity and skills due to growing present-day technological complexities. Developing embedded software and systems require core engineering proficiency and skill sets which may not be available in the automotive sector. In addition to traditional services, automakers are now focusing on suppliers providing supercomputing, advanced graphics, and high-skilled software development capabilities. The industry is undergoing rapid changes, primarily driven by the concept of convergence. Vendors are providing their services to semiconductor companies, OEMs, and technology providers for developing next-generation smart devices which can be controlled in real time without physical accessibility. Companies are outsourcing in order to address product localization needs, introduce new features and technologies, and leverage industry best practices to be globally competitive. Location Insights The onshore market estimates refer to the revenue generated within a country when a home company outsources its services to another domestic company within the national territory. For instance, a U. On the other hand, offshore market estimates refer to the revenue generated within a country by international sources. When a company outsources its requirements to a company based in a foreign location, the revenue generated in the country of the latter is a part of its offshore market. For instance, a Japanese company outsourcing its services to a company in India is considered to generate offshore revenue for India. The revenue share for the onshore outsourcing segment is expected to increase over the forecast period. However, by , offshore outsourcing is projected to gain prominence, owing to the availability of skilled and cheap labor in offshore countries which makes them attractive outsourcing destinations. Major engineering service providers ESPs have proactively invested in modern industry processes and assets. These ESPs are present across global business centers, which benefits them by being in proximity with the client and helps them build strong professional relations and acquire domain-specific experts who can also work at client locations. Post-Brexit, there have been restrictions on the movement of skilled labor from European countries to the UK. It is anticipated that the UK may look out for other lucrative offshore outsourcing destinations. The decision of the current U. The total estimated engineering services outsourcing market revenue for is expected to be USD Competitive pricing, quick turnaround time, software development capabilities specific to end-use and project needs, domain expertise, vendor infrastructure, and proximity to the manufacturing units and customers are the key criteria taken into consideration for ESO vendor selection. Cheap labor, skilled talent pool, and conducive government regulations in countries such as

India, Malaysia, and the Philippines make the region an attractive ESO destination. The Asia Pacific region is expected to witness the fastest growth rate of around 10%. Some global product manufacturers operate their captive centers in Asian countries for cost optimization. As a recent trend, to minimize operation cost and acquire a skilled talent pool, captive centers have been on a decline while the share of ESO vendors in the region has been on the rise. However, they are projected to witness steady growth over the forecast period. Within the North American region, Mexico is expected to witness the fastest growth. Japan, Germany, and the U.S. India competes with countries such as France, U.S. The companies operate a wide range of business activities spanning the various stages of a product lifecycle and usually provide end-to-end product solutions.

Chapter 2 : Scientific Research & Development Services Industry Profile from First Research

The Technology Services Industry Association (TSIA) is dedicated to helping services organizations large and small grow and advance in the technology industry. Find out how you can achieve success, too.

Grants for the professional, scientific and technical services industry are available to support businesses that: For specific grants, try searching the following resources: See the Australian Research Council grants page for specific grants and assistance programs for arts businesses. Need help understanding your WHS obligations? Try these government resources: For details on your general health and safety obligations, go to workplace health and safety. Back to top Insurance As well as compulsory insurance such as workers compensation, there are also a number of specific insurance options available for professional, scientific and technical services industry. Find out more about general insurance options for business. Professional indemnity insurance Professional indemnity insurance protects advice-based businesses from legal action taken for losses incurred as a result of professional negligence. In certain professions indemnity insurance is a mandatory requirement before registration can be accepted, including: Contact the Tax Practitioners Board to find out more. Back to top Intellectual Property IP As well as trade marks, there are other IP rights that may be relevant to businesses in the professional, scientific and technical services industry: Designs “” protects the overall feature, shape, configuration, pattern or ornamentation of a product. See the IP for designers page for IP information for architects and designers. Patents - protects inventions such as new equipment, new machinery, new systems or processes. See the computer-related inventions , biological inventions and micro-organisms pages for more industry-specific patent information. Circuit layout rights - automatically protects original layout designs for integrated circuits and computer chips. IP Australia is the federal government agency responsible for granting rights in patents, trade marks and designs. Back to top Industry training Industry training can be an important part of your business survival. Keeping pace with new scientific discoveries, emerging technologies, tax policies, animal health strategies, architectural practices and engineering standards are often a must for the survival of each specific profession and in some cases is a requirement of professional registration. From the 1 July , all ACT building and construction workers including architects and engineers who will be working with asbestos are required to complete asbestos awareness training. Need some help getting started on your training? Get tips on training yourself and your staff. Search Events to find government events, seminars, training courses and workshops. Back to top Environment Professional, scientific and technical services businesses have a great deal to do with the environment. The main environmental concerns that businesses in this industry should be aware of include:

New Industry: Professional, Scientific, and Technical Services Save Table (XLS / CSV) For an overview of the industry, including employment and salary, visit the Bureau of Labor Statistics site.

Scientific Research and Development Services Industries: Nature of the Industry Working Conditions Employment Occupations in the Industry Training and Advancement Outlook Earnings Related Careers Significant Points Workers must continually update their knowledge to retain marketable skills in this industry, which is on the cutting edge of scientific knowledge and technology. Biotechnology and other life sciences research will continue to attract research funding and generate employment growth. Overall prospects for scientists and engineers should be favorable, although competition for basic and applied research funding is expected in many fields. From carbon nanotubes to vaccines, workers in the scientific research and development services industry create today the technologies that will change the way people live and work in the future. The importance of this industry is demonstrated by the considerable attention paid to it by the press, business associations, politicians, and financial markets. Major discoveries are heralded in both the technical and the popular media, and many studies monitor the pace of research and development. New technologies can quickly revolutionize business and leisure, as the Internet has. Basic research is conducted to further scientific knowledge without any direct application. This sort of research typically involves a high level of theory and is very risky; many projects fail to produce useful or novel results. Due to this risk, and because it is difficult to determine in advance what new products, if any will result, most basic research is funded by government, universities, or nonprofit organizations. Applied research is the bridge between science and business. It is directed toward solving some general problem, but may produce several viable options that all achieve some aspect of the goal. Most development is done by private industry and is generally oriented toward manufacturing. Nearly everything consumers use, from antibiotics to zoom lenses, is a product of basic research, applied research, and development. This industry includes diverse fields. Important areas of research and development in the physical, engineering, and life sciences fields include biotechnology; nanotechnology; pharmaceutical; chemical and materials science; electronics; aerospace; and automotive. Important fields of research and development in the social sciences and humanities include economics, sociology, anthropology, and psychology. Biotechnology is among the most active fields of research. Work in this area seeks to understand and use the fundamental processes of cellular life to develop more effective medicines, consumer products, and industrial processes. Advances in biotechnology have led to new drugs and vaccines, disease-resistant crops, more efficient enzymatic manufacturing processes, and novel methods of dealing with hazardous materials. Bioinformatics, a branch of biotechnology using information technologies to work with biological data like DNA, is a particularly vibrant new field. Much of the interest in biotechnology has derived from the medical applications of its basic and applied research. Nanotechnology is perhaps even more of an emerging field than biotechnology, and they often overlap in their work on the molecular level, such as with DNA tagging. Nanotechnology is the study of new structures roughly on the same scale as individual atoms, or one millionth of a millimeter. At this size, materials behave differently and can be made into new structures such as quantum dots, which are small devices that behave like artificial atoms and can be used to tag sequences of DNA. These materials can also be used to make nanoscopic switches for electronics, or produce extremely small lasers for communications equipment. Because basic and applied research comprise the bulk of work, there are fewer immediate applications of nanotechnology. This field also has benefited greatly from advances in biotechnology, nanotechnology, and chemistry, allowing better models of biochemical processes and more efficient testing. Because a great deal of time is required to develop a new treatment, most companies have several major programs running concurrently, in what is sometimes referred to as the development "pipeline. See the statement on pharmaceutical and medicine manufacturing. By researching and modeling the properties of molecules under various conditions, scientists in this field can develop new chemical structures that are stable or volatile, rigid or flexible, insulating or conductive. Research on petroleum derivatives and substitutes continues to be an important part of this field. Basic research in areas

like electromagnetics and photonics also is a significant part of the work. As electronic technology has advanced, so have automotive designs. With the demand for more efficient vehicles that provide more power while using less fuel, a good deal of time and many resources are devoted to developing new powertrains, such as those for hybrid-electric vehicles. Economic research typically involves monitoring and forecasting economic trends relating to issues such as business cycles, competitiveness of markets, or international trade. Sociological research analyzes the institutions and patterns of social behavior in society, and the results are used mainly by administrators to formulate policies. Anthropological research focuses on the influence of evolution and culture on all aspects of human behavior. Psychological research studies human thought, learning, motivation, and abnormal behavior. Since the scientific research and development services industry is continuously on the cutting edge of knowledge, it is constantly evolving. New technologies and research methods, such as nanotechnology and biotechnology in recent years, have opened new avenues of research. Similarly, recent advances in fundamental understanding of genetics, chemistry, and physics have led to the development of new technologies. In , workers in scientific research and development services averaged The average for research and development in the physical, engineering, and life sciences was Most workers in this industry work in offices or laboratories; the location and hours of work vary greatly, however, depending on the requirements of each project. Experiments may run at odd hours, require constant observation, or depend on external conditions such as the weather. In some fields, research or testing must be done in harsh environments to ensure the usefulness of the final product in a wide range of environments. Other research, particularly biomedical research, is conducted in hospitals. Workers in product development may spend much time building prototypes in workshops or laboratories, while research design typically takes place in offices. Although there generally is little risk of injury or illness due to the working conditions, certain fields require working with potentially dangerous materials. In such cases, comprehensive safety procedures are strictly enforced. Employment[To Top] Scientific research and development services provided , jobs in Research and development in the physical, engineering, and life sciences accounted for about 90 percent of the jobs; the rest were in research and development in the social sciences and humanities. Under the North American Industrial Classification System NAICS , each establishment is categorized by the activity in which it is primarily engaged; an establishment is defined as a single physical location where business is conducted or services are performed. Although scientific research and development services can be found in many places, the industry is concentrated in a few areas. Although there are many small establishments in this industry, 55 percent of employment was in establishments with more than workers in Occupations in the Industry[To Top] Professional and related occupations account for 60 percent of employment in this industry, including 13 percent in computer and mathematical sciences occupations, 12 percent in engineering occupations, 10 percent in life science occupations, and 6 percent in physical science occupations table 1. Life, physical, and social science occupations. These workers form the core of the research operations in the industry. Biological scientists conduct research to understand biological systems, develop new drugs, and work with genetic material. Many work for pharmaceutical or biotechnology companies; others perform their research in Federal or academic laboratories. Medical scientists research the causes of health problems and diseases, and then use this information to develop medical treatments and preventive measures. Their work is similar to that of biological scientists, but with a specific emphasis on research to benefit human health. Chemists and materials scientists research the nature of chemical systems and reactions, investigate the properties of materials, and develop new products or processes using this knowledge. They perform research used by a broad array of industries to develop new products. Along with chemists, physicists and materials scientists conduct basic and applied research on nanotechnology. Social scientists, such as economists, market and survey researchers, sociologists, and anthropologists, perform research on human behavior and social interaction. Science technicians, sometimes called research assistants, assist scientists in their research and typically specialize in an area of research. They may set up and maintain lab equipment, monitor experiments, record results, or interpret collected data. Engineers and computer specialists. Engineers and computer specialists usually are involved in applied research or in development. Engineers design, produce, and evaluate solutions to problems, either by creating new products or refining existing ones. They apply the most current research

findings to develop more efficient products or processes of manufacture. Engineering technicians assist engineers in preparing equipment for experiments, recording and calculating results, or building prototypes. Their work is similar to that of the engineers with whom they work, but is more limited in scope. Computer specialists, such as computer scientists, computer programmers, and computer software engineers, develop new computer technologies, programming languages, operating systems, and programs to increase the usefulness of computers. Their work may include integrating advances in computing theory into more efficient processing techniques. Management, business, and financial occupations. These occupations account for 20 percent of the industry. Engineering and natural sciences managers plan, coordinate, and direct the activities of engineers, natural scientists, technicians, and support personnel to conduct research or develop new products. As with engineers and natural scientists, engineering managers tend to be involved in development, while natural science managers tend to be involved in basic research. Both use their technical expertise and business acumen to bridge the gap between goals set by top executives and the incremental work done by engineers and scientists. Office and administrative support occupations. Interviewers, except eligibility and loan, are particularly prevalent in research and development in the social sciences and humanities. They may be involved in soliciting and verifying information from individuals or groups for sociological, psychological, or market survey research, either in person or by phone. In the life sciences, they may collect and verify participant information for medical research. Since the scientific research and development services industry deals mainly in innovation and design, there are relatively few jobs in production, installation, maintenance, repair, transportation, sales, or service occupations. Employment of wage and salary workers in scientific research and development services by occupation, and projected change, Employment in thousands Occupation.

Chapter 4 : Technology Industry Trends | Deloitte US

The professional, scientific, and technical services sector is part of the professional and business services supersector. The Professional, Scientific, and Technical Services sector comprises establishments that specialize in performing professional, scientific, and technical activities for others.

Technical ceramics are expected to replace traditional materials to a high extent over the next eight years on account of their superior functional characteristics. In addition, these materials exhibit greater corrosion resistance, as opposed to other products such as aluminum and steel and hence, are being widely employed in the medical and automotive sectors. The growth of the automotive and medical industries in emerging economies of Asia Pacific is expected to fuel product demand over the next eight years. Within North America, the U. S is a predominant market witnessing growth in terms of ceramic applications in architectural projects and fine arts. However, the region is expected to lose market share to the developing economies over the next eight years. Various product types including zirconia, titania, alumina nitride, and silicon carbide-based materials, have their own characteristics and are employed as an economic and a high-performance substitute for numerous traditional materials such as metals, glass, and plastics. Most companies have been trying to improve product quality at a reduced cost which in turn will propel product need over the forecast period. Additionally, various agencies including the U. Clean Water Act, monitor mining operations under the CWA Section and on account of their harmful effects on the environment. According to the act, only a certain amount of mining activities can be conducted per year. Environmental sustainability is the key aim of these product manufacturers. On account of the unpredictable nature of natural gas prices, smaller companies primarily focus on looking into alternative fuel options or alternative technologies to manufacture these products. Application insights In , electronic devices were the largest application segment accounting for over USD 16 billion of the market. The product offers superior thermal and chemical properties which have led to its use in numerous application in the electronics industry such as core materials, circuit carriers, and ceramic substrates. These products are widely employed in the manufacturing of dental as well as medical implants. In addition, they are employed in the replacement of hard tissue such as teeth and bones. They are also used in the production of kidney dialysis machines, pacemakers, and respirators. Large healthcare base in Europe is expected to fuel product demand over the forecast period. The titanate ceramics segment in terms of revenue was valued at USD Titanates are well known for the production of the high-quality materials, including potassium titanate and sodium titanate, which are used as friction modifiers in brake pads and linings. The titanates market is led by the U. They are primarily employed in the automotive and machinery industries and space related applications such as heat resistant tiles. These products are also used in the manufacturing of transport equipment for space shuttles on account of their hardness properties and longer life span. Furthermore, these products are employed in the production of sports equipment such as golf clubs. The monolithic ceramics segment was valued at USD Some of the major types are zirconium, silicon nitride, zirconium carbide, aluminum nitride, zirconium oxide, aluminous oxide, and silicon carbide. These materials offer very specific properties favorable to industrial use like durability, reliability, wear and high temperature resistant. These products are used in verity of applications like electronics and electrical, power automotive, aerospace, defense, medical and transportation. In the power generation industry, monolithic products are mainly used in the manufacture of turbine blades and engine components for the machinery units. End-use Insights The medical sector is another growing end-use sector for the product as they are effectively employed in orthopedics to increase the quality of life with implant components for artificial hip joints and knee replacements. These products are also employed in medical devices and equipment such as lithotripters, ultrasonic cleaners, and dental products. These products can withstand mechanical stresses and high temperatures in applications such as energy generation in turbines and power plant engines. In addition, they are used in systems for solar thermal energy conversion and in photovoltaic, water and wind power plants. The product ensures efficient use of resources in energy supply and distribution from both renewable and conventional sources. Factors such as competitive manufacturing costs, high economic growth, and rapid

development of end-use industries will continue to drive the product demand over the next eight years. North America is relatively mature and is primarily characterized by new product developments and growing preference towards these products. As of , North America held a substantial share of the global market. S is the largest market witnessing growth in terms of product use in the environmental and medical sectors in the region. However, this region is expected to lose share to the developing economies over the forecast period.

Technical Ceramics Market Share Insights The industry is fragmented and competitive due to the presence of several key players in the market. These players have a geographical presence with numerous production facilities worldwide. However, the presence of numerous small regional vendors with significant market shares are expected to pose a threat to these international players over the next eight years. This investment will support rapid development of new materials, helping CoorsTek technology and manufacturing customers solve various challenges.

Chapter 5 : Translational Imaging through Wake Forest Innovations

NIST's Scientific and Technical Research and Services (STRS) activities provide industry, academia and other federal agencies with world-class research capabilities in measurement science that form the foundation of the global system of weights and measures and enable innovation.

Veterinary Services Coverage Options for the Professional, Scientific and Technical Services Industry Companies in the professional, scientific and technical services industry typically handle a lot of confidential client information and data. In many cases, their actions can directly impact the financial or physical well-being of their clients. As such, there is a significant risk of liability charges in this industry. Commercial insurance policies offer a number of different coverage options so that business owners can create a policy that is suitable to meet their specific needs. Some examples of coverage options that may be most important to owners of businesses within the professional, scientific and technical services industry include: This coverage is designed to protect your business in the event that a client or other third-party individual is injured or suffers property damage on your business premises. This coverage is often bundled with contents insurance with commercial insurance policies. Errors and Omissions insurance: Also referred to as professional liability insurance, this coverage is among the most critical for businesses in the professional, scientific and technical industry. It is designed to protect your business from charges of professional negligence or failure to perform your professional duties in the event that your actions, or inactions, lead to financial losses for your client. Cyber liability and data-breach insurance: In the event that your business is targeted by a hacker or other cyber-criminal, or if software that you have provided to a client is vulnerable to attack, you may be deemed liable for confidential and critical information getting into the wrong hands. This coverage is designed to provide third-party coverage and can shield your business from significant financial losses brought about by lawsuits in the event that you are sued. These are just three of the many coverage types that are available to you when you build a commercial insurance policy to protect your business. It is worthwhile to discuss your insurance needs with a professional who can make appropriate recommendations and help you find all the coverage you need. Build a Suitable Commercial Insurance Policy with the Help of an Independent Agent Because of the many different coverage options offered by commercial insurance plans, it can be difficult to decide which ones are right for your business and which ones you can go without. These agents can answer your insurance-related questions, help you assess your business coverage needs, and advise you about suitable coverage amounts. Best of all, because they are not captive to any one insurance provider, these agents can comparison shop to find you suitable and competitively-priced policies. Enjoy the convenience of keeping all your insurance coverage solutions under one roof. Contact a Trusted Choice network agent near you to learn more, and you can start reviewing policies specifically tailored to the professional, scientific and technical services industry in no time.

Chapter 6 : Engineering Services Outsourcing (ESO) Market | Industry Report,

You have the research problem; we have the tools to help you find a solution. By working with Wake Forest Innovations, you gain easy access to our faculty experts, clinical trials capabilities and the specialized and unique technical services provided by the 14,+ faculty and staff at our internationally regarded academic medical center.

Chapter 7 : Technical Research Services at Wake Forest Innovations

Industry & Technical Research groups are comprised of various policy-driven committees as well as technical committees that provide specialized expertise to provide interpretation, recommendations, and knowledge exchange on the industry's technical matters to individual stakeholders, state and local agencies, Association staff, or to the membership as a whole.

Chapter 8 : Global Technical Ceramics Market Size | Industry Report,

Technology Industry Outlook Navigating to the future: Leveraging tech advances in the digital era The Technology Outlook reviews which industry trends are top-of-mind and strategies that tech companies are leveraging as they plan for growth.

Chapter 9 : Scientific Research and Development Services Industries: Career, Outlook and Education Info

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