

# KAUST

# SME

# SURVEY REPORT

King Abdullah University of Science and Technology  
Innovation and Economic Development Department

SME Innovation Services



جامعة الملك عبد الله  
للعلوم والتقنية  
King Abdullah University of  
Science and Technology

INNOVATION  
AND ECONOMIC  
DEVELOPMENT



# CONTENTS

---

Acronyms and Abbreviations .....	3
List of Figures .....	4
Executive Summary .....	5
Planning.....	7
Overview of the Data Findings .....	9
Introduction .....	11
Vision 2030.....	12
Objectives of the KAUST SME Survey.....	13
Methodology .....	14
Data Analysis .....	15
Landscape and Type of SMEs.....	16
Research and Development.....	23
Company's Needs and Challenges.....	26
Innovation and Economic Development .....	28
Professional Development and Training.....	34
Conclusion .....	37



# ACRONYMS AND ABBREVIATIONS

---

3D.....	THREE-DIMENSIONAL
AI .....	ARTIFICIAL INTELLIGENCE
B2B .....	BUSINESS TO BUSINESS
B2C .....	BUSINESS TO CONSUMER
EU.....	EUROPEAN UNION
EC.....	ENTREPRENEURSHIP CENTER
GDP.....	GROSS DOMESTIC PRODUCT
HSE .....	HEALTH, SAFETY, AND ENVIRONMENT
I&ED.....	INNOVATION AND ECONOMIC DEVELOPMENT
IOT.....	INTERNET OF THINGS
IP .....	INTELLECTUAL PROPERTY
KAUST .....	KING ABDULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
LED .....	LIGHT-EMITTING DIODE
MONSHA'AT .....	SMALL AND MEDIUM ENTERPRISES AUTHORITY
R&D .....	RESEARCH AND DEVELOPMENT
SAR .....	SAUDI RIYALS
SME.....	SMALL AND MEDIUM-SIZED ENTERPRISES



# LIST OF FIGURES

---

- FIGURE 1** KAUST SME Engagement Model
- FIGURE 2** SMEs and Large Enterprises in the EU Nonfinancial Business Sector, 2016
- FIGURE 3** SME Contribution to GDP, Vision 2030
- FIGURE 4** Industry Landscape of the KAUST SME Survey
- FIGURE 5** Companies That Participated in the KAUST SME Survey by Ministry of Commerce Designation
- FIGURE 6** SME Size, Category, and Survey Participation Rate
- FIGURE 7** Role or Position of the Person Completing the Survey
- FIGURE 8** Location of Participating SMEs' Headquarters
- FIGURE 9** Primary Customers of SMEs Participating in the Survey
- FIGURE 10** Responses to Question 2.2: How Does the Company Conduct Research and Development Activities?
- FIGURE 11** Responses to Question 2.3: Is the Company Interested in Any of the Following Research and Development Services?
- FIGURE 12** Responses to Question 2.4: Is the Company Interested in Accessing/Using Advanced Laboratory Equipment or Tools?
- FIGURE 13** Responses to Question 3.1: What Are the Company's Current Technical Challenges?
- FIGURE 14** Responses to Question 3.3: Are You Interested in Collaborating with KAUST to Address Your Company's Technical Challenges?
- FIGURE 15** Responses to Question 4.1: Who Is Responsible for Innovation in Your Company?
- FIGURE 16** Responses to Question 4.2: What Kind of Innovation and Entrepreneurship Services Would Your Company Be Interested In?
- FIGURE 17** Responses to Question 4.3: Which of the Following Design, Prototype, and/or Fabrication Services Does Your Company Require?
- FIGURE 18** Responses to Question 4.5: Does Your Company Require Any of the Following Intellectual Property Services?
- FIGURE 19** Responses to Question 4.6: What Kinds of Facilities Would Help Your Company Expand Its Existing Business or Establish New Operations?
- FIGURE 20** Responses to Question 4.7: How Does Your Company Fund New Ideas or Projects?
- FIGURE 21** Responses to Question 5.1: What Type of Technical Professional Development and Training Services Is Your Company Interested In?
- FIGURE 22** Responses to Question 5.2: What Type of Emerging Technologies Professional Development and Training Services Is Your Company Interested In?
- FIGURE 23** Responses to Question 5.3: What Type of Entrepreneurship and Innovation Training Services Is Your Company Interested In?



# EXECUTIVE SUMMARY

## **KAUST can support the SME sector through partnerships, programs, and initiatives.**

Examples from many countries show how important small and medium-sized enterprises (SMEs) are to supporting economic development and growth and creating job opportunities. In emerging economies, SMEs contribute up to 45 percent of total employment and 33 percent of gross domestic product (GDP). Moreover, SMEs can contribute to economic diversification, especially in resource-rich countries that are particularly vulnerable to commodity price fluctuations, such as the Kingdom of Saudi Arabia and other Gulf Consortium Countries. In the Kingdom, according to the Small and Medium Enterprises Authority (Monsha'at), SMEs contribute approximately 21 percent to the Kingdom's non-oil GDP, which is lower than the average of 46 percent among the top 15 percent of global economies.<sup>1</sup>

### **SMEs contribute up to 45 percent of total employment and 33 percent of gross domestic product.**

The King Abdullah University of Science and Technology (KAUST) SME Innovation Services will support the SME community by capitalizing on KAUST resources and capabilities. To better understand how SMEs and universities can interact, KAUST surveyed more than 500 SMEs in Saudi Arabia. The objective of this survey was to understand how KAUST can support the SME sector by developing programs and initiatives that affect the SME ecosystem. The data from the survey indicate that research and development (R&D) into new ideas and expanding markets does not currently support the SME ecosystem. Therefore, the program will also develop a model for effective KAUST-SME partnerships that foster R&D.

The KAUST SME Survey is the Kingdom's first survey to focus on SME R&D engagement with research institutions. This timely survey aligns with a main objective of the Kingdom's Vision 2030: to increase SME contribution to GDP from 20 percent to 35 percent by 2030.

The survey results revealed opportunities for KAUST to work closely with SMEs. In addition, it produced five key takeaways:

- **In total, 45 percent of the challenges facing SMEs relate to lack of expertise and know-how.**
- **Manufacturing dominated the industries that participated in this survey, followed by construction, then information and communication.**
- **In total, 357 out of 470 SMEs wanted to partner with KAUST to address their technical challenges.**
- **The top three professional development areas SMEs indicated are scientific and laboratory equipment, artificial intelligence (AI), and business development training.**
- **In total, 80 percent of SMEs selected at least one innovation and entrepreneurship service, with commercialization being the most widely demanded service.**

<sup>1</sup> *SMEs and Vision 2030* (Riyadh, Kingdom of Saudi Arabia: Jadwa Investment, 2019).



The survey was disseminated with the support of governmental and nongovernmental organizations using databases from chambers of commerce, KAUST partners, and social media accounts. As a result, 500+ SMEs responded to 30 survey questions over 10 weeks, starting September 8, 2019. The survey consisted of six parts: company working domain, R&D services, needs and challenges, innovation and economic development services, professional development services, and company general information.

Three recommendations were developed from this survey:

- **Develop an R&D-related partnership program that can address SME challenges.**
- **Encourage SMEs to adopt an innovation ecosystem by developing new ideas and products.**
- **Close the skill gap within the SME sector through professional development.**



## PLANNING

To implement the recommendations and move forward, we propose the KAUST SME Engagement Model. The model provides an overall implementation strategy, starting with the opportunity gap.

The survey revealed three main opportunity gaps:

- SMEs' need for R&D services
- SMEs' need for innovation and entrepreneurship services
- SMEs' need for professional development services

### **SMEs' Need for R&D Services**

The SME ecosystem does not favor R&D as a means of innovating or developing new ideas. However, the survey data indicated that SMEs' intention to employ R&D is high. Several SMEs indicated that they would use R&D as a vehicle to reach new markets and expand their customer base through technological innovation and the use of advanced equipment. In total, 44 percent of SMEs indicated that R&D could be a solution to technical challenges and 58 percent selected at least one piece of advanced equipment they wanted to use. In addition, 22 percent of SMEs indicated that a lack of specialized tools and equipment is a major challenge. The model addresses these focus areas, suggests ways to address them and predicts possible impacts.

### **SMEs' Need for Innovation and Entrepreneurship Services**

Innovation is a game changer—a major economic driver. Responses in the survey showed that 81 percent of the participating SMEs selected at least one innovation and entrepreneurship service. In addition, 80 percent of SMEs selected at least one type of design, prototype, or fabrication service, with product development and design services being the most commonly chosen. Survey results indicated that 80 percent of SMEs are looking for one type of such service—for example, three-dimensional (3D) printing, computer numerical control machining, advanced machining, welding and nanofabrication.

Another 58 percent of the SMEs sought access to advanced equipment and tools.

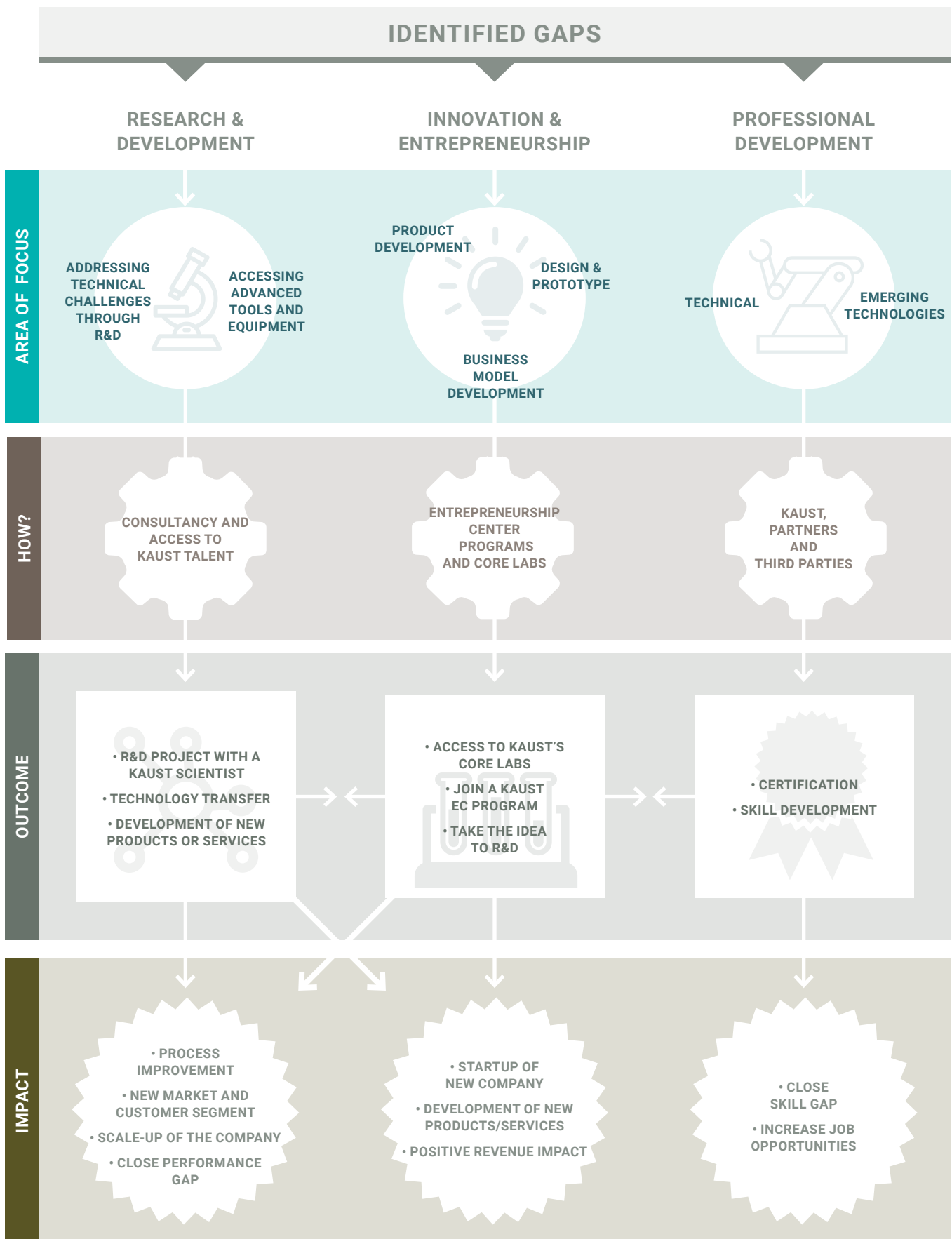
**81 percent of the participating SMEs selected at least one innovation and entrepreneurship service.**

### **SMEs' Need for Professional Development Services**

Responses to the challenges and need question highlighted a lack of expertise and know-how among 45 percent of SMEs. Similarly, the inability to attract skilled labor is a global issue. Professional development is key to closing this gap, as was highlighted in the survey data. Further, as companies move toward digitization and automation, the need for workers with skills in emerging technologies is increasing. Demand currently exceeds supply in this area, with knowledge of AI, the Internet of Things (IoT), big data, blockchain, robotics, and related skills leading the way. Survey responses to the emerging technology question indicated that AI, the IoT, and smart cities are among the most widely sought-after skills. This challenge is common globally and not necessarily linked to SMEs; however, SMEs may suffer the most because they struggle to attract workers with such skills at this early stage of technology adoption.

Figure 1 shows the KAUST SME Engagement Model. The model identifies the gaps and sub-areas for each based on the survey analysis. The How? row offers proposed vehicles to address the gaps and build the partnership bridge between KAUST and the SMEs. The Outcome row details possible impacts. These two rows provide suggestions: Other outcomes and impacts from the model could arise.

**FIGURE 1**  
KAUST SME ENGAGEMENT MODEL







## OVERVIEW OF THE DATA FINDINGS

### RESEARCH AND DEVELOPMENT

72%

**SMES DID NOT INTERACT WITH UNIVERSITIES OR ACADEMIC INSTITUTIONS**

- 72 percent of SMEs did not interact with universities or academic institutions.
- 72 percent of participants selected at least one R&D service with which they wanted to be involved.
- 58 percent of SMEs outsourced R&D-related activities.

### INNOVATION AND ENTREPRENEURSHIP

80%

**SMES SELECTED AT LEAST ONE TYPE OF INNOVATION AND ENTREPRENEURSHIP SERVICE**

- 60 percent of SMEs had staff dedicated to innovation or outsourced such work to a third party.
- 80 percent of SMEs selected at least one type of innovation and entrepreneurship service, with commercialization being the most-requested service.
- Product development and design services, including prototyping and fabrication, are in high demand among SMEs.
- 47 percent of SMEs do not require intellectual property (IP)–related services. In fact, among the 470 total participants, only 7 percent owned IP.
- Financing is the preferred option for funding new projects or ideas; 93 percent of SMEs did not have registered IP (i.e., patents).

### PROFESSIONAL DEVELOPMENT AND TRAINING

72%

**SMES SELECTED AT LEAST ONE TYPE OF TECHNICAL PROFESSIONAL DEVELOPMENT SERVICE**

- 72 percent of SMEs selected at least one technical professional development service, with health, safety, and environment (HSE) training the most commonly requested.
- AI, IoT, smart cities, and 3D printing were among the most commonly requested emerging technologies professional development skills.
- The top three professional development areas SMEs sought were scientific laboratory equipment, AI, and business development training, representing the technical, emerging technologies, and innovation and entrepreneurship categories, respectively.



## COMPANY'S NEEDS AND CHALLENGES

45%

**SMES INDICATED LACK OF EXPERTISE AND KNOW-HOW AS THEIR GREATEST CHALLENGE**

- 45 percent of SMEs indicated lack of expertise and know-how as their greatest challenge.
- More than 357 SMEs wanted to partner with KAUST to address technical challenges.

## GENERAL

53%

**SMES WERE SOLE PROPRIETORSHIPS OR ONE-OWNER COMPANIES**

- Manufacturing dominated the industries participating in the survey, followed by construction and information and communication.
- 50 percent of participating SMEs were small businesses, followed by medium-sized and micro businesses.
- 53 percent of participating SMEs were sole proprietorships or one-owner companies.
- Of the 470 individuals participating in the survey directly, 356 were senior management.
- 52 percent of participants were from the western province of Saudi Arabia.
- 31 percent of SMEs' customer segment was business to business (B2B), followed by government and business to consumer (B2C).
- 78 percent of participants used the Arabic version of the survey.
- A total of 470 responses were received during the 10 weeks of the survey.



# INTRODUCTION

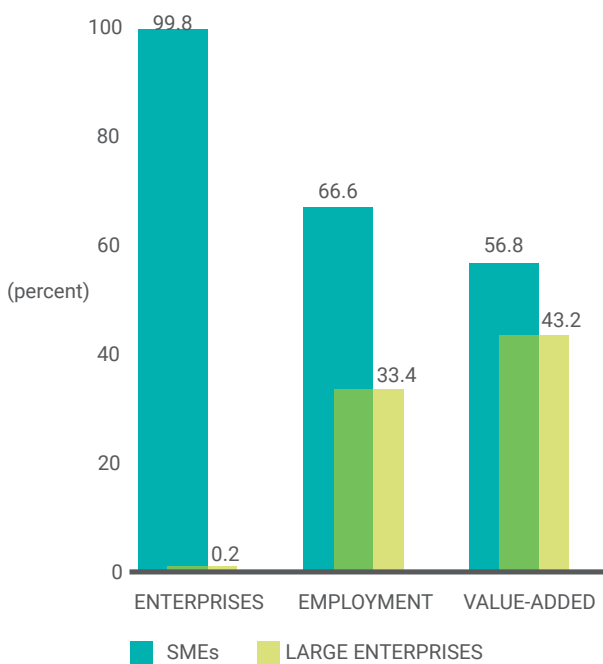
## An I&ED mission is to bridge the gap between academia and industry through collaboration, technology transfer, startup funding, entrepreneurship, and other initiatives.

According to the World Bank,<sup>2</sup> formal SMEs contribute up to 60 percent of total employment and up to 40 percent of national income (GDP) in emerging economies. These numbers are even higher if the informal sector is included. The World Bank also estimates that in the next 15 years, a workforce of 600 million will be required, especially in Asia and sub-Saharan Africa. SMEs now provide a substantial share of the current employment opportunities and future growth prospects in many countries. For example, in the European Union (EU), where SMEs make up 99 percent of all businesses, nonfinancial SMEs account for about 57 percent of value-added businesses (Figure 2).

As the Kingdom moves toward full implementation of Vision 2030, each sector of the government will have to contribute to this transformation. KAUST is the leading research and scientific institute in Saudi Arabia. Creating an impact in the local economy is a core value of KAUST. To that end, KAUST support to the SME sector will contribute to the Vision 2030 realization. This can be done through increasing industry engagement to build partnerships with key multinational corporations and offering KAUST's capabilities to SMEs in the Kingdom.

### KAUST support to the SME sector will contribute to the Vision 2030 realization.

**FIGURE 2**  
SMEs AND LARGE ENTERPRISES IN THE EU  
NONFINANCIAL BUSINESS SECTOR, 2016<sup>3</sup>



An I&ED mission is to bridge the gap between academia and industry through industry collaboration, technology transfer, startup funding, entrepreneurship, and many other initiatives. KAUST SME Innovation Services is one such initiative and will focus on SME engagement and development. One element of the engagement is to develop programs within KAUST that can benefit the SME community in the Kingdom. The SME survey was created to discover limitations and opportunities in this sector and answer the question, Can KAUST address these limitations and opportunities through R&D and other, related services?

<sup>2</sup> World Bank (n.a.). "Small and Medium Enterprises (SMEs) Finance: Improving SMEs' access to finance and finding innovative solutions to unlock sources of capital," The World Bank, <https://www.worldbank.org/en/topic/sme/finance>.

<sup>3</sup> SMEs and Vision 2030 (Riyadh, Kingdom of Saudi Arabia: Jadwa Investment, 2019).

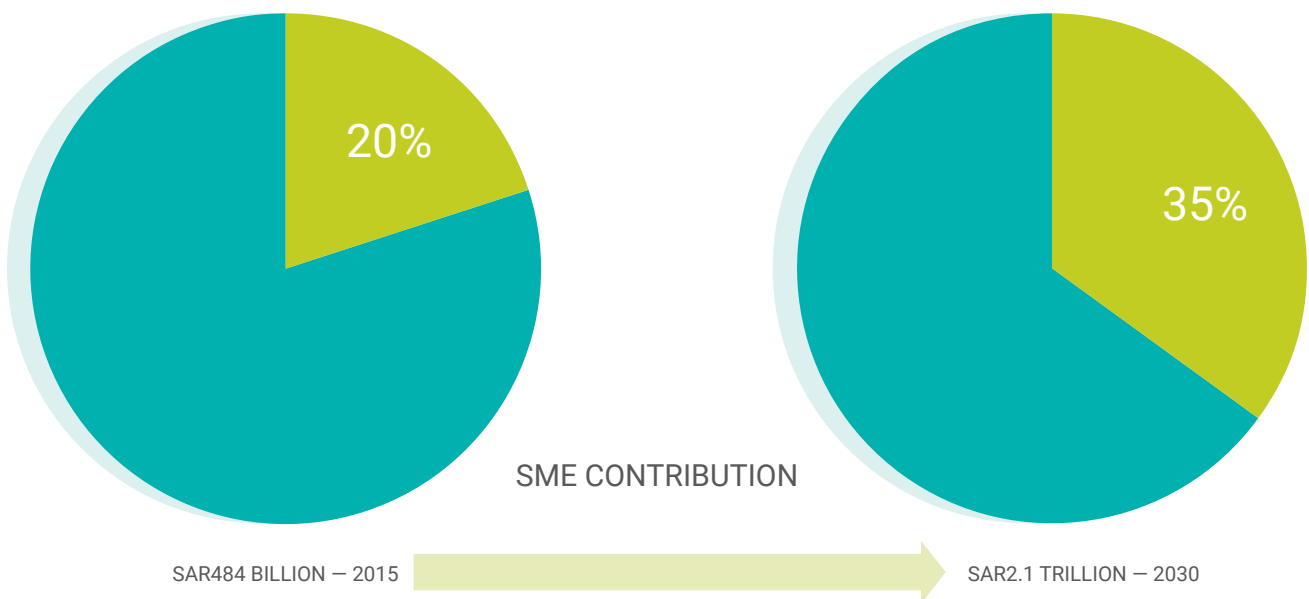


## VISION 2030

On April 25, 2016, Saudi Arabia unveiled Saudi Vision 2030 (Vision 2030) to transform its economy and diversify the country's income sources away from its current dependence on oil. Vision 2030 is a comprehensive plan for reforming the entire economic structure of Saudi Arabia. The main goals are to develop other industries and sectors, thereby ensuring that the economy is no longer as dependent on oil as a source of income, and to decrease government spending, with greater emphasis on and participation from the private sector.



**FIGURE 3**  
SME CONTRIBUTION TO GDP, VISION 2030



Vision 2030 seeks to increase the contribution of SMEs to the Kingdom's GDP, increasing the contribution from SMEs from 20 percent to 35 percent by 2030 (Figure 3). This 15 percent increase is estimated to result in 2.1 trillion Saudi riyals (SAR).

This can only happen if all government and nongovernmental organizations work together. Hence KAUST established SME Innovation Services.



# OBJECTIVES OF THE KAUST SME SURVEY

---

## **An objective of the survey was to gather data on the types of programs and services SMEs need to realize their full potential in the Saudi economy.**

When the KAUST I&ED department began KAUST SME Innovation Services, the team was eager to learn more about this sector and understand how KAUST could support the Kingdom's SME community. Individual interviews with SMEs would not have produced a sufficiently broad overview of the major challenges or requirements these SMEs face. Therefore, the team worked with various governmental and nongovernmental organizations to create a survey that would reach the greatest number of SMEs possible.

SMEs are unique and cannot be treated the same way as large enterprises. In many countries, SMEs form the backbone of the economy, contributing more than 80 percent to the national GDP. An objective of KAUST's SME survey was to gather data on the types of programs and services SMEs need to realize that kind of contribution in Saudi Arabia. First, the team sought to learn what KAUST can offer the Kingdom's SME community in the form of programs. For example, large enterprises budget a substantial amount for R&D annually, but R&D funding among SMEs barely exists. Therefore, the team decided to design R&D-related services that can benefit the Kingdom's SME community.

The second objective was to reach out to SMEs that are interested in working with KAUST and want to be involved in R&D and other, related activities. The survey indicated that more than 76 percent of participants were willing to partner with KAUST to address technical challenges. The team will contact those participants selected to partner with KAUST for collaboration.

## **The survey indicated that more than 76 percent of participants were willing to partner with KAUST to address technical challenges.**

The third objective was to create a B2B opportunity between SMEs and KAUST startups. The ideas and technologies that these startups are developing required support, engineering, and product-development expertise. In addition, services such as material supply, fabrication, and logistical services are in development. The SMEs that participated in the survey may be able to provide such services.

The final objective was to get closer to the SME sector. The data collected from the survey will provide the knowledge foundation of the SME community. Further, responses to survey questions not directly related to R&D or innovation will improve the team's understanding of the sector's other needs, including education and skill development, IP protection, and funding assistance.



## METHODOLOGY

---

### **To ensure a significant sample, the team started with 300 SMEs; 491 SMEs ultimately participated in the survey.**

To reach as many SMEs as possible, the team sought help from relevant governmental organizations. The General Authority for Statistics confirmed that more than 500,000 SMEs are currently in operation in Saudi Arabia. To ensure a significant sample, the team started with 300 SMEs; 491 SMEs ultimately participated in the survey. Surveys were distributed by email to 19,000 individuals; 2.6 percent responded, which was 61 percent more than our target response rate. In addition to direct emails, the team posted a link to the survey in KAUST social media accounts and in the social media of key public figures. Participation originating from social media was not tracked.

With the help of KAUST Government Affairs, the team worked with major governmental organizations to disseminate the survey, including the following:

- Jeddah Chambers of Commerce
- Riyadh Chambers of Commerce
- Dammam Chambers of Commerce
- Saudi Arabian General Investment Authority
- Saudi Authority for Industrial Cities and Technology Zones
- The Industrial Forum
- Small & Medium Enterprises General Authority (Monsha'at)
- The Royal Commission of Jubail and Yanbu
- The Council of Saudi Chambers

In addition, the team contacted organizations that work directly with SMEs in the Kingdom, such as SABIC, through its Nusaned program. Within KAUST, the team worked with the Procurement department, the Research Park Tenant Affairs department, and the Entrepreneurship Center. The survey remained available for 10 weeks; four weeks into the survey, the team sent a reminder, which had a significant impact on the rate of response. The effort paid off, and the team was satisfied with the overall response rate.

Finally, using official KAUST website, email, and social media accounts built confidence within the SME community. The survey made it clear to participants that the team was not looking for marketing data and would not distribute response data to organizations outside KAUST. A short introduction to the survey indicated its purpose and provided an email address through which potential respondents could ask questions or request clarification before starting the survey.



# DATA ANALYSIS

## **KAUST has identified eight strategic goals, of which I&ED will most help KAUST affect the Saudi economy.**

The KAUST SME Survey was divided into six parts, each with a set of objectives that KAUST would like to reach. Questions were carefully selected to lead to a conclusion about the Kingdom's SME sector. Of the survey's 30 questions, 7 were not mandatory. The majority of the questions were of the check box type; users could select multiple answers, and space was provided to write in answers if no appropriate option existed.

The six parts of the KAUST SME Survey are as follows:

1. Company Working Domain
2. Research and Development
3. Company's Needs and Challenges
4. Innovation and Economic Development
5. Professional Development and Training
6. Company Information

Parts 1 and 6 collected information about the SME to help the team understand the type of company participating in the survey and the domain in which it worked. The responses from these two parts helped the team place each SME into the appropriate sector and so better understand the challenges and requirements of each sector.

Parts 2 through 5 form the body of the survey. The responses from these four parts helped the team understand the type of services the SMEs needed from academia. The questions in these four parts

were grouped into two categories: one related to KAUST and the other related to programs and services to close the gap between academia and the SME sector. Responses to the KAUST-specific questions drove the analysis of what KAUST can provide (e.g., access to KAUST Core Labs, the Entrepreneurship Center, research partnerships, innovation activities). Responses to the other questions helped the team determine whether KAUST should develop new programs for the SME sector (e.g., education, access to research tools and equipment, IP services, funding).

The team used two levels of analysis. First, team members looked at all responses to determine counts or percentages and to explain the data as is with some correlation. This primarily quantitative analysis enabled the team to read the data at a high level.

Next, the team looked at different questions to correlate the responses and to link the questions and responses to a specific market segment or industry. From this analysis, the team drew valuable conclusions that they could then use to formulate recommendations.

Finally, the team compiled recommendations on how KAUST can contribute to closing the performance gap within the SME sector through R&D and innovation services, as well as identifying opportunities for partnership between KAUST and the Kingdom's SME community.



## LANDSCAPE AND TYPE OF SMES

Part 1 and Part 6 of the report provide basic information about the participating SMEs, the industries in which they operate, the type of products and services they provide, and their Saudi Arabia Ministry of Commerce designation. The survey saw results from 491 companies. After removing duplicates, the survey report includes data from 470 companies. Parts 2, 3, 4 and 5 provided the core information about the SME requirement for R&D, innovation and entrepreneurship and professional development.

Figure 4 (page 17) shows companies' responses to question 1.3, "What is the industry?"; results are segmented by industry. Based on the analysis, the top three industries of SME respondents are manufacturing, construction, and information and communication.

If participants worked in an industry not already listed among possible survey options, they could write it in the **Other Industry** category. This category accounted for 14.4 percent of the responses:

- Security, safety, and HSE
- Marketing, advertisement, and event management
- Fashion design, makeup, and beauty
- Facility management and operations and management
- Legal and law
- Sport and gaming
- Engineering and instrumentation





FIGURE 4

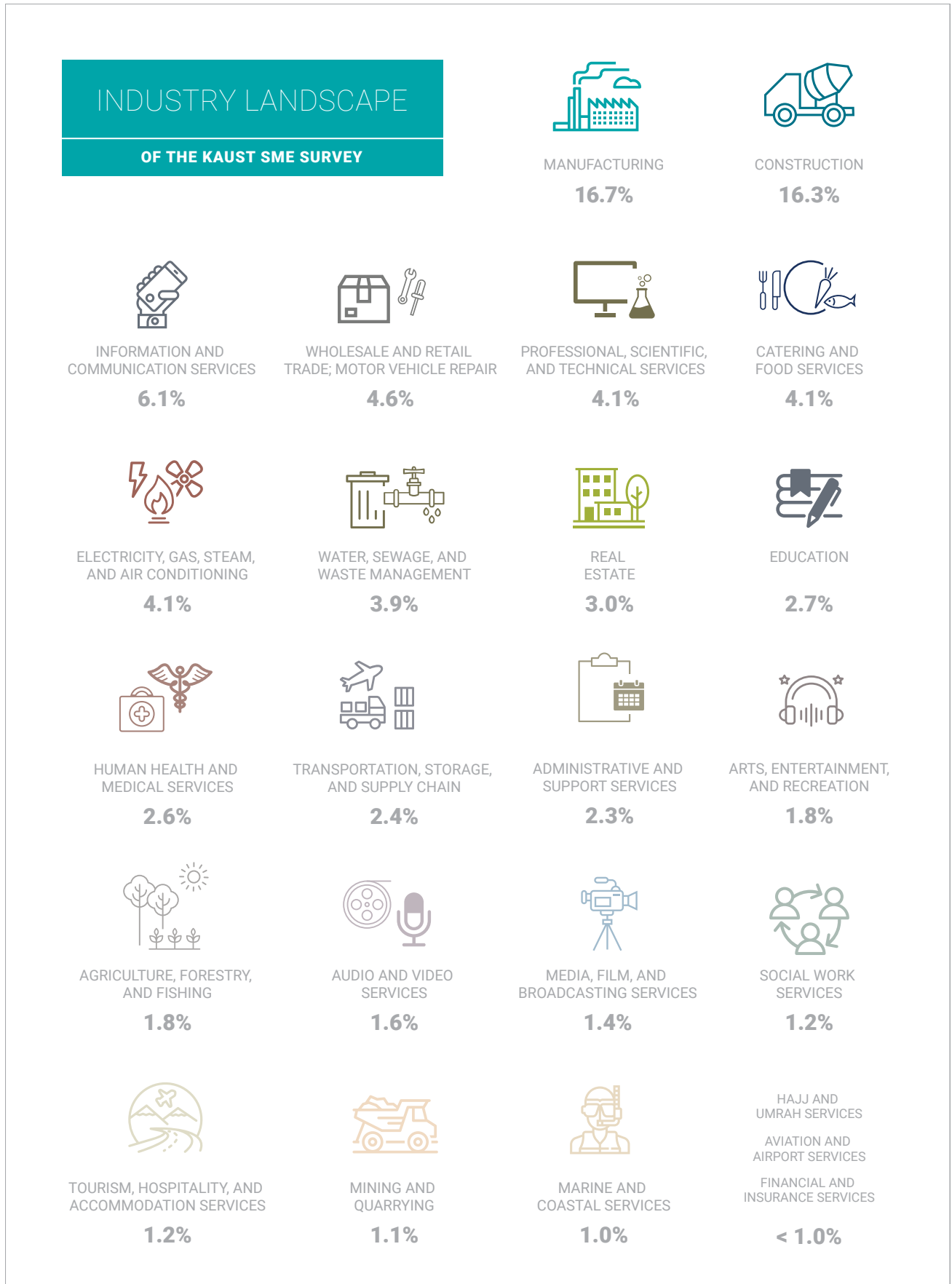
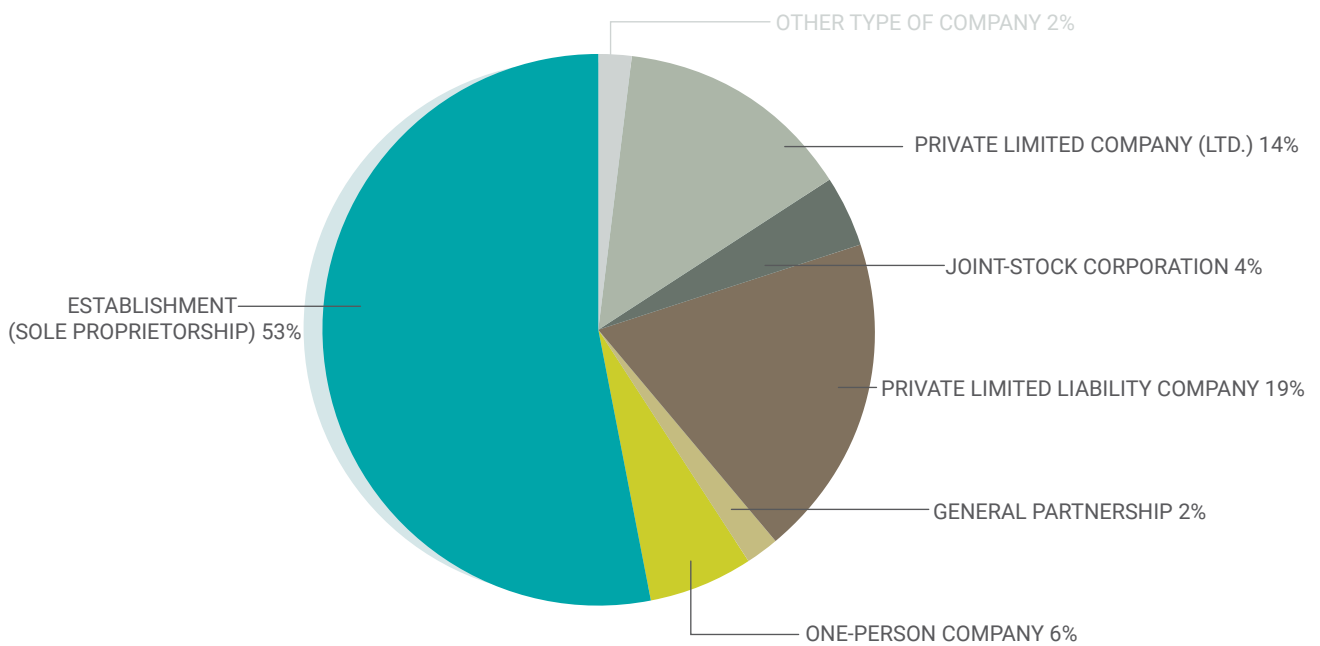




Figure 5 shows the company types that participated in the survey by Ministry of Commerce designation.

**FIGURE 5**  
COMPANIES THAT PARTICIPATED IN THE KAUST SME SURVEY BY MINISTRY OF COMMERCE DESIGNATION



As the graph shows, more than 50 percent of participants are sole proprietorships. This finding is in line with the SME ecosystem, where most of

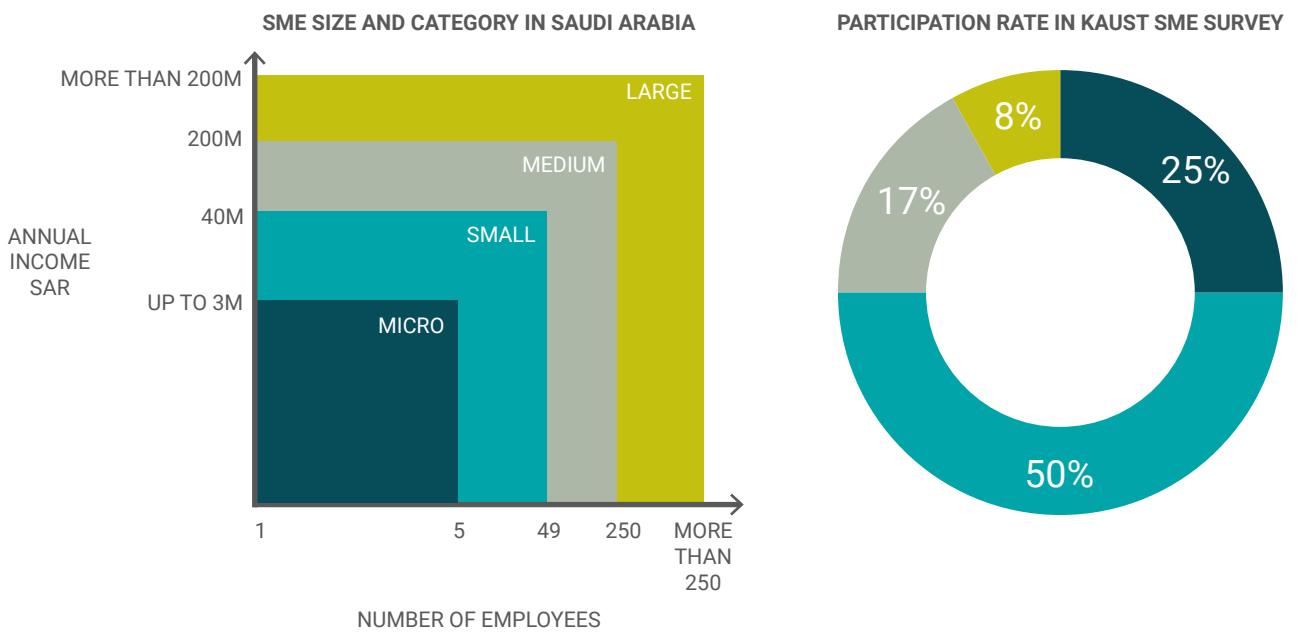
these companies have one owner providing a limited number of products or services.



SMEs in Saudi Arabia are categorized by number of employees or annual revenue, as shown in Figure 6. To determine the size of each company participating, the survey asked for number of employees. In total, 50 percent of the companies participating in the survey were small, followed by

micro and medium-sized businesses. A correlation exists between company type and company size for SMEs participating in the survey, with most of the small companies being sole proprietorships—the Ministry of Commerce’s “Establishment” designation.

**FIGURE 6**  
SME SIZE, CATEGORY, AND SURVEY PARTICIPATION RATE

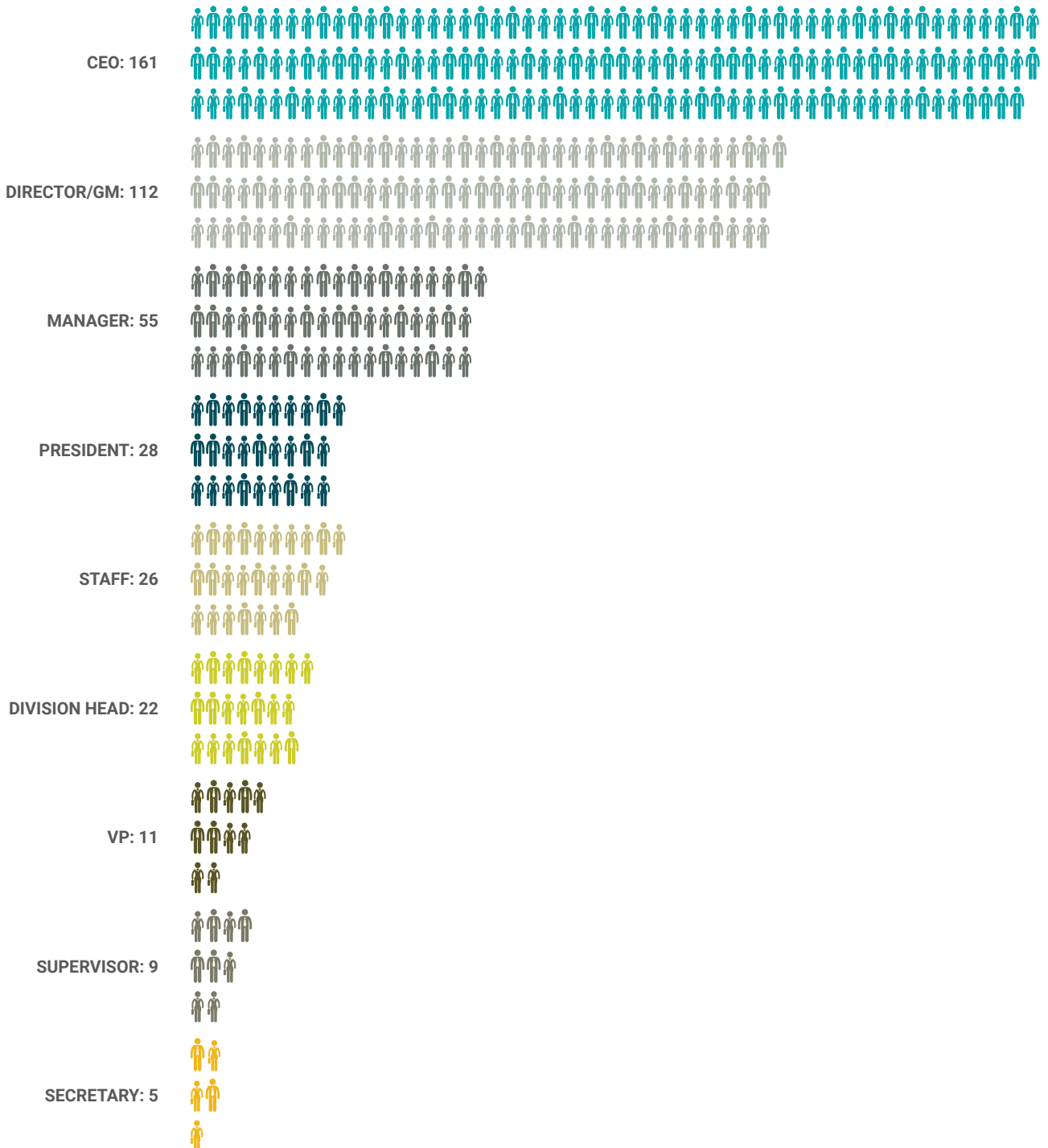




With respect to the person completing the survey, as Figure 7 shows, more than 356 respondents were in senior leadership positions, an indication of the

data validity and correctness. The direct involvement of decision makers adds considerable value to the survey findings.

**FIGURE 7**  
ROLE OR POSITION OF THE PERSON COMPLETING THE SURVEY

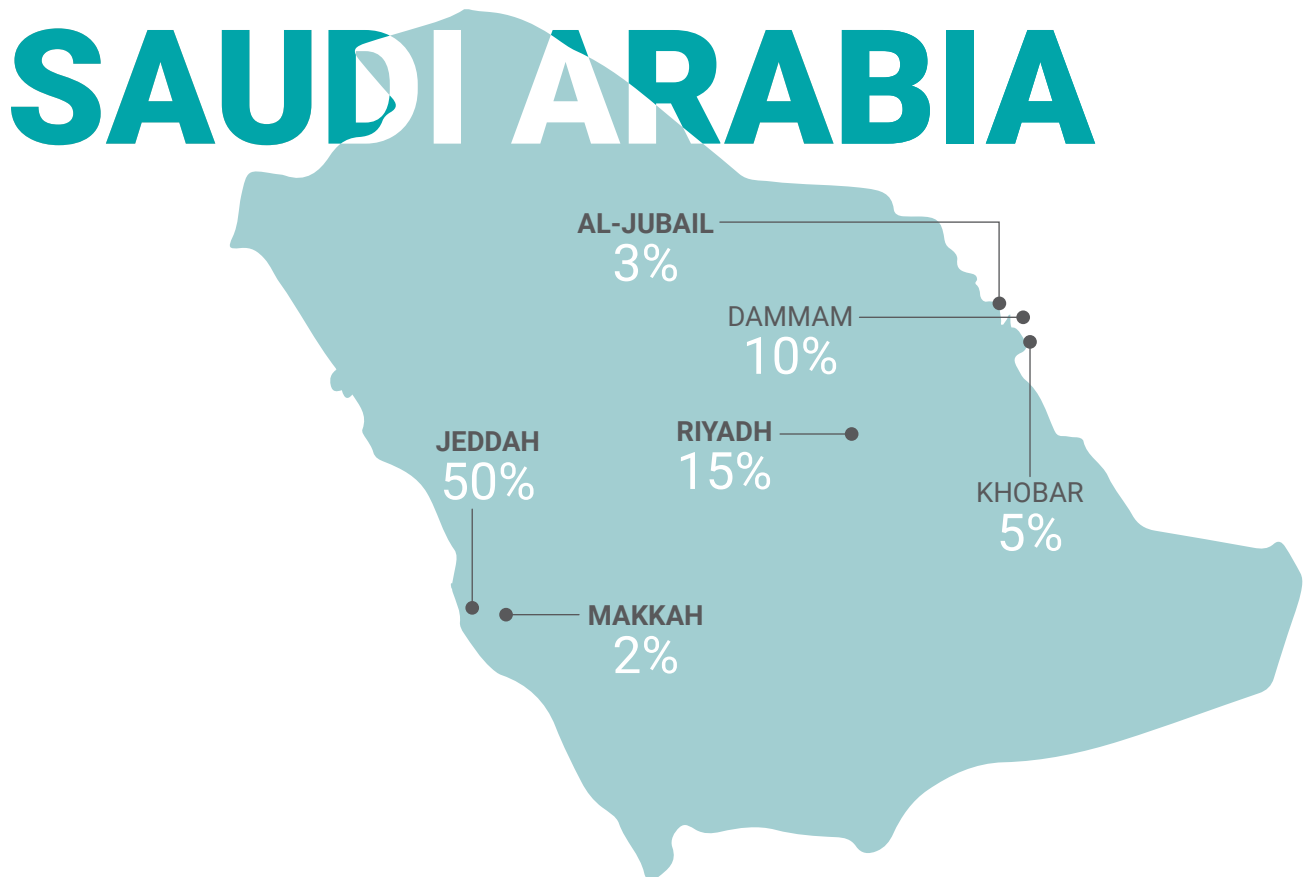




Finally, Figure 8 shows the geographical location for each SME participant in the survey.

As the graph shows, 50 percent of participant companies are based in Jeddah, followed by Riyadh and Dammam.

**FIGURE 8**  
LOCATION OF PARTICIPATING SMES' HEADQUARTERS

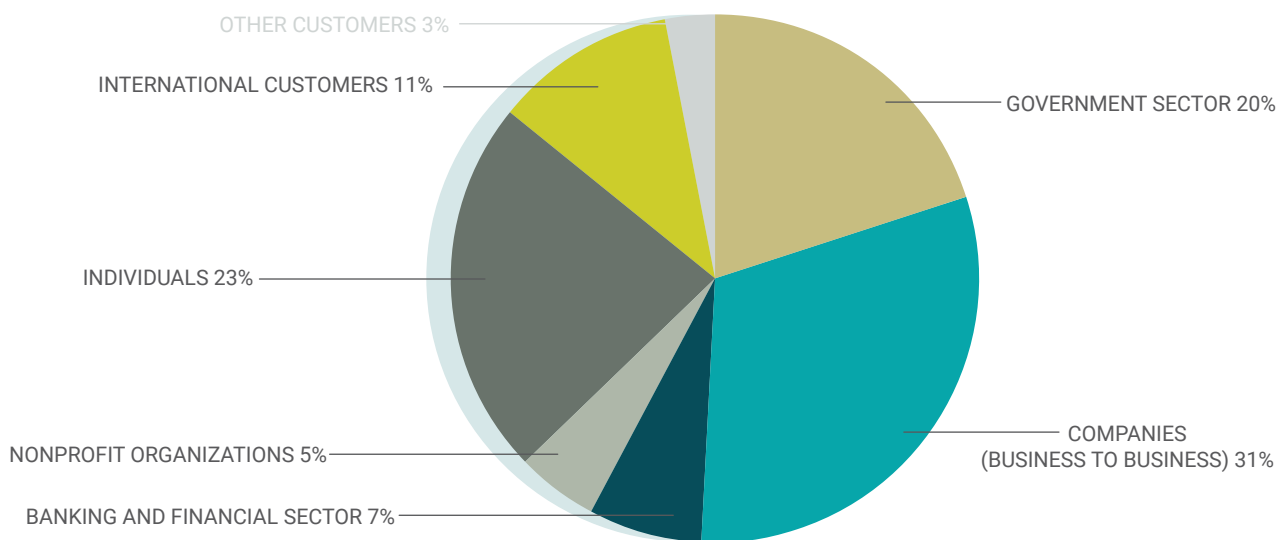




With respect to the primary customers of these SMEs, the data indicated that 31 percent come from the B2B market segment, followed by the B2C and government segments (Figure 9). As an objective of the KAUST SME Survey was to identify the SMEs

that can support startups in KAUST, the results are in line with the team's strategy to create a pipeline for our startups and SMEs. To support this objective, question 1.4 asked about the primary products and services the participating SMEs provide.

**FIGURE 9**  
PRIMARY CUSTOMERS OF SMES PARTICIPATING IN THE SURVEY





## RESEARCH AND DEVELOPMENT

**The objective of the survey’s R&D section was to help the team understand how the SME sector engages in R&D and, where there is interest in R&D, what the area of R&D interest is.**

The SME sector in many economies does not consume R&D services. SMEs are profit driven: They operate in a faster economy and look for quick results. R&D requires a slower pace, and results and commercialization may take considerable time. This finding is in line with the response to question 2.1: “Has your company engaged with academic institutions in Saudi Arabia or internationally?”

- No: 72 percent
- Yes: 28 percent

Despite only 28 percent of SMEs working with universities, the amount of that work that is for R&D is unclear. For example, R&D efforts could be the result of partnerships or project-based collaboration. It is also possible that the definition or level of R&D may not be clear in the survey questions. For example, question 2.2 asked, “How does the company conduct research and development activities?” The responses indicated that 28 percent of SMEs do not conduct R&D, and 72 percent of

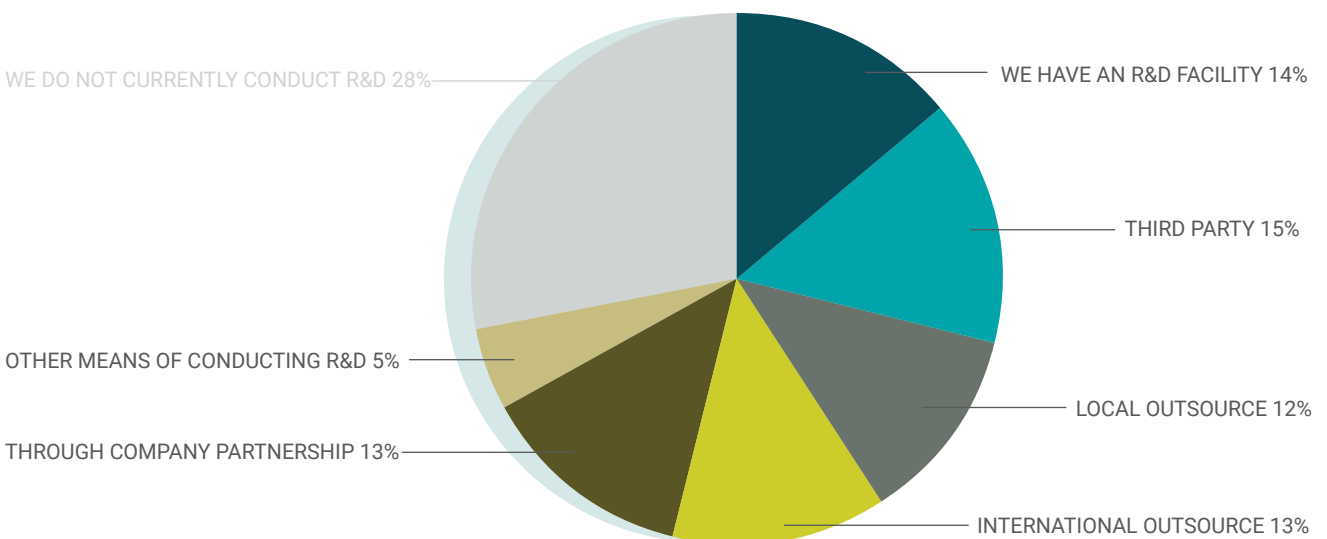
SMEs selected at least one method of conducting R&D (Figure 10)—a good indication that SMEs are engaged in some type of R&D activity.

**The SME sector in many economies does not consume R&D services. SMEs are profit driven: They operate in a faster economy and look for quick results. R&D requires a slower pace, and results and commercialization may take considerable time.**

**Question 2.2 Free-Text Responses.** One interesting response the team received in the free-text space for the **Other (Specify)** option for this question is, “We don’t have R&D centers and that is part of the problem.” This comment indicated two things: first, that SMEs may not be fully aware of R&D capabilities in the Kingdom, and second, that this challenge may not affect this one company but many other SMEs, as well. Other comments linked R&D to funding shortages, even if the SME wanted to engage in R&D. One company responded, “It’s more engineering and product development than pure R&D,” indicating that R&D for some SMEs means product development rather than laboratory-based research.

**FIGURE 10**

RESPONSES TO QUESTION 2.2: HOW DOES THE COMPANY CONDUCT RESEARCH AND DEVELOPMENT ACTIVITIES?

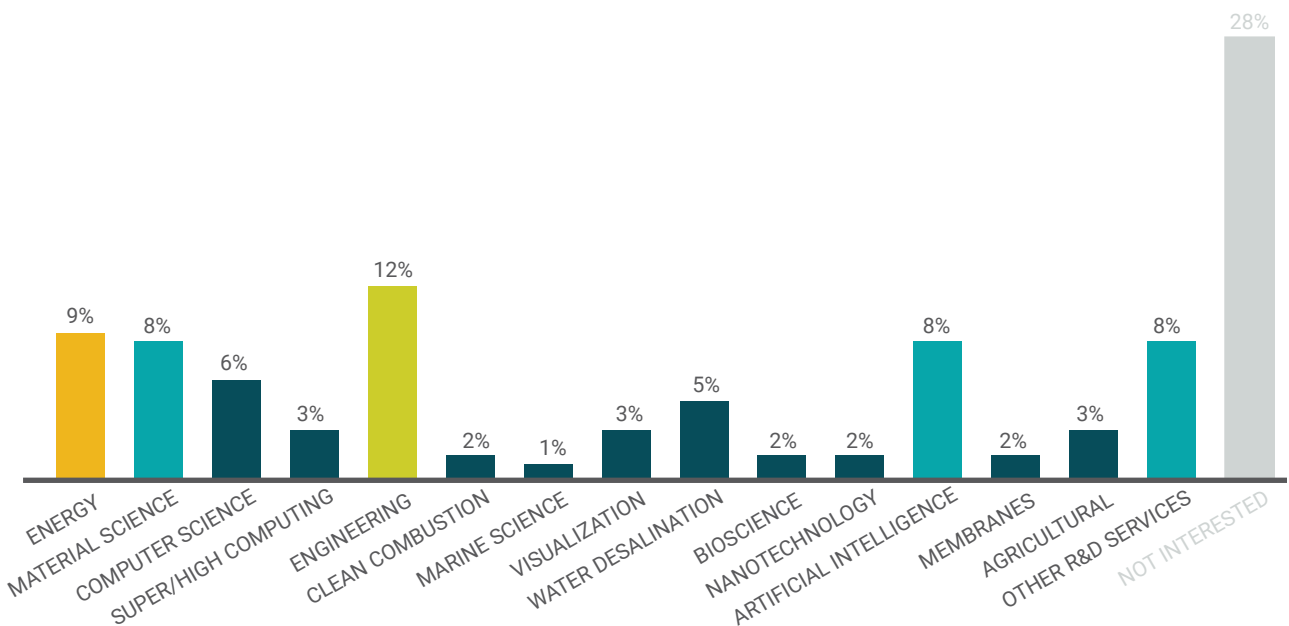




With respect to question 2.3—“Is the company interested in any of the following research and development services?”—although a third of the responses were negative, at least 72 percent of SMEs selected one area of R&D in which they

wanted to engage. Engineering led the list at 12 percent, followed by energy at 9 percent and material science, AI, and other R&D services at 8 percent each (Figure 11).

**FIGURE 11**  
RESPONSES TO QUESTION 2.3: IS THE COMPANY INTERESTED IN ANY OF THE FOLLOWING RESEARCH AND DEVELOPMENT SERVICES?



The responses to questions 2.2 and 2.3 indicated that SMEs have an interest in R&D. In fact, some SMEs indicated more than one R&D service. In general, R&D is not the primary means of developing new products among SMEs, compared with large enterprises.

**Question 2.3 Free-Text Responses.** In the free-text space for the **Other R&D Services (Specify)** option for this question, a few SMEs indicated different areas of R&D, such as dealing with food containers and how the company can improve food packaging. Other SMEs were interested in glass, portable electronic safety, and vivarium-related R&D.

Interest in R&D related to building sustainability and building materials was repeated in the free-text area, as well. At least one participant wanted to pursue acoustics-related R&D, stating, “Voice research services, acoustic performance laboratories, waves and vibration as well as advanced electronic performance for sound devices, voice systems and acoustic waves.” Light-emitting diode (LED) technologies and lighting is another area mentioned in this free-text space. Finally, one SME wanted to pursue R&D in an area related to seismic field operation and technology, geophysical data, and reservoir characterization.



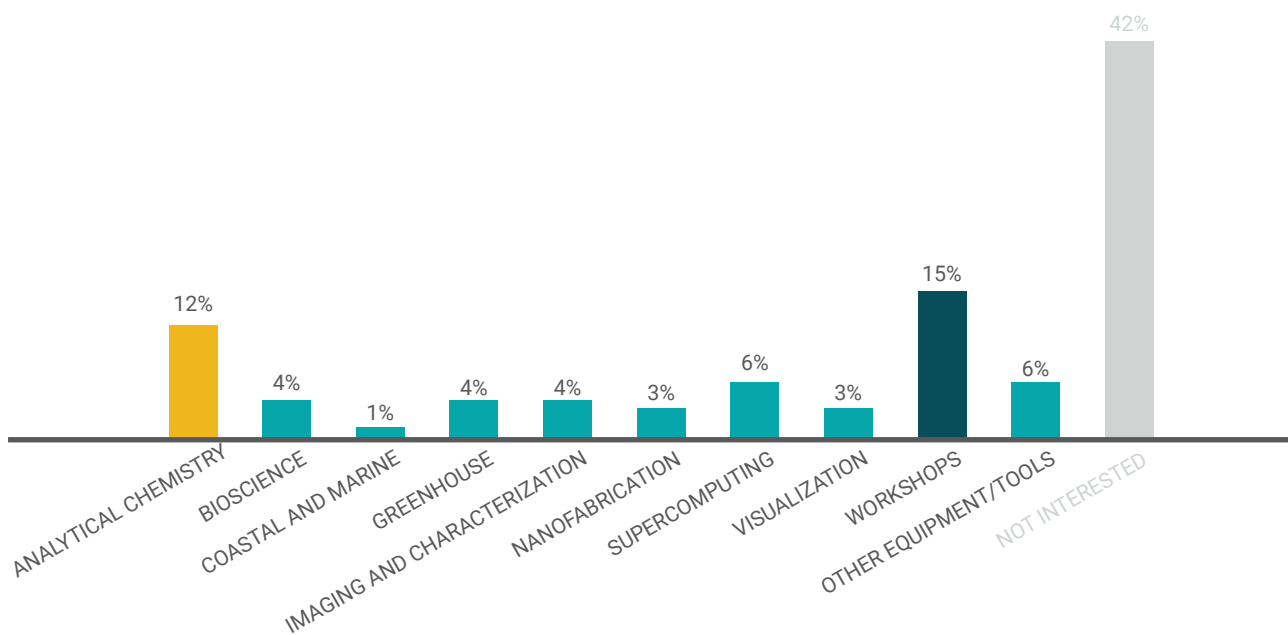


With respect to SMEs pursuing advances in equipment and tools, responses to question 2.4, "Is the company interested in accessing/using advanced laboratory equipment or tools?" more than 58 percent selected at least one type of advanced equipment or tool to which they wanted access. The

survey did not provide a full description of the listed equipment and tools in the question, but 12 percent selected analytical chemistry, and 15 percent selected equipment and tools related to workshops (Figure 12). This question was based on services provided in KAUST Core Labs.

**FIGURE 12**

RESPONSES TO QUESTION 2.4: IS THE COMPANY INTERESTED IN ACCESSING/USING ADVANCED LABORATORY EQUIPMENT OR TOOLS?



**Question 2.4 Free-Text Responses.** In the free-text space for the **Other Equipment/Tools (Specify)** option for this question, multiple SMEs were interested in advanced fire-related equipment, including fire and heat protection, safety, and fire-related coating. Other equipment related to molecular genetics; mining; and even IT, such as cybersecurity, was mentioned in this space.

The conclusion drawn from the responses in the R&D part of the survey indicated that SMEs are not the usual consumer of R&D services. What R&D means for large enterprises is product development or engineering for the majority of SMEs. However, the responses in this section also indicated that some SMEs are interested in engaging in R&D-related activities. The same applies for accessing advanced R&D equipment and tools: Unlike their large enterprise counterparts, not all SMEs can afford to purchase such equipment and tools.



## COMPANY'S NEEDS AND CHALLENGES

**This section of the survey offered participants an opportunity to share their company's technical challenges and whether they would like to partner with KAUST to address them. It is the most important part of the survey. As a follow-up action, the team will use data from these responses to contact SMEs that want to partner with KAUST to address challenges.**

Starting with question 3.1, "What are the company's current technical challenges?" Figure 13 shows that 72 percent of the responses indicated lack of technical expertise/resources, lack of specialized tools/equipment, and lack of technical knowledge/know-how. Lack of technical expertise is related to lack of know-how; if we combine these responses, then 45 percent of the participants have a common challenge. This result is alarming and brought to the team's attention an important factor about resources limiting SME capabilities and an opportunity to close a performance gap.

Lack of specialized tools/equipment is in line with question 2.4, with both results indicating that SMEs do not have access to appropriate tools/equipment.

**72 percent of the responses indicated lack of technical expertise/resources, lack of specialized tools/equipment, and lack of technical knowledge/know-how.**

**Question 3.1 Free-Text Responses.** In the free-text space for the **Other Technical Challenges (Specify)** option for this question, respondents indicated other challenges that were not necessarily technical (e.g., more than one SME referred to recent government regulations). However, 22 percent of respondents identified lack of advanced training as a challenge (Figure 13); if KAUST can provide appropriate specialized training, that training can address at least 45 percent of the challenges respondents to this question identified.

### FIGURE 13

RESPONSES TO QUESTION 3.1: WHAT ARE THE COMPANY'S CURRENT TECHNICAL CHALLENGES?



**29%**

LACK OF TECHNICAL EXPERTISE/RESOURCES



**22%**

LACK OF SPECIALIZED TOOLS/EEQUIPMENT



**16%**

LACK OF KNOWLEDGE/KNOW-HOW



**5%**

OTHER TECHNICAL CHALLENGES



**28%**

THE COMPANY CURRENTLY DOES NOT HAVE TECHNICAL CHALLENGES



To understand whether R&D can address the challenges indicated, the survey asked question 3.2: "Will access to research and development help the company overcome their technical challenges?"

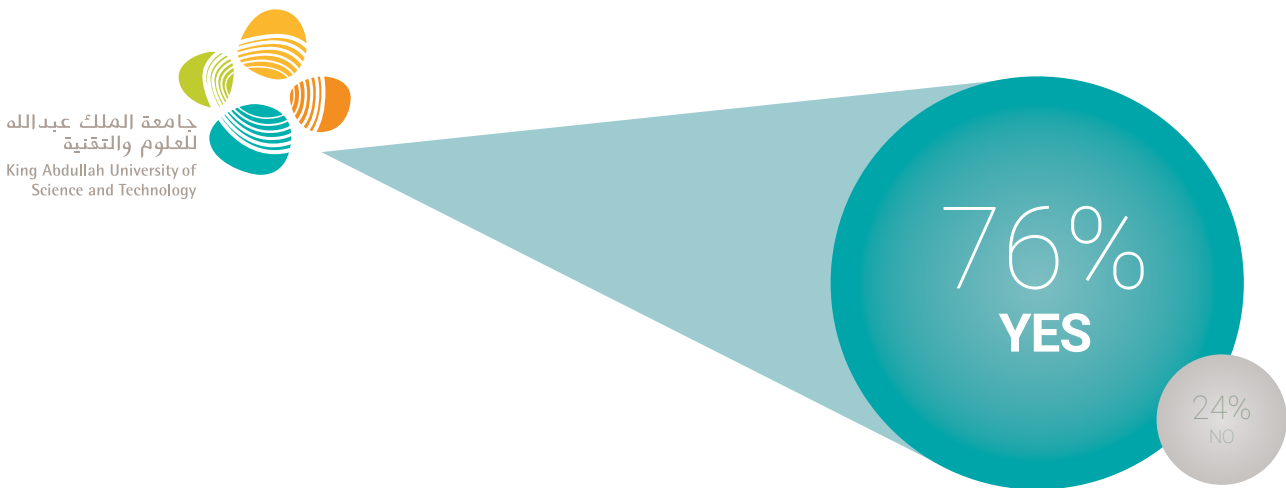
- Yes: 44 percent
- No: 56 percent

In total, 44 percent of participants said that R&D can address their challenges; however, the team is not sure this is the case. Linking this question to question 3.1, the team's understanding is that participants may be referring to R&D as expertise and know-how. This matter requires further investigation to understand whether the challenges related to lack of expertise and lack of know-how are related to problems that can be solved only in the laboratory environment or by scientists. In contrast, 56 percent of respondents said no. This response probably makes more sense because few SME challenges are related to R&D.

With respect to question 3.3, "Are you interested in collaborating with KAUST to address your company's technical challenges?" Figure 14 shows that 76 percent of SMEs are interested—an important finding. Looking at KAUST as part of the solution is an indication of KAUST's capabilities and popularity in the Kingdom's SME community. A separate section of this report will discuss how KAUST will use these data and extend its services to the Kingdom's SME sector. The 76 percent positive responses represent 357 companies participating in the survey; whether KAUST can address every technical challenge will depend on the nature and type of each SME's challenge. The way forward will become clear when the team meets with these companies and gathers details about their challenges.

**FIGURE 14**

RESPONSES TO QUESTION 3.3: ARE YOU INTERESTED IN COLLABORATING WITH KAUST TO ADDRESS YOUR COMPANY'S TECHNICAL CHALLENGES?



SMEs' responses to these three questions highlight their intention to resolve their technical challenges; however, it is not yet clear whether R&D can address them. Lack of expertise and know-how is the biggest challenge the Kingdom's SME sector faces. The fact that SMEs want to share their challenges with

KAUST shows willingness to collaborate and form partnerships. It is an opportunity for KAUST and other R&D institutes in the Kingdom to work closely with the SME community to address challenges and minimize the technical gap.



## INNOVATION AND ECONOMIC DEVELOPMENT

**The responses to this section of the survey helped the team understand whether the participants' SMEs foster an innovation mindset. The team wanted to learn whether the Kingdom's SME sector looks into the various aspects of economic development and whether SMEs want to expand into new products and services based on innovation and new technologies. The section's seven questions do not cover everything related to innovation and economic development.**

Starting with responses to question 4.1, "Who is responsible for innovation in your company?" Figure 15 shows that in 35 percent of participants' companies, no one is responsible for innovation. However, 41 percent of the SMEs have a dedicated team, staff member, or department that handles innovation initiatives in the company. In addition, 24 percent of respondents seek different methods to address innovation, through either third parties

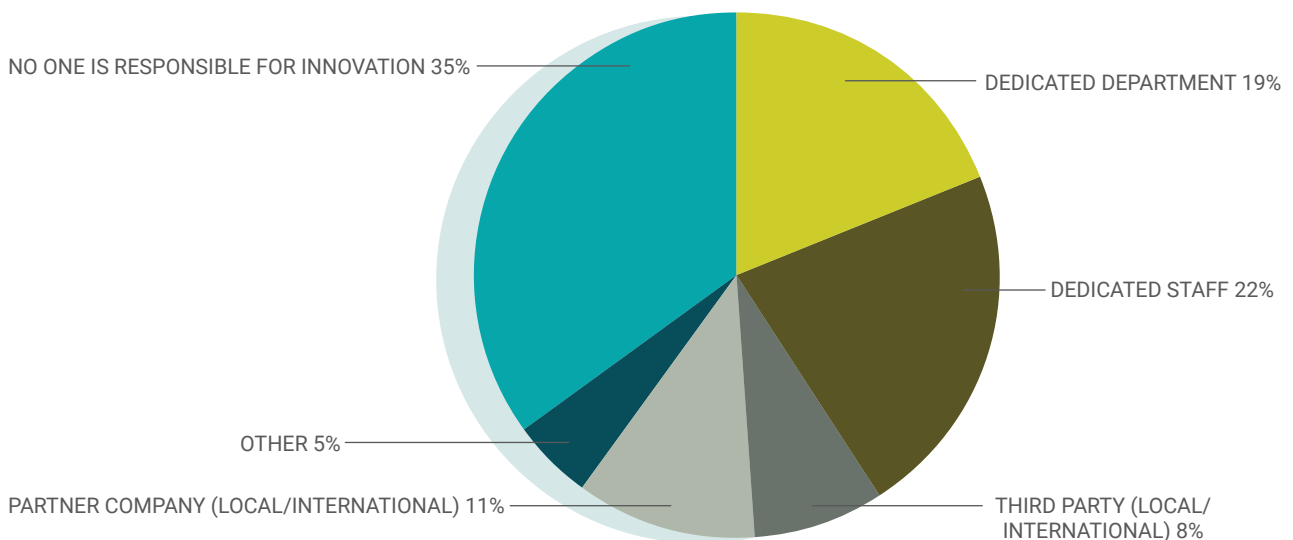
or partners. Some respondents selected more than one option for handling innovation. The team assumed that the participants understood what the survey meant by innovation—hence, the diversity of the responses.

**In 35 percent of participants' companies, no one is responsible for innovation.**

**Question 4.1 Free-Text Responses.** Responses in the free-text space for the **Other (Specify)** option for this question indicated that innovation is the responsibility of the SME's owner or the chief executive officer. This finding is interesting because many think that innovative ideas should come from the top. This understanding is not limited to the SME sector, either: Many family businesses think that the owner or the family is responsible for coming up with new ideas. This model is no longer valid, and innovation initiatives should come from all levels of the business.

### FIGURE 15

RESPONSES TO QUESTION 4.1: WHO IS RESPONSIBLE FOR INNOVATION IN YOUR COMPANY?





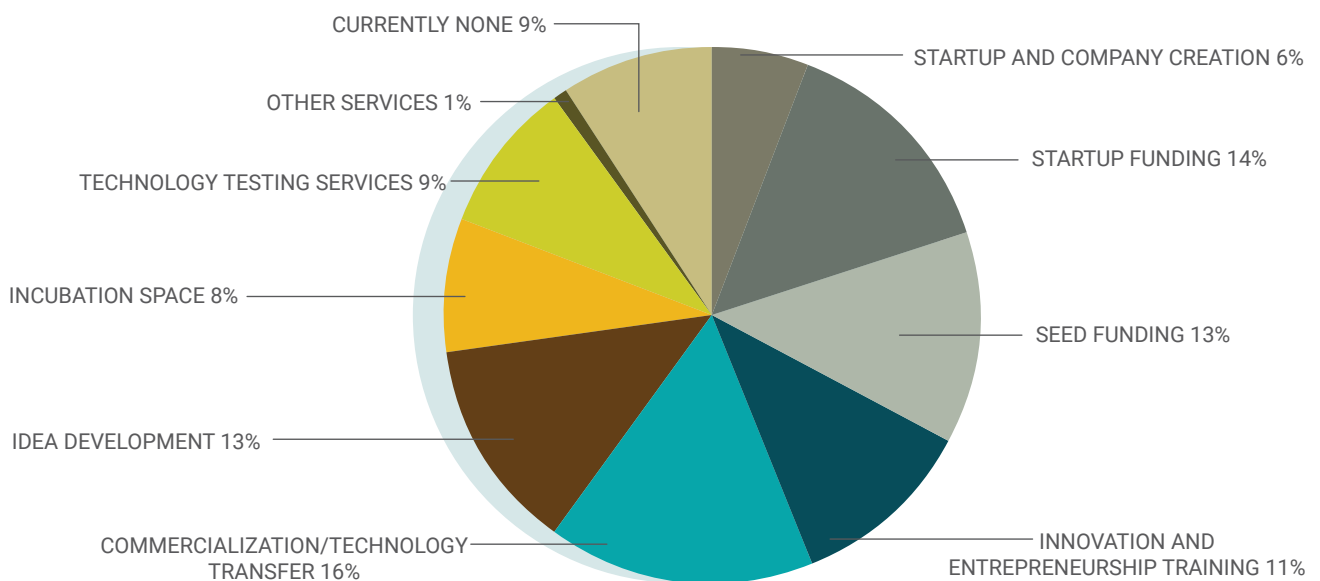
In question 4.2, “What kind of innovation and entrepreneurship services would your company be interested in?” the responses showed that 81 percent of participating SMEs selected at least one innovation and entrepreneurship service, with **Commercialization/Technology Transfer** being the most commonly chosen option at 16 percent. This result may indicate that SMEs struggle to commercialize new ideas and so look to commercialization and technology transfer as a service they require. Taking new products and services to market requires marketing specialists, which some SMEs may not be able to afford.

**81 percent of participating SMEs selected at least one innovation and entrepreneurship service, with Commercialization/Technology Transfer being the most commonly chosen option at 16 percent.**

The variety of responses indicated that the Kingdom’s SME community needs innovation and entrepreneurship services, starting with idea development, company creation, training, incubation, and funding—all typical services for innovation and entrepreneurship. Funding in particular was a major issue for SMEs, with 27 percent looking for either startup or seed funding.

**Question 4.2 Free-Text Responses.** In the free-text space for the **Other Services (Specify)** option for this question, one interesting response was, “Facilitating a common center to address all startup logistics issues for the startups to focus on conducting their businesses” (Figure 16). This is indeed an excellent idea for KAUST to develop a centralized service center that startups and SMEs can use as a hub for services and information. In addition, some SMEs indicated marketing as a requirement.

**FIGURE 16**  
RESPONSES TO QUESTION 4.2: WHAT KIND OF INNOVATION AND ENTREPRENEURSHIP SERVICES WOULD YOUR COMPANY BE INTERESTED IN?





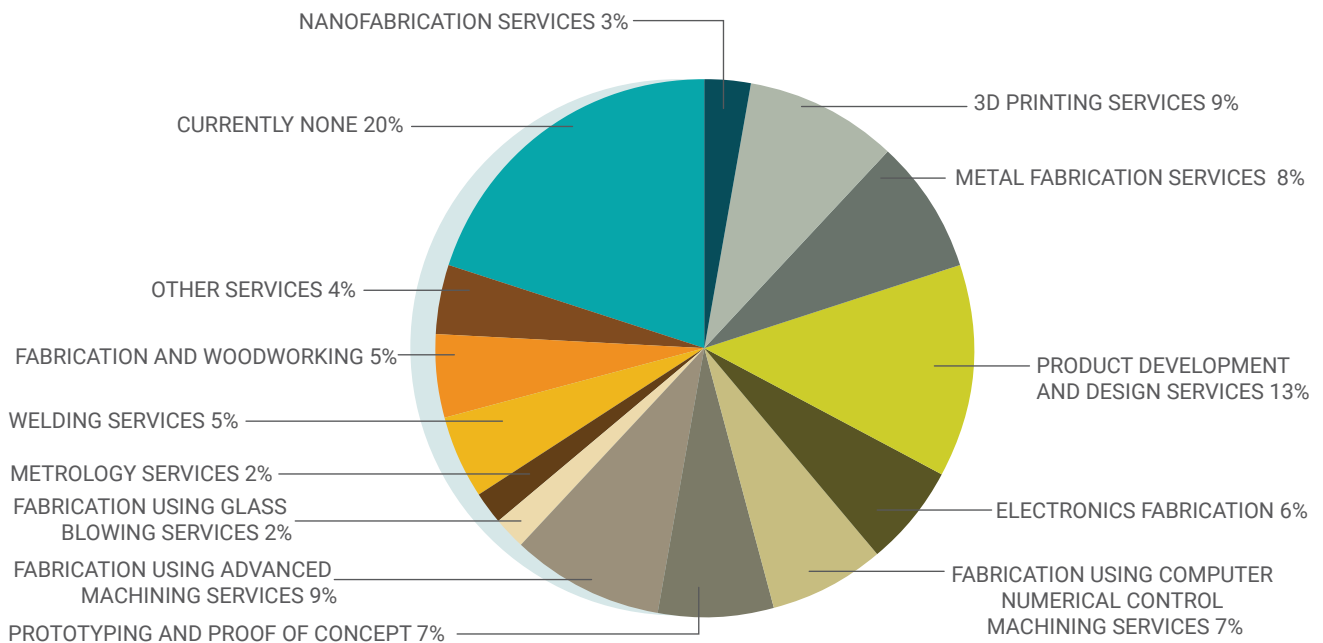
The survey team believes that the majority of SMEs may not have access to fabrication services to design and develop new products. The responses to question 4.3, "Which of the following design, prototype, and/or fabrication services does your company require?" indicated that 80 percent of respondents selected at least one type of design, prototype, or fabrication service. **Product Development and Design Services** was the most commonly chosen option at 13 percent. Review of the responses will indicate the variety of services the Kingdom's SME sector requires. The responses to this question are in line with the 13 percent response rate for **Idea Development** in question 4.2. Any new idea going through the realization process will

require the full product development life cycle, from idea to full realization and development.

**Question 4.3 Free-Text Responses.** In the free-text space for the **Other Services (Specify)** option for this question, 4 percent suggested other types of design, prototype, or fabrication services (Figure 17). Some of the services requested were unique, such as testing chemical reactions and petroleum products. Other respondents were looking for software platforms on which to test AI-related software. At least one respondent's company wanted to design and prototype elevators.

**FIGURE 17**

RESPONSES TO QUESTION 4.3: WHICH OF THE FOLLOWING DESIGN, PROTOTYPE, AND/OR FABRICATION SERVICES DOES YOUR COMPANY REQUIRE?



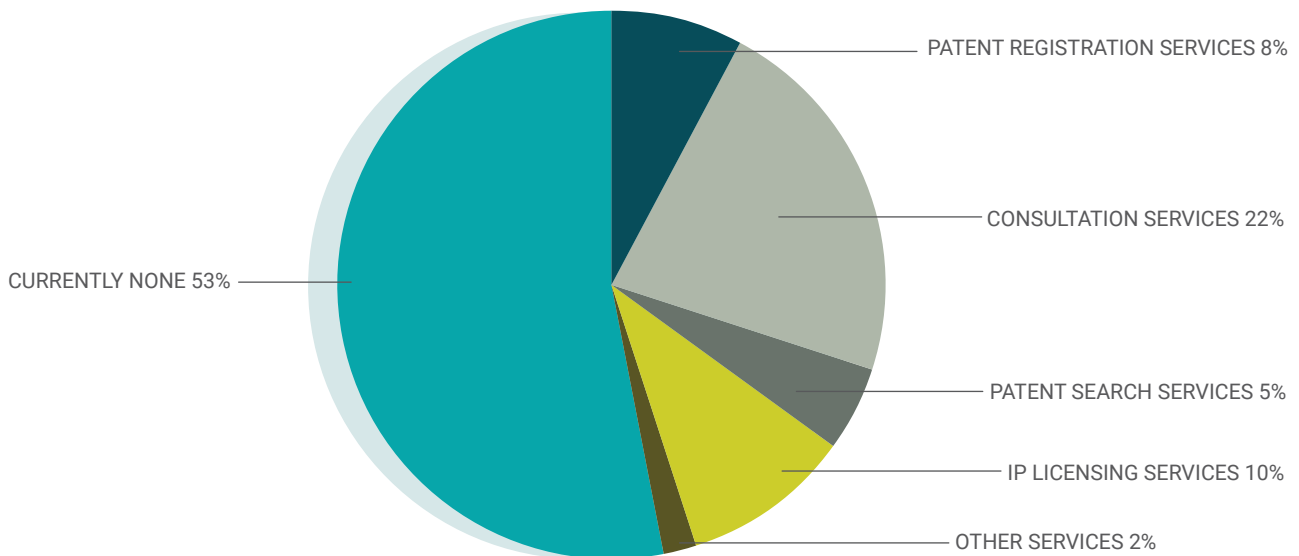


**Intellectual Property.** Questions 4.4 and 4.5 relate to IP. The team wanted to understand SMEs' IP capabilities and whether they require services related to IP. KAUST I&ED does provide IP services to the KAUST research community and staff, but knowing what the Kingdom's SME community requires in this area will indicate where KAUST should focus to better design IP-related programs in the future. When asked if the respondent's company had registered IP under the company's name, the responses were as follows:

- Yes: 7 percent
- No: 93 percent

This finding indicates that the Kingdom's SME ecosystem is not based on IP, or at least that IP is not SMEs' focus or that the SMEs' products or services are not based on proprietary technologies.<sup>4</sup> In addition, the cost associated with IP registration is high, and not all SMEs can afford it. The responses to question 4.5, "Does your company require any of the following intellectual property services?" are in line with the responses to question 4.4, "Does your company own any intellectual property (e.g., patents)?" with 53 percent of respondents indicating that they are not interested in IP-related services (Figure 18).

**FIGURE 18**  
RESPONSES TO QUESTION 4.5: DOES YOUR COMPANY REQUIRE ANY OF THE FOLLOWING INTELLECTUAL PROPERTY SERVICES?



<sup>4</sup> Technologies based on research and development and intellectual property, mainly developed in laboratories and supported with scientific publications.



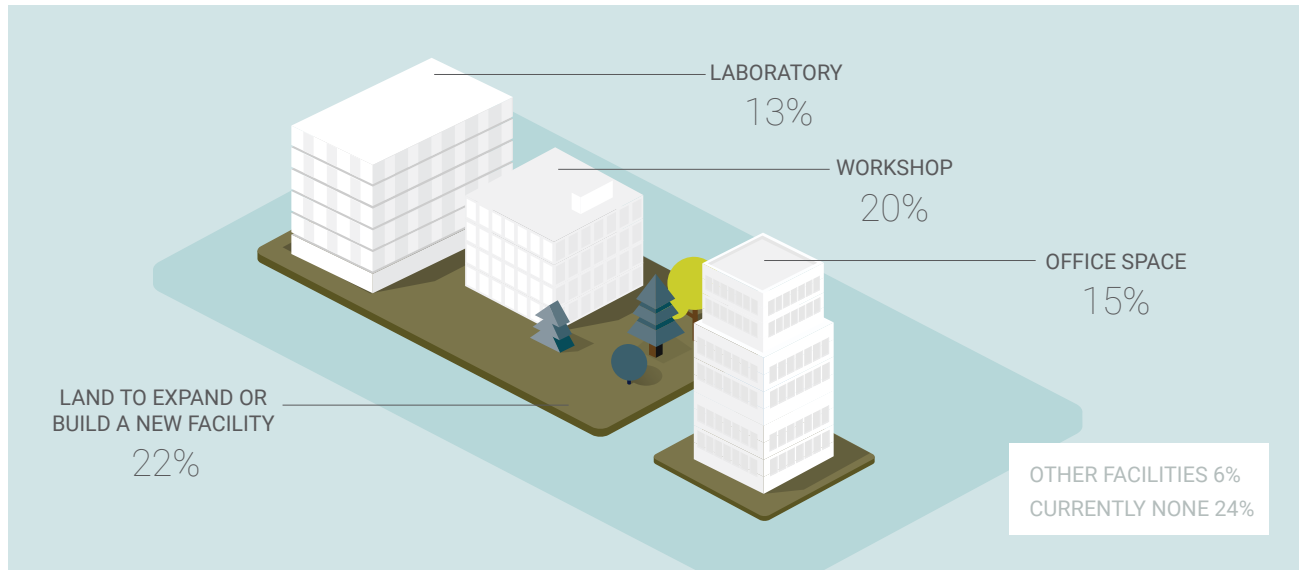
Facilities are major enablers of any business, which led to question 4.6, "What kinds of facilities would help your company expand its existing business or establish new operations?" Although 24 percent of respondents stated that they do not need facilities, 76 percent selected at least one type of facility, and 22 percent were looking for land to expand and build new facilities. Most universities in the Kingdom developed technology parks near their campus to help startups and existing enterprises establish themselves. KAUST I&ED, through the research and technology park, provides different types of facilities; currently, the park is a destination for many companies locally and globally.

**Although 24 percent of respondents stated that they do not need facilities, 76 percent selected at least one type of facility, and 22 percent were looking for land to expand and build new facilities.**

**Question 4.6 Free-Text Responses.** In the free-text space for the **Other Facilities (Specify)** option for this question, several respondents indicated warehouse space. Warehouses are indeed important facilities, and not all SMEs can afford them. Training centers are another facility respondents mentioned so that their company could conduct training and seminars (Figure 19).

### FIGURE 19

RESPONSES TO QUESTION 4.6: WHAT KINDS OF FACILITIES WOULD HELP YOUR COMPANY EXPAND ITS EXISTING BUSINESS OR ESTABLISH NEW OPERATIONS?





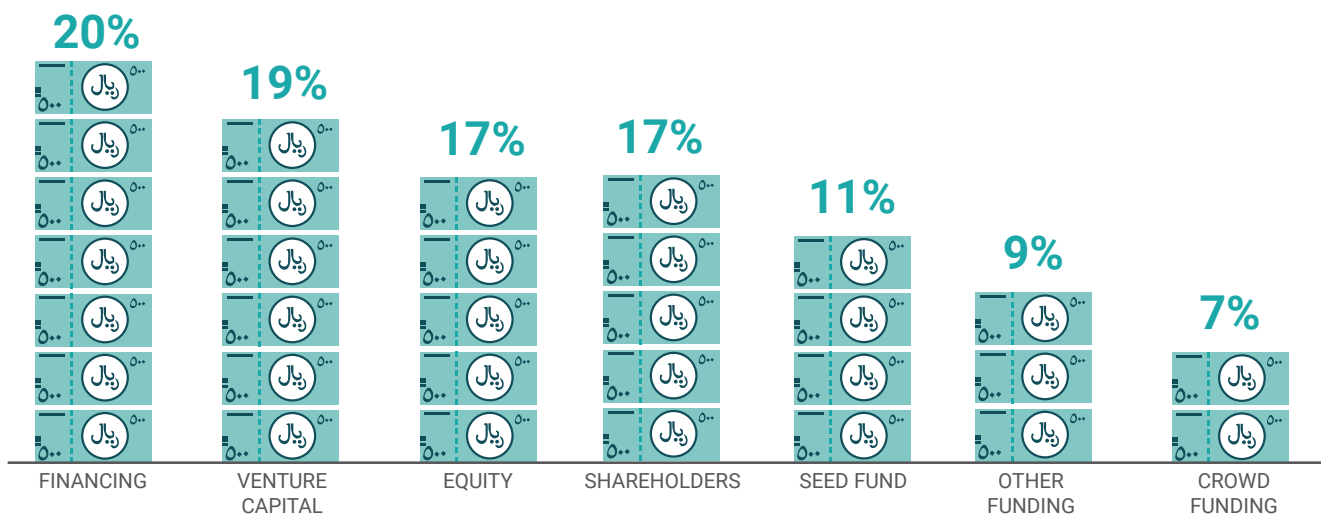


The last question in this section was related to funding. Responses to question 4.7, "How does your company fund new ideas or projects?" indicated that no one source of funding was dominant. However, 20 percent of respondents indicated that financing was imperative to funding new projects and ideas. At the same time, participants indicated that venture capital, equity, and shareholders made up a large portion of funding for new projects and ideas. Funding is clearly a major concern to the Kingdom's SMEs. Saudi Arabia has developed many funding sources for the SME sector, one of the most famous being Kafala, a bank-based funding source that is

designed for the Kingdom's SME community. With the Vision 2030 support to the SME sector in the Kingdom, more funding channels are within reach of the SME community in the Kingdom.

**Question 4.7 Free-Text Responses.** In the free-text space for the **Other Funding (Specify)** option for this question, respondents indicated sources such as international companies. The setup for such funding is unclear but is most likely based on shares in the SME. Personal savings is another option that respondents mentioned (Figure 20).

**FIGURE 20**  
RESPONSES TO QUESTION 4.7: HOW DOES YOUR COMPANY FUND NEW IDEAS OR PROJECTS?



This section of the survey highlighted requirements in the SME sector for innovation and economic development. The results show that the SME sector is looking for a range of services to support innovation and the development of new ideas. Commercialization and technology transfer was one highlight discovered through this survey. That funding was a major concern was not a surprise; however, understanding what the best sources of funding are will help KAUST design programs that can best provide that funding.

IP was a key area completely absent in the Kingdom's SME sector. The survey indicated

that 93 percent of SMEs neither have IP nor are interested in IP services. The reason behind this response is unclear; however, it is in line with the SME ecosystem being driven more by profit and fast turnover. Another reason for this response could be the cost of maintaining and registering IP.

Finally, respondents indicated a desire for design, prototype, and fabrication services, with 80 percent of respondents selecting at least one type of design, prototype, or fabrication service based on KAUST Core Lab services. The percentages among responses are similar, although product development was among the highest at 13 percent.



## PROFESSIONAL DEVELOPMENT AND TRAINING

This part of the survey was designed to help the team understand the training and professional development needs in the Kingdom's SME sector. It focused on three types of professional development: technical, emerging technologies, and innovation and entrepreneurship.

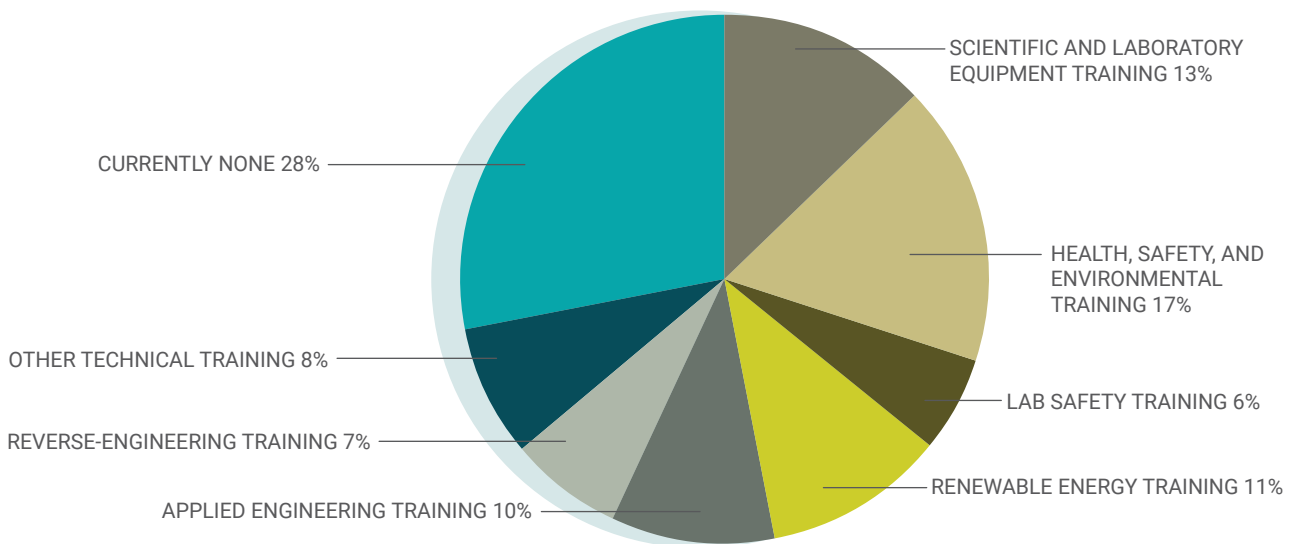
The responses showed an almost equal distribution of training and professional development, with HSE training being the most commonly selected option at 17 percent, followed by 13 percent for scientific and laboratory equipment training.

Starting with technical training requirements, question 5.1 asked, "What type of technical

professional development and training services is your company interested in?" The responses showed an almost equal distribution of training and professional development, with HSE training being the most commonly selected option at 17 percent, followed by 13 percent for scientific and laboratory equipment training. The responses may not represent the full skill gap in the SME sector, but from another KAUST survey distributed during the establishment of KAUST Academy, HSE was one of the most demanded skills. The results of this survey are in line with the KAUST Academy skill gap analysis. As Figure 21 shows, SMEs' demand for technical training is distributed almost equally across the training areas.

**FIGURE 21**

RESPONSES TO QUESTION 5.1: WHAT TYPE OF TECHNICAL PROFESSIONAL DEVELOPMENT AND TRAINING SERVICES IS YOUR COMPANY INTERESTED IN?



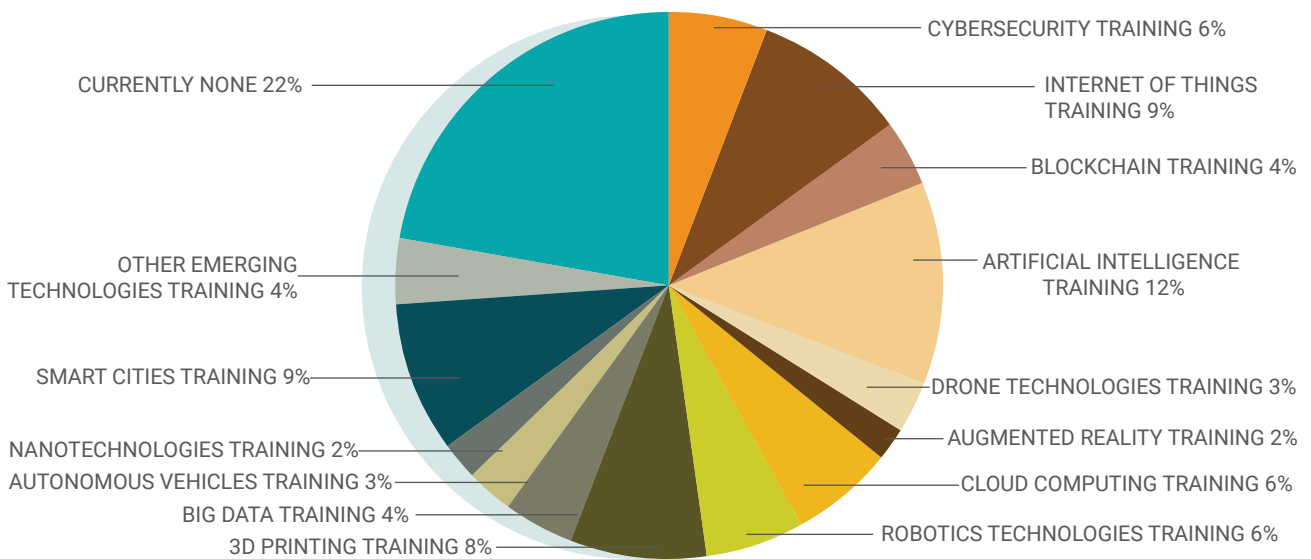


The survey also asked about emerging technologies, which the team identified as technologies that could dominate in the next 10 to 15 years and have a direct effect on enterprise development. Question 5.2, "What type of emerging technologies professional development and training services is your company interested in?" listed several emerging technologies that are expected to dominate most industries. The responses were almost equal in their distribution, but AI, the IoT, smart cities, and 3D printing were among the most commonly chosen, at 12 percent, 9 percent, 9 percent, and 8 percent, respectively.

Figure 22 indicates the wide distribution of emerging technology professional development and training services participants in the survey selected. Some respondents selected more than one emerging technology. The results indicated the training need within the SME sector and that SMEs want to be at the leading edge, using the latest developments in these technologies.

### FIGURE 22

RESPONSES TO QUESTION 5.2: WHAT TYPE OF EMERGING TECHNOLOGIES PROFESSIONAL DEVELOPMENT AND TRAINING SERVICES IS YOUR COMPANY INTERESTED IN?



**Question 5.2 Free-Text Responses.** In the free-text space for the **Other Emerging Technologies Training (Specify)** option for this question, participants listed application development, renewable energy, emission footprint reduction,

LED technologies, 7D gaming, and fiber optics. All these areas are as important as the options listed for the question. Many of these technologies are transforming the way companies do business and bringing new platforms online for enterprises.



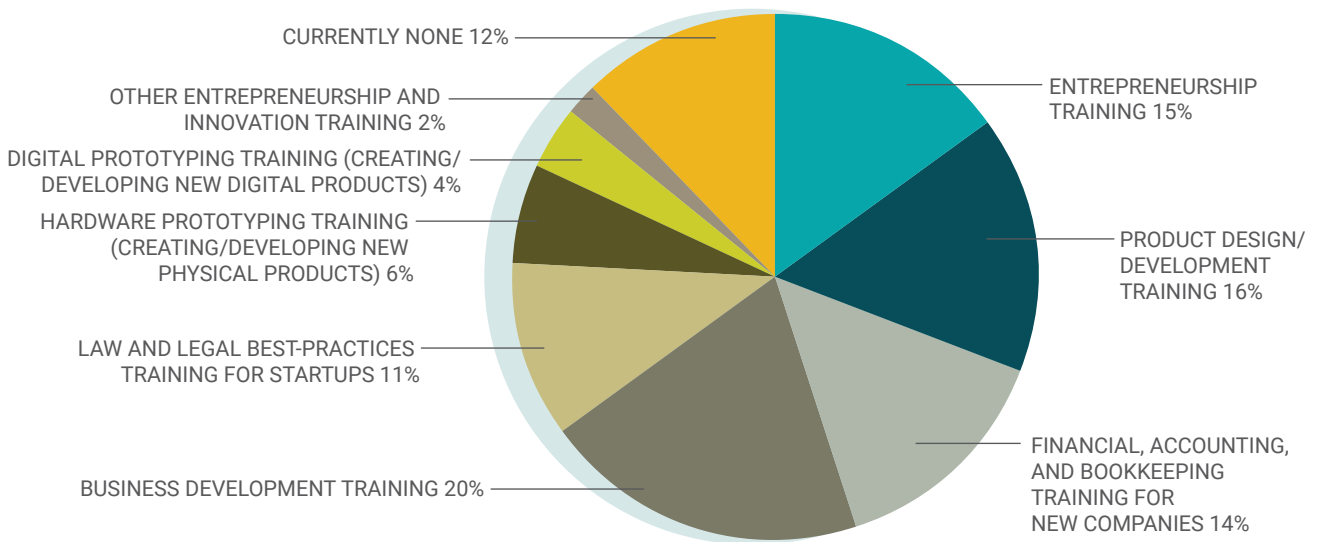
**Question 5.3.** The last question in this section asked, "What type of entrepreneurship and innovation training services is your company interested in?" Figure 23 shows the distribution of responses, with the three most sought-after training areas being business development at 20 percent, product design and development at 16 percent, and entrepreneurship at 15 percent. Linking this question with the innovation and economic development section of the survey shows the similarities in responses. For example, question 4.2 identifies innovation and entrepreneurship at 11 percent; in question 5.3, it

was highlighted at 15 percent. So, it is not a reach to realize the demand for this type of training.

Similarly, 13 percent of respondents to question 4.3 sought product development and design services, while in question 5.3, 16 percent of respondents indicated an interest in product design and development training. This correlational indicates a strong demand for such training and services in the Kingdom's SME sector. Knowing what this sector requires will help KAUST develop programs and initiatives to close the knowledge gap and increase economic opportunity.

**FIGURE 23**

RESPONSES TO QUESTION 5.3: WHAT TYPE OF ENTREPRENEURSHIP AND INNOVATION TRAINING SERVICES IS YOUR COMPANY INTERESTED IN?



**Question 5.3 Free-Text Responses.** In the free-text space for the **Other Entrepreneurship and Innovation Training (Specify)** option for this question, respondents indicated marketing skills, such as understanding how to read the market and introduce new products to the market. This response strongly relates to innovation and entrepreneurship.

Professional development and training are major game changers. Looking back to Section 2 of the survey on challenges and needs, the lack of resources, expertise, and know-how participants

expressed can be addressed through professional development and training. Responses in this section align with responses in the rest of the survey.

Many other types of training exist that the team did not include in the survey. However, the options included covered a range of skills that the market and the SME sector in particular are demanding. The top three areas of training SMEs requested based on the survey results are in scientific and laboratory equipment, AI, and business development, representing technical, emerging technologies, and innovation and entrepreneurship, respectively.



# CONCLUSION

## **SMEs are profit driven and may not be able to sustain the longer pace large enterprises can to engage in R&D.**

SMEs are major drivers of any economy. The government of Saudi Arabia continues to support this sector through Monsha'at and other, related governmental organizations. The data from the KAUST SME Survey is helping KAUST understand some of the requirements of this sector. Comparing the total number of SMEs in the Kingdom with the number of survey participants, the responses may not reflect the full picture or represent all SMEs in the Kingdom, but the data this survey gathered will enable KAUST to discover how we can help and support this sector. Contribution to the Kingdom's GDP is one of the Vision 2030 mandates: This can happen only if we all work together, governmental and nongovernmental organizations alike, to support the Kingdom's SMEs.



The three main outcomes of the KAUST SME Survey are identifying opportunity gaps related to SME participation in R&D, innovation services, and professional development. Based on the data analysis and the correlation between responses, these three outcomes constitute the main finding of the survey. Limitations in these three areas create an opportunity for KAUST to help close the gap and develop programs that can help the SME sector in Saudi Arabia.

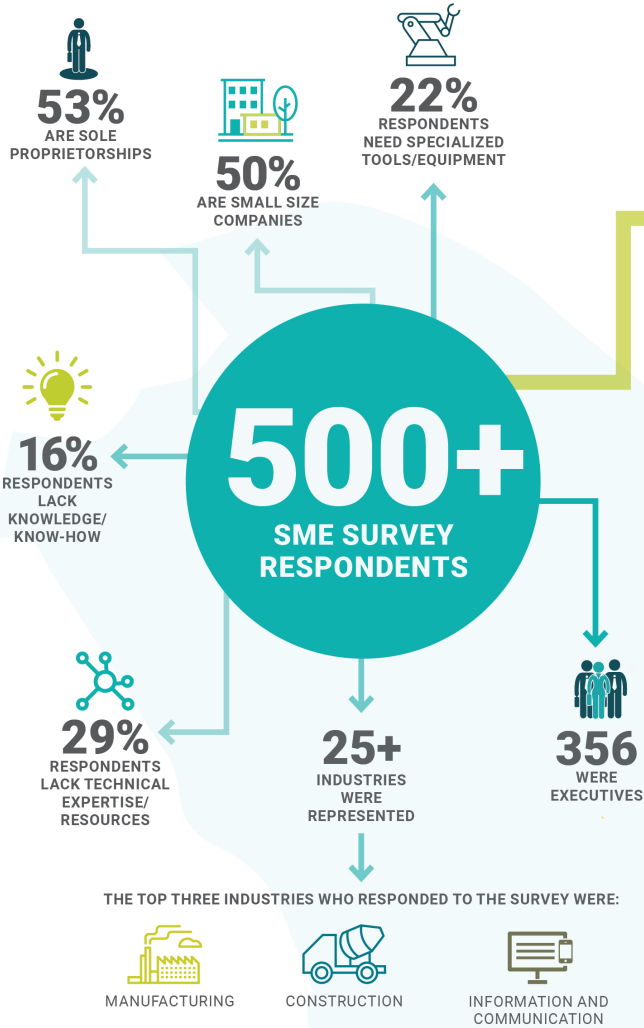
The three main outcomes of the KAUST SME Survey are identifying opportunity gaps related to SME participation in R&D, innovation services, and professional development.

**To ensure a significant sample, the team started with 300 SMEs; 491 SMEs ultimately participated in the survey.**

SMEs are profit driven and may not be able to sustain the longer pace large enterprises can to engage in R&D. Many of these companies are family based or sole proprietorships, especially the small and micro businesses. In contrast, medium-sized companies want to innovate and expand their customer base through the development of new products and services.

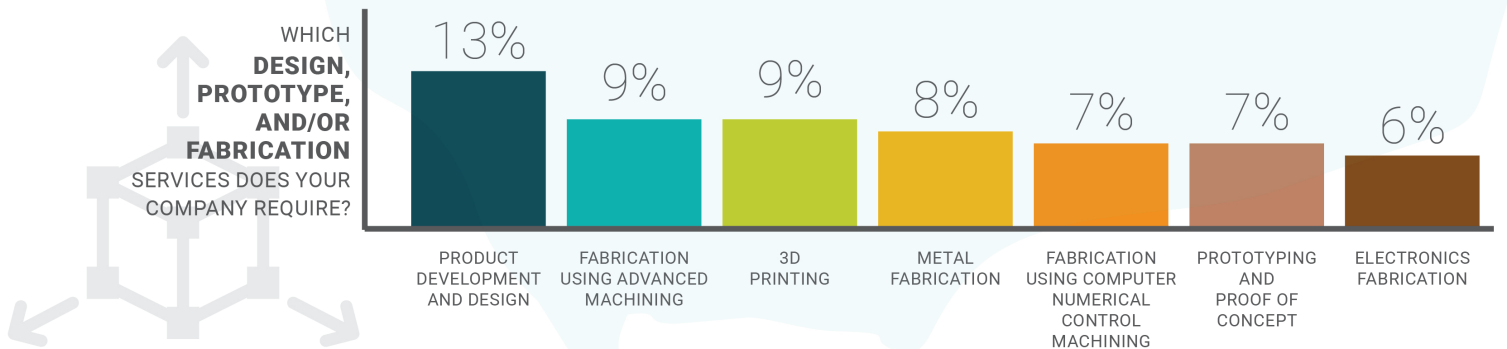
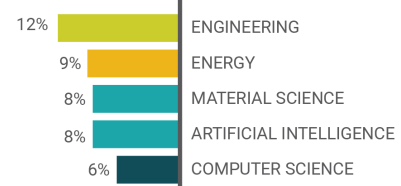
Finally, to pursue better programs and support services, the university developed the KAUST SME Engagement Model (Figure 1). This model will help KAUST to support the Kingdom's SME sector, focusing on the identified opportunities and gaps. The model also assumes outcomes and impact resulting from its implementation. These outcomes and impacts may not emerge immediately, but they will become obvious in the long term.

# INFOGRAPHIC

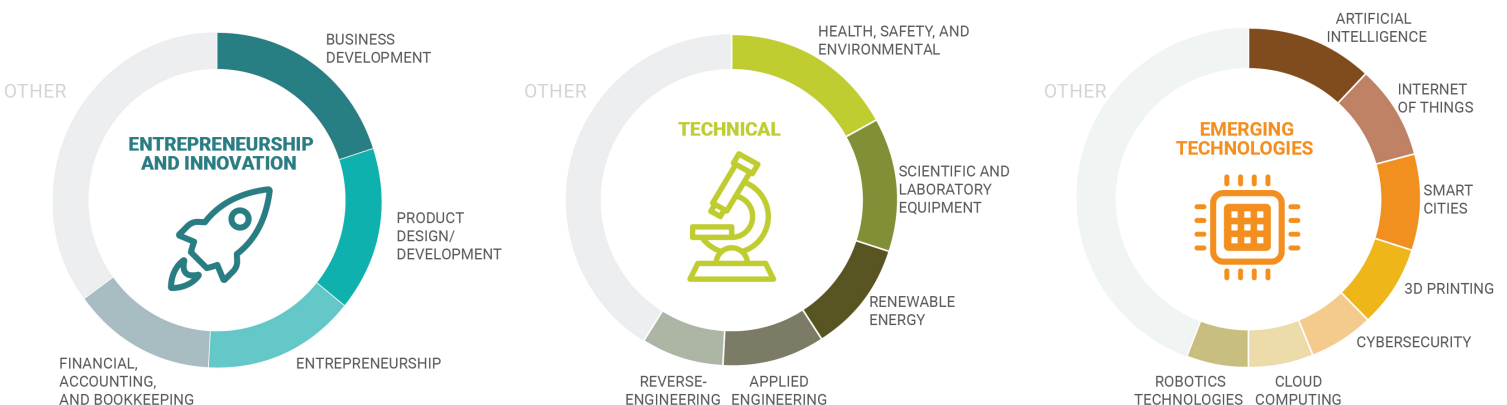


**“YES”**  
**76%**  
SMES ARE INTERESTED IN COLLABORATING WITH KAUST TO ADDRESS THEIR TECHNICAL CHALLENGES

SMES ARE INTERESTED IN THE FOLLOWING RESEARCH AND DEVELOPMENT SERVICES



WHAT TYPE OF PROFESSIONAL DEVELOPMENT OR TRAINING SERVICES IS YOUR COMPANY INTERESTED IN?





جامعة الملك عبد الله  
للعلوم والتقنية  
King Abdullah University of  
Science and Technology

INNOVATION  
AND ECONOMIC  
DEVELOPMENT

[sme@kaust.edu.sa](mailto:sme@kaust.edu.sa)