

SESHA / Vichara Partners Proposal to Multiple Stakeholders:

A Strategic Plan to Develop the Next Generation of an EHS Workforce for High-Technology Industries

(Living Document Version 1.1, Updated November 25, 2019)

A copy of this document is available here: → www.vicharapartners.com/workforce-development/

Executive Summary

Workforce development issues appear to be jeopardizing the high-tech industry's future abilities to address environmental, health, and safety (EHS) risks, as well as related risks associated with sustainability, social responsibility, and regulatory compliance. To address these fundamental challenges, the professional society, SESHA, in concert with the sustainable business advisory group, Vichara Partners, proposes a sixteenth month collaboration with a wide variety of stakeholders. The vision of the SESHA / Vichara initiative is to support and to encourage the diverse array of organizations that serve EHS professionals in various high technology industries to create formal partnerships with each other. These organizations include professional societies, industry associations, academia, research institutions, government agencies, and civil organizations. The expanded vision is that these partnerships will serve to address the long-term development of the next generation of a competent workforce able to manage EHS and sustainability risks for these industries.

As part of the short-term engagement, Vichara Partners and SESHA will devote the necessary internal resources to coordinate the creation of a multi-organization, multi-year strategic plan to address EHS workforce development issues for the high-tech sector. The publication of this strategic plan is envisioned in April 2021.

As part of this initiative, Vichara Partners and SESHA pledge to coordinate the following four key deliverables:

1. Survey: Development and Administration of Confidential Surveys on EHS Workforce Trends
2. Discussion: Workforce Development Workshop & Keynote Roundtable at SESHA 2020 Symposium
3. Committee: Formation and Facilitation of Multi-Organization Committee + Task Forces
4. Strategy: Creation of a Strategic Plan to Address EHS Workforce Development

Vichara Partners and SESHA are currently undertaking an extensive outreach campaign to engage multiple stakeholder organizations and to invite them to participate in this initiative. Your organization is officially invited to join us.

A description of the workforce development problem, a vision of how to address the talent shortage, and a detailed discussion of the deliverables are provided below. If you or your organization would like to participate, please contact Nikole Reaksecker at nikole@vicharapartners.com.

Introduction and Problem Statement

Development of a robust EHS workforce for the electronics and related high technology industries began in the 1970s. In the early days, occupational safety was the primary focus. Through time, EHS professionals expanded their duties to include industrial hygiene as well as larger environmental issues. By 2000, the “EHS” profession was well codified within the broader electronics sector. Sustainability, corporate social responsibility, and regulatory concerns became prominent at the turn of the century with most EHS professionals simply expanding their corporate roles to include these topics. Due to the hard work of dedicated professionals, EHS efforts within the electronics industry have been extremely successful, resulting in safer, more sustainable, responsible practices throughout these product sectors.

Notwithstanding this success story, workforce development issues appear to be jeopardizing the industry’s future abilities to address environmental, health, and safety (EHS) risks. Most EHS professionals in the industry came of age between 1975 and 2005. Many of these professionals are now entering their retirement years. Shifting demographics and an aging workforce have resulted in a shortage of talent. A confluence of factors contributes to the difficult task of attracting and retaining talent. Younger generations are attracted to more popular companies that are more in-line with the trends of their age group, perceiving corporations focused on manufacturing as uninteresting and outdated. While much of the design of high-tech products occurs in the United States, globalization moved a lot (if not most) manufacturing overseas resulting in a gap in understanding how products are produced and a lack of understanding of the importance of fundamental technologies. To further complicate matters, a highly technical industry demands graduates with strong backgrounds in science, technology, engineering and math (STEM) fields. Rapid technology changes require new skills and talents. And, the industry faces stiff competition from many other industries in the fight for talent. Unfortunately, there does not appear to be a steady stream of younger professionals entering the electronics industry space, portending a bleak future for the industry. Despite these dire circumstances, broad-based solutions to bolster EHS workforce development in high-tech manufacturing is lagging.

Most EHS professionals are concerned about proximate risk as measured in hazard and exposure. The most prominent risks focus on chemical, biological, mechanical, ergonomic, laser and related physical hazards where it is possible to establish more clear relationships between the exposure and the harm to workers, communities, end-users and the larger environment. In the early decades of the high-tech space, the collective labor pool of EHS professionals was extremely successful in understanding these proximate risks and in creating corporate programs to manage and mitigate the risks.

Due to their collective success, EHS professionals in the late 1990's were able to turn their attention to more complicated issues. Many of these EHS professionals became the environmental management, sustainability, social responsibility, supply chain, and regulatory compliance professionals of the 2000s. While these professionals formed the backbone of the EHS field, there was also a need for newer professionals to join industry to focus on these non-proximate risks, and many new university and professional educational training centers emerged. Many of the professionals that entered the field in the 2000s do not consider themselves EHS professionals, but many do. The ones that do not are typically not trained in the foundational academic fields necessary to understand and address proximate risks. Instead, they are trained in the broader fields of organizational management, supply chain management, economics, and labor protection. It is clear there is a need for all these types of professionals, as they individually assess differential risks to industry.

If you look at the larger pool of professionals in the workforce today, most conventional EHS professionals in the high-tech space are between 45 to 70 years of age, with an average age in the late 50s. Professionals addressing the broader range of non-market risks are much younger. The average age of these professionals is in the late 30s. These trends make sense when you look back on the history of the high-tech industry between the 1970s and the present day.

The pending retirement of EHS professionals focused on proximate risks is troubling as many of the younger professionals addressing broader, non-market risks have minimal training on how to address physical hazards. While non-market issues are critically important for industry to address, the loss of professionals with a deep understanding in physical and biological risk management undermines the foundation on which all corporate risk management is built.

Many collective organizations that serve EHS professionals in these industries have adapted to the changing times, expanding the scope of their mission and broadening their charters. For example, in the 2000s, the professional society, SESHA created partnerships to expand its scope to include non-market concerns. Other organizations adopted similar changes to address the changing times.

Nonetheless, the problem remains, as most organizations do not have an explicit focus on EHS workforce development. While several organizations have EHS training programs, workforce development is typically not part of the vision. One of the challenges for organizations, such as SESHA, is that the association is composed of EHS professionals with little or no formal expertise in workforce development.

Problem Statement: The lack of a robust EHS workforce development plan represents a threat to the industry. Many of the organizations at the center of the EHS world for high tech industries, including SESHA, do not possess the internal expertise to understand and find solutions to this vexing issue. Even if these organizations held the expertise, they lack the strong organizational partnerships necessary to address the workforce development problem at a fundamental level.

Vichara Partners is currently working to create an expanded problem statement document that provides a deeper dive into the supply and demand of the EHS workforce in the high-tech sector. We expect this document to be available for download and feedback in early December. When published, the expanded document will be available here: → www.vicharapartners.com/workforce-development/.

Vichara Partners’ Initial Vision to Address This Problem – Four Key Deliverables

To address this problem, Vichara Partners is offering to assist SESH A in the creation of a workforce development strategic plan which is comprehensive enough to address the fundamental obstacles facing the industry, but also pragmatic enough to be implementable. Vichara Partners will assist in coordination of the creation of the plan by conducting an assessment of the state of the profession, by bringing together stakeholders from other organizations, and by taking the lead in facilitating a series of important conversations.

As a starting point for the creation of the strategic plan, Vichara Partners proposes three different activities: surveys to assess the situation, a series of discussions to explore solutions, and the formation of a multi-stakeholder committee to further develop alternatives. To create a robust strategic plan, the committee would be comprised of volunteers from SESH A as well as a wide array of other organizations.

In late October, Vichara Partners received formal approval from the SESH A Board of Directors to proceed. Preliminary outreach to stakeholders and construction of the survey is occurring now. Survey administration would commence in January 2020. The workforce development committee would launch at the SESH A 2020 Symposium taking place in Scottsdale, Arizona (USA) the week of April 13, 2020. Work on the strategy would begin in May 2020 and be finalized by April 2021. In summary, Vichara Partners will provide coordination assistance to SESH A and the larger multi-organization committee as follows:



Scope of the Proposal

Vichara Partners believes that the scope of this proposal to address workforce development issues needs to be focused enough to be implementable, but broad enough to address the fundamental obstacles facing industry. To achieve this end, Vichara proposes the following focus areas:

Focus Area # 1: United States

Vichara Partners appreciates that all workforce development issues should be viewed through the lens of the global workforce. However, in practical terms, immigration is still somewhat restricted globally and hence does

not represent a simple solution to attracting a more robust workforce. As a starting point, Vichara Partners proposes that the workforce development proposal focus on labor in the United States.

Focus Area # 2: EHS and Related Risks

This proposal is NOT focused on the creation of a larger workforce necessary for the high-tech sector. The focus is on the traditional areas that have been the bread and butter of SSHA, namely Environmental, Health, and Safety (EHS) along with other issues, such as sustainability, social responsibility, supply chain management, and regulatory compliance. The most troubling challenge is the loss of traditional EHS experts trained in hazard management.

Focus Area # 3: EEE-Manufacturing, Products, and Reliant Services

To help define the scope of this proposal, Vichara Partners suggests limiting the industries considered to companies that utilize and/or make high technology components, assemblies, products, and/or systems that contain “electronic and electrical equipment” or EEE.

Traditionally, EHS concerns about the use of semiconductor *products* were not considered critical, as most of the EHS hazards reside in manufacturing and not in the use of the IC product. As the world has globalized, manufacturing for semiconductors (and the larger category of EEE) shifted from the United States to Asian countries. While some semiconductor manufacturing still occurs in the United States, many U.S. based companies are now solely focused on design and product-related concerns, remaining somewhat neutral about manufacturing concerns. To ensure the needs of the U.S. workforce are addressed, Vichara Partners recommends that both manufacturing and product related EHS concerns be included in the scope of the proposal.

Lastly, because many U.S. based high-tech companies rely heavily on the use EEE-related products either for the services they provide or for the design and manufacturing of non-EEE-related products, Vichara suggests that the scope of the proposal also focus on EEE-reliant services.

A Starting Point for Discussion

In summary, the scope of the proposal is limited to:

- United States
- EHS, Sustainability, Social Responsibility, and Regulatory Compliance
- EEE-Manufacturing, EEE-Products, and EEE-Reliant Services

Vichara Partners proposes that these three scope statements be the starting point for deliberations by the multi-organization committee described below with the caveat that the committee may want to expand or limit the scope to address fundamental obstacles facing the industry vis-à-vis workforce development.

Possible Collaboration Partners

Vichara Partners believes that to truly address the development of the next generation of a vigorous EHS workforce, a wide array of institutions must work together. Vichara Partners categorizes possible partners into the following five groupings: Professional Societies, Industry Associations and Consortia, Universities and Academic Centers, Applied Research Institutions, and Government Agencies.

Each of these categories of institutions will be able to address portions of the workforce development puzzle. In the table below, Vichara Partners lists several potential collaborators. While this table is fairly comprehensive, many other organizations could be added, and it will be necessary to be selective in determining which relationships to pursue.

In concert with SSHA, Vichara Partners is currently engaging individuals associated with these organizations, seeking their expertise and, as appropriate, inviting their assistance with the survey. These organizations are also being asked to attend various events which are proposed to take place at the SSHA 2020 Symposium, taking place in Scottsdale, Arizona the week of April 13. Finally, these organizations could volunteer to assist a multi-organization committee operating under the auspices of SSHA that is charged with creating a strategic plan.

POTENTIAL WORKFORCE DEVELOPMENT PARTNERS	
<p>Professional Societies</p> <ul style="list-style-type: none"> • American Society of Safety Professionals (ASSP) • American Industrial Hygiene Association (AIHA) • Institute of Electrical and Electronics Engineers (IEEE) • National Assoc. for Environmental Management (NAEM) • Society of Women Engineers (SWE) • National Society of Black Engineers (NSBE) • National Center for Women & IT (NCWIT) • Society of HR Management (SHRM) • National Association of Workforce Development Professionals 	<p>Industry Associations & Consortia</p> <ul style="list-style-type: none"> • Semiconductor Industry Association (SIA) • Responsible Business Alliance (RBA) • IPC • Information Technology Industry Consortium (ITI) • SEMI and Affiliated Partners (FOA, MSIG, etc.) • American Chemistry Council (ACC) • Global Semiconductor Alliance • National GEM Consortium • National STEM Collaborative • STEMconnector
<p>Universities & Academic Centers</p> <ul style="list-style-type: none"> • M.I.T. • University of Maryland • Texas A&M • University of Kansas • NCWIT Academic Alliance Members • California Alliance for Graduate Education • Tufts Center for STEM Diversity • ASU Center for Gender Equity in Science & Technology • USC STEM Education Pipeline Consortium 	<p>Applied Research Institutions</p> <ul style="list-style-type: none"> • SUNY Polytechnic Institute • Semiconductor Research Corporation • ASCENT at Notre Dame • ADA at University of Michigan • CRISP at University of Virginia • CONIX at Carnegie Mellon • CBRIC at Purdue • ComSenTer at UCSB • Sustainability Leaders Network

POTENTIAL WORKFORCE DEVELOPMENT PARTNERS

Government Agencies

- U.S. Dept. of Labor Employment & Training Administration
- National Science Foundation
- National Institute of Standards & Technology
- National Science & Technology Council
- State & Local Workforce Development Boards
- State Departments of Education
- Regional / Local Offices of Economic Development

It is important to remember that collaboration on the plan should not be limited to EHS professionals since most EHS professionals have little or no formal training in workforce development. The voices of specialists in labor and human resources should be included in the conversation as they provide valuable insight into how best to structure workforce development programs and can aid in the implementation of the strategic plan.

To ensure a well-crafted plan, we recommend that the committee be comprised of volunteers from SESH, representatives from trade and industry associations, professional societies, academia, research institutions and government.

Deliverable # 1 – Survey Dissemination, Collection and Analysis

While anecdotal information on EHS workforce development trends exists, further research and evaluation of the subject is warranted. Therefore, as a starting point to better understand the extent of the problem, Vichara Partners will take the lead in developing, administering and analyzing a set of confidential surveys. The surveys will be crafted with input from the SESH board as well as leaders in the environmental field along with representatives from other relevant organizations.

The first assessment is an online survey distributed to EHS professionals working within the electronics industry. This confidential survey will pose questions regarding demographics, education level/expertise, capabilities and skills sets required, and future trends in EHS. The intent of this survey instrument is to capture information based on personal experiences and to set a baseline for the knowledge, skills and expert required within the industry.

The second assessment will be conducted via an online survey as well as interviews of a select number of representative companies. This survey will be distributed to HR professionals within the electronics sector and will be designed to capture broader trends within the industry and steps taken to fill the talent gap.

To ensure that the surveys are well-crafted and reach a wide range of respondents, Vichara Partners will conduct outreach to and engage several stakeholders starting in mid-November 2019 with the goal of finalizing and administering the survey by January 1. The survey will close on March 31. Results will then be analyzed, and a report will be written. Findings will be presented at SESH's 2020 Symposium.

Vichara Partners is currently working to create the first draft of these survey instruments, which will be available for download and feedback on November 30. The surveys will be posted at:

→ www.vicharapartners.com/workforce-development/.

Deliverable # 2 – Discussion and Assessment

Vichara Partners appreciates that dialogue and discussion are excellent starting points for the engagement that would be necessary for the creation and implementation of a strategic plan focused on workforce development. The assessment that emerges from dialogue can be used as a launching point for any plan.

In the second (and concurrent) phase of the project, preliminary conference calls and online discussions with potential partners will occur from November 2019 through April 2020. We plan to use these interactions with potential partners as an opportunity to refine the survey, to gauge interest in participating in an ongoing committee to craft the strategic plan, and to leverage their membership bases for survey distribution.

In terms of outreach to the broader community, Vichara Partners proposes two sets of dialogue opportunities – an online engagement initiative and a series of in-person meetings at the SSHA Symposium. Using various LinkedIn communities, Vichara Partner will work with SSHA to start an online discussion that generates interest and participation in the survey, soliciting the community’s thoughts on best practices for ensuring knowledge transfer and business continuity. The online dialogue will mainly take place between November 2019 and April 2020.

The SSHA Symposium taking place the week of April 13, 2020 will be the epicenter of the workforce development discussion. Vichara Partners proposes two different symposium events as follows:

1. Workforce Development Interactive Dialogue Workshop on Monday, April 13: Vichara Partners will invite participants from potential partner organizations and a select list of other interested stakeholders to join the workshop. During the workshop, Vichara Partners (in concert with workforce development experts) will coordinate a set of interactive roundtables and breakout sessions to better understand the issue and to generate potential solutions.
2. Committee Decision-Making Session on Tuesday, April 14: On the afternoon of April 14, Vichara Partners proposes holding an invitation-only breakout session to solicit participation in an on-going committee to develop an EHS workforce development plan. During the session, Vichara Partners will officially create the Workforce Development Committee, securing commitments to participate, establishing a preliminary meeting schedule and outlining an initial scope of work. Because it is important to ensure a cohesive team, we request that any organization or individual that would like to participate on the committee become a member no later than July 1, 2020.

Within two weeks of the symposium, Vichara Partners will write a summary report of the discussions occurring during SESH 2020 and a press release announcing the creation of the EHS Workforce Development Committee.

NOTE: The SESH Symposium takes place over the course of five days between April 13 – 17, 2020 and attending the Symposium requires registration fees. This invitation to attend the April 13 workshop and the April 14 decision-making session does NOT entitle you or your organization to attend the entire Symposium free of charge. The free workforce development invitation is only for the two events mentioned above. More information about the SESH Symposium is located here: → www.sesha.org/meetings/2020/index.php.

Deliverable # 3 – Committee Creation and Deliberation

Although the Workforce Development Committee will be officially created on April 14, the real efforts will take place starting May 1 when the Committee will officially decide its scope and schedule. Over the course of the next year, Vichara Partners will coordinate and facilitate committee and task force meetings as appropriate, helping to guide the conversations towards solutions that are actionable and enlisting support from participants. We will assist the Committee as it deliberates and creates a strategic plan for EHS workforce development. While it is not yet known how often the Committee will meet, Vichara Partners can host as many as one to two conference call meetings per month.

Deliverable # 4 – Strategic Plan Development

Vichara Partners will work closely with the Committee to develop a draft to be distributed for comments and feedback. Our aim is to have a rough draft of the strategic plan no later than January 1, 2021 so that there is adequate time to incorporate feedback into the final plan. Once comments are received, we will work with the Committee to address any feedback and to finalize the document no later than April 1, 2021 so that it may be presented at the SESH 2021 Symposium. The *execution of the strategic plan* is beyond the scope of this proposal.

Note About Costs

Please note that these collective efforts should be considered a voluntary, pro-bono effort on your part. Unfortunately, we do NOT have the budget to pay the expenses incurred by your organization, including time and travel expenses. Vichara Partners and SESH volunteers are undertaking all efforts on a pro-bono basis with no expectation of reimbursement or remuneration.

Vichara Partners envisions that there may be a time when the Committee launched in April may need funds to pay for routine expenses and outside expert assistance. Allocation of funds will be decided by the Workforce Development Committee. Should your organization want to assist in covering a portion of these collective expenses, please let us know. SESH is currently looking into creating a fund to accept your donations. As a non-

profit organization, SSHA has a fiduciary responsibility to account for and manage these funds wisely. Any donations will be spent solely on workforce development issues.

Workforce Development as the Starting Point for Broader Collaboration

Vichara Partners appreciates that this workforce development issue has the potential to bring together institutions which normally do not work together but should. Workforce development could be the starting point for broader collaboration amongst organizations that exist to serve others.

December 2019 Conference Call Meetings to Learn More

Vichara Partners has scheduled several one-hour conference call meetings in December 2019 for stakeholders to better understand this workforce development initiative and to signal their intention to participate. Each of the six meetings are identical and we urge you to join any one of these. [It's not necessary to join more than one.]

- Monday, December 2 at 10:00 AM PST | 1:00 PM EST
- Thursday, December 5 at 5:00 PM PST | 8:00 PM EST
- Tuesday, December 10 at 3:00 PM PST | 6:00 PM EST
- Friday, December 13 at 7:00 AM PST | 10:00 AM EST
- Monday, December 16 at 1:00 PM PST | 4:00 PM EST
- Wednesday, December 18 at 9:00 AM PST | 12:00 PM EST

To join the conference call meetings, please use the following access details:

- Web: <https://www.gotomeet.me/VicharaPartners>
- Phone: +1.646.749.3112 | Access Code: 549.227.005

If additional meetings are necessary in late December 2019 or early January 2020, a list of these meetings will be made available here: → www.vicharapartners.com/workforce-development/.

Action Items Suggested of Partner Organizations

As mentioned above, this EHS Workforce Development Initiative is envisioned to be a multi-organization effort. Your organization is being formally invited to participate. While each organization may have a different scheme for partner engagement, please consider undertaking the following action items:

1. Determine the value of addressing this workforce development challenge to your organization.
2. Make an organizational decision to work on this collective effort (and inform us).
3. Provide feedback on this “living document” proposal for improvement.

4. Provide feedback on the draft survey instrument for improvement.
5. Assist in the distribution of the survey to your constituencies.
6. Make yourself available for interviews with Vichara Partners to provide your perspective.
7. Attend the SESHAsymposium workforce development events between April 13 – 14, 2020 in Arizona.
8. Commit to participating on the multi-organization Committee charged with creating the strategic plan.

SESHA and Vichara Partners looks forward to working with your organization on this grand collaborative effort to address EHS workforce development issues for high-tech industries. We assume that these collective efforts will make all our organizations more effective, efficient, and sustainable. We welcome your active participation!

About SESHAs

In 1978, nine safety and health professionals for the semiconductor industry met to exchange information on corporate best practices for risk management. The value of sharing information, forming relationships with peers at other companies, and building comradery was clear and SESHAs was formed.

In the forty years since, SESHAs has become the pre-eminent professional society for over 1,000 EHS professionals working in the high-tech space. The organizations' annual conference is attended by over 250 professionals representing virtually all high technology disciplines. SESHAs provides value to individual and corporate members through education and professional development. Additional information about SESHAs is located on-line at: → www.sesha.org.

About Vichara Partners

Vichara Partners is a sustainable business advisory group launched in October 2018. The founders of Vichara Partners, Sanjay Baliga and Nikole Reaksecker, jointly possess over 50 years of professional expertise in EHS, sustainability, social responsibility, supply chain management, and regulatory compliance.

For more than a decade before creating Vichara Partners, Baliga was Director of Sustainable Manufacturing at SEMI, the global industry association and its affiliated partner associations, including: the Fab Owners Alliance (FOA), the FlexTech Alliance, the MEMS and Sensors Industry Group (MSIG), the Electronic System Design Alliance (ESD Alliance), the PV Group, the High Brightness LED Group, and the Flat Panel Display Group. During these years, Baliga worked with more than 2,000 companies around the world to address EHS risks in manufacturing. From 2009 to 2017, Sanjay Baliga served on the National Board of Directors for SESHAs and strongly believes in the organization. He has a profound desire to help SESHAs, as well as all other related collective-action organizations to grow and expand their services to make the world a better place. His significant knowledge of the electronics sector and his extensive contacts within the industry can be utilized to support SESHAs as it seeks institutional partners to address workforce development issues for the industry.

From 2012 to 2018, Nikole Reaksecker served on the board of the Women’s Environmental Network (WEN). Reaksecker is passionate about providing professional development opportunities for women working in the environmental field, increasing the diversity and inclusivity of workplaces, and improving STEM education. She has extensive experience in the education field and has even participated on a committee crafting career technical education curriculum standards for the utility sector.

To learn more about Vichara Partners, please visit: → www.vicharapartners.com.

Contact Information for Key Players Working on the EHS Workforce Development Initiative

The Founders of Vichara Partners coordinating the initiative are:

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Governing Officials of SESH can be contacted at:

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